U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 78-8-534

CHILTON METAL PRODUCTS
CHILTON, WISCONSIN

OCTOBER, 1978

I. TOXICITY DETERMINATION

A health hazard evaluation was conducted by the National Institute for Occupational Safety and Health (NIOSH) on December 14, 1977, April 18, and May 18, 1978, at Chilton Metal Products in Chilton, Wisconsin. Breathing zone and general area samples were taken for benzene, toluene, xylene, VM&P naptha, butyl alcohol, sec-butyl alcohol, 2-butoxyethanol, chlorodifluoromethane, lead, carbon monoxide, methyl acetylene-propadiene(MAPP gas), propane, and oxides of nitrogen. Concentrations of carbon monoxide, in three area samples and twelve personal samples, exceeded the evaluation criteria. The concentrations of carbon monoxide as they existed during the time of this evaluation, constitute a health hazard to the workers involved. Recommendations have been offered in this report to reduce the exposure of employees to this substance.

The NIOSH industrial hygienists and medical investigator were also informed by employees of an intense red flushing of the head and neck when drinking alcohol after working with MAPP gas at the plant. This syndrome was reported to the NIOSH Industrial Hygienists on the initial survey of the plant, and was later characterized in more detail by the NIOSH medical investigator on a follow-up visit. Recommendations have been offered in this report regarding possible future studies by NIOSH.

II. DISTRIBUTION AND AVAILABILITY

Copies of this Determination Report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After ninety (90) days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from the NIOSH Publications Office at the Cincinnati, Ohio address.

Copies of this report have been sent to:

a) Chilton Metal Products
b) Authorized Representative for Employees, International

Association of Machinists and Aerospace Workers
c) International Association of Machinists and Aerospace Workers, Local 2185
d) U.S. Department of Labor - Region V
e) NIOSH - Region V

For the purpose of informing the 300 affected employees, copies of the report shall be posted in a prominent place accessible to the employees 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 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 a request from an authorized representative of employees regarding exposure to potentially toxic substances at the Chilton Metal Products Plant in Chilton, Wisconsin.

IV. HEALTH HAZARD EVALUATION

A. Plant Process

Chilton Metal Products is basically a job shop type operation, capable of producing a multitude of plastic and metal products. Thus a specific description of the plant processes is difficult, due to the fact that the plant has the capability of changing a process completely overnight, and is best described in general terms.

Polyethylene, ABS, polypropylene, acetal, nylon, and polystyrene plastics are used in an injection molding operation to make a variety of products including lawn sprinklers, lawnmower parts, and gasoline tanks.

Coiled metal stock is used by the plant to produce various metal products with a majority of the metal being used for the production of lawnmower housing, gasoline tanks, and small pressurized gas storage bottles. Lawnmower housings are stamped out by a press, have various flanges spot welded on, and boxed for shipment. Metal gasoline tanks are stamped out by a press, cleaned, fluxed, soldered, flux neutralized, dried, and boxed for shipment. Gas bottles are stamped out by a press, cleaned and phosphatized, copper brazed, painted, filled with various gases, and tested. Bottles that are to be filled with propane, Freon-22, and MAPP gas are taken to a separate building to accomplish the filling and testing process. The gas bottles or cylinders

are used with portable gas torches and as automobile spare tire inflators.

All the brazing ovens, soldering and fluxing stations, parts washers, paint spray booths, and one of the two bottle filling stations were enclosed and exhaust ventilated.

B. Evaluation Design

An initial survey was conducted on December 14, 1977. The NIOSH Regional Industrial Hygienist made a complete walk through of the entire plant, accompanied by management and union representatives. About 20 of the employees were given nondirected interviews to determine if they had experienced health problems as a result of their work place exposure. Those interviewed made complaints such as; "nasal congestion," "throat and eye irritation," "bad smell," "skin problems," etc. Also, 10 of the employees from the propane building complained of an intense red flushing of the face and neck when drinking alcohol after working with MAPP gas at the plant. Levels of carbon monoxide were measured by detector tubes and indicated a need for further investigation. Material safety data sheets on the substances used in the plant were obtained from the plant safety director and plant manager.

