

ENVIRONMENTAL HEALTH SURVEY

FOR 1985

CHLORINATED METHANES PLANT

LOUISIANA DIVISION

Submitted by: R. J. Bordelon

DO 089866
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**CHLORINATED METHANES PLANT
INDUSTRIAL HYGIENE JOB ANALYSIS**

A. Introduction

The Plaquemine, Louisiana Chlorinated Methanes Plant was monitored during 1985 in a routine and continual survey of the chemicals and noise present in this block. Listed below are the chemicals plus noise with their respective standards:

<u>Chemical</u>	<u>Standard (TLV)</u>
Methyl Chloride	25 ppm
Vinyl Chloride	1 ppm
Methylene Chloride	100 ppm
Chloroform	10 ppm
Carbon Tetrachloride	5 ppm
Methanol	200 ppm
Ethylene Dichloride	10 ppm
B-trichloroethane	10 ppm
1,1 Dichloroethane	200 ppm
Dimethyl Ether	400 ppm
Propylene Oxide	20 ppm
Noise	85 dBA

B. Conclusion from 1985 Survey

Employees in the CMP block were monitored using personnel monitors. Most were monitored two or three times during the year. As in the previous years the data reflects that employees are within the threshold limits when performing their routine jobs. People are provided with and required to wear proper protective equipment when a job has the potential of exposing them to levels which may exceed the standards.

C. Monitoring Results - Routine Work

Personnel monitoring using charcoal adsorption tubes was employed to cover the jobs for the following chemicals: methyl chloride, vinyl chloride, dimethyl ether, methylene chloride, chloroform, carbon tetrachloride, ethylene dichloride, 1,1 dichloroethane, propylene oxide, and B-trichloroethane. To monitor for methanol, tubes filled with activated alumina were used. A total of 63 samples revealed the following results in ppm based on TWA (over a 4 hour period).

Chemical	Standard	# of Samp.	High/ Job Average	High/ Indiv. Sample
Methyl Chloride	25	7	OT 3.7	OT 12.7
Vinyl Chloride	1	63	All <0.01	All <0.01
Dimethyl Ether	400	63	All <0.1	All <0.1
Methylene Chloride	100	4	Loading 9.8	Loading 31.5
Chloroform	10	4	Loading 1.7	Loading 6.9
Carbon Tetrachloride	5	5	Contract Maint. 9.0	Contract Maint. 44.8
Ethylene Dichloride	10	6 5	SOT Instrument 0.1	Instrument 0.3
B-Trichloroethane	10	63	All <0.1	EDO 0.3
Propylene Oxide	20	6	SOT 0.3	SOT 1.5
1,1 Dichloroethane	200	63	All <0.1	All <0.1
Methanol	200	7	OT 0.6	OT 1.1 OS 1.1 EDO 1.1

C. Monitoring Results (Cont'd)

In '85 we used a personnel monitor to check for chlorine exposure levels in the block. In the past we had relied solely on area samples as we use for HCL and H₂SO₄. Not everyone was monitored due to the limited availability of this one monitor. The people working the jobs most susceptible to Cl₂ exposure were monitored. Samples were also taken on areas where the possibility of Cl₂ vapors existed. A total of 15 samples were collected, with two of these being discarded due to malfunctioning of the monitor. The TLV for chlorine is 3mg/m³ or 1 ppm. Monitoring results in ppm follow:

Job	No. Samples	High Instanteous	High 15 min. avg.	TWA
OT	2	1.35	0.05	<0.01
SOT	4	1.50	0.07	0.07
EDO	2	0.60	0.03	<0.01
Loader	3	0.25	<0.01	<0.01
Area - C-805 Vent Scrubber	1	0.05	<0.01	<0.01
Area - N/E corner of WHB	1	0.40	0.03	<0.01

C. Monitoring Results (Cont'd)

Monitoring for hydrochloric acid and sulfuric acid was conducted by scrubbing air with distilled water as the scrubbing agent, usually for a duration of 7-8 hours per sample. The scrubber was strategically placed in areas which were downwind of any possible HCl or H₂SO₄ vapors. A total of 19 samples were taken.

Highs in mg/m³

Chemical	Standard	High Job Average	High Area Reading
Hydrochloric Acid	³ 7mg/m	R-600 Area 0.21	R-600 Area 0.31
Sulfuric Acid	³ 1mg/m	R-200 & R-300 Area 0.28	R-200 & R-300 Area 0.31

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D. Analysis Review

**INDUSTRIAL HYGIENE JOB ANALYSIS
VERSUS
% OF HYGIENE STANDARD**

Standard		100%	50-100%	25-50%	10-25%	<10%
Methyl Chloride	25 ppm	-	-	-	1	12
Vinyl Chloride	1 ppm	-	-	-	-	13
Methylene Chloride	100 ppm	-	-	-	-	13 ^a
Chloroform	10 ppm	-	-	-	1	12
Carbon Tetrachloride	5 ppm	-	1	1	-	11
Methanol	200 ppm	-	-	-	-	13
Ethylene Dichloride	10 ppm	-	-	-	-	13
B-trichloroethane	10 ppm