On April 18-20, 1978, an environmental follow-up survey of the plant was conducted by NIOSH Investigators to further assess the potentially toxic substances. The plant has the capability of running hundreds of different products according to customer specifications, so sampling had to be limited to the products or processes run most frequently or complained about the most. Personal breathing zone and general area atmospheric samples were taken at the electrostatic paint booths for lead, butyl alcohol, sec-butyl alcohol, 2-butoxy ethanol, benzene, toluene, xylene, and VM&P naptha. The entire plant was also sampled, both personal and general area, for carbon monoxide. The propane building was sampled for propane, oxygen levels, and chlorodifluoromethane. On May 18, 1978 the propane building was checked for levels of methyl acetylene - propadiene gas, and a NIOSH physician also interviewed employees in an effort to better characterize the red flushing syndrome of the head and neck.

C. Evaluation Methods

Breathing zone and general area atmospheric samples for benzene, toluene, xylene, VM&P naptha, butyl alcohol, sec-butyl alcohol, 2-butoxy ethanol, and chlorodifluoromethane (area samples only) were collected on organic vapor charcoal sampling tubes using portable battery powered sampling pumps operating at

approximately 200 cubic centimeters (cc) per minute. The sampling train for chlorodifluoromethane (freon-22) utilized two charcoal tubes in series instead of only one charcoal tube. Samples were analyzed by gas chromatography.

Atmospheric samples for lead were collected on 37 millimeter mixed cellulose ester membrane filters using battery powered gravimetric pumps operating at a flow rate of 1.5 liters per minute (lpm). Samples were analyzed by atomic absorption spectrophotometer.

Carbon monoxide was monitored in the plant with a portable direct reading CO analyzer (Ecolyzer(R) Model 2400) equipped with recorders. Personal samples for CO were taken using Drager(R) long term detector tubes and portable battery powered sampling pumps operating at approximately 20 cubic centimeters per minute. It should be noted, that at the present time NIOSH is not certifying long term detector tubes for accuracy. Mention of commercial names or products does not constitute endorsement by NIOSH.

Atmospheric concentrations of oxygen, propane, and methyl acetylene - propadiene were monitored using portable direct reading instruments.

D. Evaluation Criteria

In order that workers may better understand the potential health hazards associated with the chemical substances evaluated during this study, the following discussion is provided.

Benzene -- there is strong evidence that benzene can cause progressive malignant disease of the blood-forming organs. Benzene can also result in central nervous system depression and skin irritation. NIOSH recommends a ceiling value of 1 part per million (ppm) for benzene. A ceiling value is a concentration that should never be exceeded.(1) The permanent OSHA standard for benzene, which was to have become effective March 13, 1978, is 1 PPM for an 8 hour TWA, with 5 PPM as a maximum peak above the acceptable ceiling for a maximum duration of 15 minutes.(2)

Toluene -- the major problem of toluene is its narcotic effects on workers. Symptoms and signs of these narcotic effects are experienced in the form of muscular weakness, incoordination, and mental confusion. NIOSH recommends that no worker be exposed to a concentration greater than 100 ppm determined as a time - weighted average (TWA) exposure for up to a 10-hour workday, 40-hour workweek.(3) The OSHA standard is 200 ppm.(4)

Xylene -- the major problem of xylene is its narcotic effects on workers. Symptoms and signs of these narcotic effects are experienced in the form of muscular weakness, incoordination, and mental confusion. NIOSH recommends that no worker be exposed to a concentration greater than 100 ppm determined as a time - weighted average (TWA) exposure for up to a 10-hour workday, 40-hour workweek.(5) The OSHA standard is 100 ppm. (4)

VM&P Naptha -- exposure to VM&P naptha may cause throat and eye irritation, hyperactivity, and cyanosis if concentrations are high. NIOSH recommends an exposure limit of 350 mg/cubic meter (TWA). (6)

Butyl Alcohol -- overexposure may cause irritation of the eyes, nose and throat, headache, dizziness, drowsiness, and blurred vision. Prolonged skin exposure may cause drying and cracking of the skin. NIOSH recommends an exposure limit of 100 ppm (TWA).(7) The OSHA standard is the same.

sec-Butyl Alcohol -- overexposure may cause irritation of the eyes, nose and throad, headache, dizziness, drowsiness, blurred vision. Prolonged skin exposure may cause drying and cracking of the skin. NIOSH recommends an exposure limit of 150 ppm(TWA).(8) The OSHA standard is the same.

2-Butoxyethanol -- is an irritant to the eyes and upper respiratory system, and may cause hemolysis. Hemolysis is the separation of the hemoglobin from the red cells and its appearance in the plasma. NIOSH recommends an exposure limit of 50 ppm(TWA).(9) The OSHA standard is the same.

Lead -- lead intoxication (plumbism) may occur via inhalation, ingestion, and/or absorption through the skin; however, the latter method of exposure is rare. Once lead has entered the body, the blood transports the lead to the various body organs as well as depositing the lead in the skeletal system. Diagnosis of lead intoxication is difficult due to the lack of a specific sign or symptom. Symptomology of plumbism may include metallic taste in the mouth, loss of appetite, insomnia, nervousness, constipation or diarrhea, muscle tremors, weakening of the muscles(particularly those that raise the wrists and ankles), colic and loss of kidney function which may be irreversible. NIOSH recommends an exposure limit of less than 0.1 milligrams per cubic meter (TWA).(10) The OSHA standard is 0.2 milligrams per cubic meter (TWA).(4) However, there is a proposed OSHA standard of 0.1 milligrams per cubic meter (TWA).

Chlorodifluoromethane -- high atmospheric levels of chlorodifluoromethane may produce stimulation and then depression of the central nervous system. The American Conference of Governmental Industrial Hygienist (ACGIH) recommends that no worker be exposed to a concentration greater than the Threshold Limit Value (TLV) of 1000 ppm determined as a TWA exposure for a normal 8-hour workday or 40-hour workweek.(11)

Carbon Monoxide-- The symptoms of carbon monoxide poisoning include headache, nausea, vomiting, dizziness, drowsiness and collapse. CO exerts its harmful effect by binding with the blood hemoglobin forming carboxyhemoglobin. As a result, the hemoglobin is no longer able to transport oxygen to the cells of the body, causing tissue hypoxia. The intensity of the symptoms is dependent on the per cent of carboxyhemoglobin in the blood. Smokers usually have higher levels of carboxyhemoglobin than non-smokers (often 5 - 10% or more).(12) NIOSH recommends an exposure limit of 35 ppm (TWA) and a 200 ppm ceiling limit.(13) The current OSHA standard is 50 ppm.(4)

Propane -- the major problem with propane is it's safety and explosion hazard potential. The OSHA standard is 1000 ppm.(4)

Methyl Acetylene-Propadiene Mixture -- The literature does not indicate any significant toxicological effects from exposure to MAPP gas. However, it should be noted that the red flushing syndrome (previously noted in this report) may be a toxic property of MAPP gas which has gone undetected until now. The ACGIH recommends a TLV of 1000 ppm as a hygienic standard of good operating practice.(14)

E. Evaluation Results

Results from the personal breathing zone and area samples collected are shown in Tables 1-10.

On the days of the investigation (April 19-20, 1978) the levels of carbon monoxide in the shipping and receiving area, as indicated by Tables 1 and 2, were above the NIOSH evaluation criteria. Several of the personal samples taken for carbon monoxide, Tables 3 and 4, were also above the NIOSH evaluation criteria. It should be noted that the personal samples were taken with long term detector tubes, and that long term detector tubes are not being certified by NIOSH at this time. However, a comparison of the levels shown by the detectors tubes with a

calibrated direct reading instrument indicated that the detector tubes were accurate to within a few parts per million.

The two area samples taken for chlorodifluoromethane (FREON-22) were above the ACGIH recommended TLV of 1000 ppm. Both of the area samples should be considered as indicators of a potentially hazardous condition.

F. Recommendations

1) Employee exposure to carbon monoxide should be reduced to the lowest extent possible through conversion of gasoline powered lift trucks to LP gas and/or catalytic convertors, and engineering modifications of ventilation system.

2) A local exhaust ventilation system should be completed at both bottled gas filling apparatus. The hoods of the system should be designed with sufficient capture velocity to prevent gases from leaking bottles from escaping into the employees breathing zone.

3) The hoods on some of the present exhaust ventilation systems should be flanged. Flanging will increase the hood effectiveness and will usually reduce air requirements by 25%.(15)

4) NIOSH should further study the red flushing syndrome caused by exposure to MAPP gas. This could be accomplished by proceeding with the following suggestions offered by NIOSH medical investigator:

   A. Document the phenomenon in a human volunteer study similar to that done for trichloroethylene.

   B. Attempt to determine the metabolic fate of MAPP and develop a method for biologic monitoring of blood or urine levels to correlate with susceptibility to alcohol intolerance.

   C. Conduct animal experiments to determine the physiology of the apparent vasodilatory response to MAPP plus ethanol.

   D. Perform screening serum chemistries on MAPP-exposed workers to screen for other signs of organ damage.

V. REFERENCES

1. NIOSH Revised Recommended Standard for Occupational Exposure to Benzene, NIOSH, Cincinnati, Ohio (1976)

2. DOL/OSHA Permanent Standard for Occupational Exposure to Benzene: Title 29, Section 1910:1028 adopted February 2, 1978 - Effective March 13, 1978.

3. NIOSH Recommended Standard for Occupational Exposure to Toluene, NIOSH, Cincinnati, Ohio (1973)

4. Federal Register, Volume 39, No. 125, Title 29, Code of Federal Regulations, Part 1910, July 1977.

5. NIOSH Recommended Standard for Occupational Exposure to Xylene, NIOSH, Cincinnati, Ohio (1975)

6. NIOSH Recommended Standard for Occupational Exposure to Refined Petroleum Solvents, NIOSH, Cincinnati, Ohio (1977)

7. NIOSH/OSHA Draft Technical Standard, Standards Completion Program, Set E, n-Butyl Alcohol

8. NIOSH/OSHA Draft Technical Standard, Standards Completion Program, Set E, sec-Butyl Alcohol

9. NIOSH/OSHA Draft Technical Standard, Standards Completion Program, Set F, 2-Butoxyethanol

10. NIOSH Revised Recommended Standard for Occupational Exposure to Inorganic Lead, NIOSH, Cincinnati, Ohio (1978).

11. American Conference of Governmental Industrial Hygienists: Documentation of the Threshold Limit Values for Substances in Workroom Air, third edition, 1971, page 299.

12. Occupational Diseases, a Guide to Their Recognition, Revised Edition, DHEW(NIOSH) Publication No. 77-181 (June 1977).

13. NIOSH Recommended Standard for Occupational Exposure to Carbon Monoxide, NIOSH, Cincinnati, Ohio (1973).

14. American Conference of Governmental Industrial Hygienists: Documentation of the Threshold Limit Values for Substances in Workroom Air, third edition, 1971, page 154.

15. American Conference of Governmental Industrial Hygienists: Industrial Ventilation, A Manual of Recommended Practice, 14th edition, 1976, page 4-1.

VI. AUTHORSHIP AND ACKNOWLEDGMENTS

Report prepared by:

Charles Jeff Bryant
Regional Industrial Hygienist
NIOSH Region V
Chicago, Illinois

Originating Office:

Jerome P. Flesch
Chief, Hazard Evaluation and Technical
Assistance Branch
Cincinnati, Ohio

ACKNOWLEDGMENTS

Environmental Evaluation:

Stanley A. Salisbury
Regional Industrial Hygienist
NIOSH Region V
Chicago, Illinois

Richard S. Kramkowski
Regional Consultant
NIOSH Region V
Chicago, Illinois

Medical Evaluation:

Charles L. Wisseman, M.D.
Medical Officer
Medical Section
Hazard Evaluation and Technical
Assistance Branch
Cincinnati, Ohio

Report Typed By:

Elizabeth Richmond
Regional Secretary
NIOSH Region V
Chicago, Illinois

Laboratory Analysis:

Measurements Service Section
Measurements Support Branch
NIOSH
Cincinnati, Ohio

TABLE 1
RESULTS OF AIR SAMPLING FOR CARBON MONOXIDE WITH
AN ECOLYZER AND RECORDER

SHIPPING AND RECEIVING DEPARTMENT
CHILTON METAL PRODUCTS DIVISION
CHILTON, WISCONSIN
APRIL 19, 1978

TIME	AVERAGE CO CONCENTRATION(PPM)	PEAK CO CONCENTRATION(PPM)
09:30 - 10:30	70	100
10:30 - 11:30	53	95
11:30 - 12:30	41	82
12:30 - 13:30	64	100
13:30 - 14:30	72	100
14:30 - 15:30	69	100
Evaluation Criteria (NIOSH)	35	200

PPM = Parts of carbon monoxide per million parts of air by volume.

Table 2
RESULTS OF AIR SAMPLING FOR CARBON MONOXIDE WITH
AN ECOLYZER AND RECORDER

SHIPPING AND RECEIVING DEPARTMENT
CHILTON METAL PRODUCTS DIVISION
CHILTON, WISCONSIN
APRIL 20, 1978

TIME	Average CO Concentration(PPM)	Peak CO Concentration(PPM)
08:00 - 09:00	71	100
09:00 - 10:00	118	240
10:00 - 11:00	103	150
11:00 - 12:00	110	245
12:00 - 13:00	50	140
13:00 - 14:00	74	260
14:00 - 14:30	105	230
Evaluation Criteria (NIOSH)	35	200

PPM = Parts of carbon monoxide per million parts of air by volume.

TABLE 3
RESULTS OF AIR SAMPLING FOR CARBON MONOXIDE
WITH LONG TERM DETECTOR TUBES

CHILTON METAL PRODUCTS DIVISION
CHILTON, WISCONSIN
APRIL 19, 1978

Sample Number	Location	Job Classification	Time of Sample	Concentration(PPM)	Type of Sample
1	Spot Welding	Spot Welder	07:19 - 15:02	49	BZ
2	Soldering	Solderer	07:22 - 15:09	39	BZ
3	Line Throughout Plant	Lift Truck	07:26 - 13:25	62	BZ
4	Shipping & Receiving	----------	07:32 - 11:07	106	General Area
5	Shipping Dept.	Lift Truck Driver	07:36 - 15:12	76	BZ
6	Plastics Dept.	Machine Operator	07:41 - 15:16	43	BZ
7	Brazing Ovens	Bottle Inspector	07:44 - 15:17	49	BZ
8	Bottle Fill Area	Bottle Checker	07:48 - 15:19	44	BZ
9	Press* Room	Lift Truck Driver	07:50 - 15:20	25	BZ
10	Die Storage	Tool Maker	07:57 - 15:20	35	BZ
	Evaluation Criteria (NIOSH)			35	

PPM = Parts of carbon monoxide per million parts of air by volume
BZ = Breathing Zone
* = Electric lift truck being utilized

Table 4
RESULTS OF AIR SAMPLING FOR CARBON MONOXIDE
WITH LONG TERM DETECTOR TUBES
CHILTON METAL PRODUCTS DIVISION
CHILTON, WISCONSIN
April 20, 1978

SAMPLE NUMBER	LOCATION	JOB CLASSIFICATION	TIME OF SAMPLE	CONCENTRATION(PPM)	TYPE OF SAMPLE
11	Spot Welding	Welder	09:00 - 14:55	33	BZ
12	Soldering	Solderer	09:01 - 14:56	30	BZ
13	Shipping	Shipping Clerk	09:05 - 13:02	25	BZ
14	Throughout Plant	Lift Truck Driver:	09:06 - 15:00	72	BZ
15	Plastics Dept.	Injection Molder	09:24 - 15:07	47	BZ
16	Brazing Oven	Bottle Inspector	09:28 - 15:08	39	BZ
17	Press Area	Press Operator	09:44 - 15:44	42	BZ
19	Bottle Fill Area	Lift Truck Driver	09:48 - 15:13	64	BZ
		Evaluation Criteria(NIOSH)		35	

PPM = Parts of carbon monoxide per million parts of air by volume
BZ = Breathing Zone

TABLE 5
ATMOSPHERIC CONCENTRATIONS OF FREON-22 (Chlorodifluoromethane)

Chilton Metal Products Division
Chilton, Wisconsin
April 19, 1978

SAMPLE NUMBER	TYPE OF SAMPLE	TIME OF SAMPLE	FREON-22(PPM)
C-6 & C-7	Area sample at one foot from filling apparatus	13:04 - 15:01	3146
C-8 & C-9	Area sample at eight feet - from filling apparatus	13:05 - 15:01	2906
	Evaluation Criteria(ACGIH)		1000
	NIOSH Limit of Detection		0.01 mg/sample

PPM = Parts of Freon-22 per million parts of air by volume

TABLE 6
ATMOSPHERIC CONCENTRATIONS OF LEAD

Chilton Metal Products Division
Chilton, Wisconsin
April 19 and 20, 1978

SAMPLE NUMBER	LOCATION	JOB CLASSIFICATION	TIME OF SAMPLE	LEAD(ug/M3)	TYPE OF SAMPLE
A-1	Paint Booth	-------	08:21 - 14:58	39	General Area
A-2	Paint Booth	Assembler Painter	08:18 - 14:54	21	BZ
A-4	Paint Booth	Assembler Painter	08:28 - 14:46	12	BZ
A-5	Paint Booth	---------	08:25 - 14:49	13	General Area
		Evaluation Criteria (NIOSH)		100	
		NIOSH Limit of Detection		5 ug/Sample	

ug/M3 = micrograms of substance per cubic meter of air
BZ = breathing zone

TABLE 7
ATMOSPHERIC CONCENTRATIONS OF BUTYL ALCOHOL,
sec-BUTYL ALCOHOL AND 2-BUTOXY ETHANOL

Chilton Metal Products Division
Chilton, Wisconsin
April 19 and 20, 1978

SAMPLE NUMBER	LOCATION	JOB CLASSIFICATION	TIME OF SAMPLE	BUTYL ALCOHOL PPM	sec-BUTYL ALCOHOL PPM	2-BUTOXY ETHANOL PPM	TYPE OF SAMPLE
C-11	Paint Booth	-------	08:25 - 14:49	0.4	0.1	*	General Area
C-12	Paint Booth	Painter Assembly	08:28 - 14:46	0.7	0.3	*	BZ
C-13	Paint Booth	Painter Assembly	08:39 - 14:48	0.9	*	*	BZ
			Evaluation Criteria(NIOSH)	100	150	50	
			NIOSH Limit of Detection	0.001mg/sample	0.001mg/sample	0.002mg/sample	

PPM = Parts of substance per million parts of air by volume
BZ = Breathing Zone
* = Below the NIOSH limit of detection

TABLE 8
ATMOSPHERIC CONCENTRATIONS OF BENZENE
TOLUENE, XYLENE, AND VM&P NAPTHA

Chilton Metal Products Division
Chilton, Wisconsin
April 19 and 20, 1978

SAMPLE NUMBER	LOCATION	JOB CLASSIFICATION	TIME OF SAMPLE	BENZENE PPM	TOLUENE PPM	XYLENE PPM	VM&P NAPTHA mg/M3	TYPE OF SAMPLE
C-1	Paint Booth	-------	08:20 - 14:58	0.1	2.6	0.3	19	General Area
C-2	Paint Booth	-------	08:28 - 15:00	*	10	2.3	106	General Area
C-3	Paint Booth	Painter Assembly	08:20 - 15:01	*	1.6	1.4	2	BZ
C-4	Paint Booth	Painter Assembly	08:18 - 14:54	0.1	3.8	0.2	8	BZ
		Evaluation Criteria(NIOSH)		1.0	100	100	350	
		NIOSH Limit of Detection(mg/sample)		0.01	0.01	0.01	0.03	

PPM = Parts of substance per million parts of air by volume
mg/M3 = Milligrams of substance per cubic meter of air
BZ = Breathing zone
* = Below the NIOSH limit of detection

TABLE 9
RESULTS OF AIR SAMPLING FOR PROPANE

Propane Building
Chilton Metal Products Division
Chilton, Wisconsin
April 19, 1978

Time	Location	Concentration(PPM)
10:25	unvented filling station	858
10:25	vented filling station	858
10:25	start of filling line	638
10:25	testing area	528
10:25	packaging area	440
13:05	unvented filling station	220
13:05	vented filling station	220
13:05	start of filling line	220
13:05	testing area	110
13:05	assembly area	110
	Evaluationn Criteria(OSHA)	1000

PPM = Parts of Propane per million parts of air by volume

TABLE 10
RESULTS OF AIR SAMPLING FOR METHYL ACETYLENE - PROPADIENE MIXTURE

Propane Building
Chilton Metal Products Division
Chilton, Wisconsin
May 18, 1978

TIME	CONCENTRATION(PPM)
10:10	200-600
10:55	440
11:20	400
11:40	400
13:00	440
13:30	440
Evaluation Criteria(ACGIH)	1000

PPM = Parts of methyl acetylene - propadiene mixture per million parts of air by volume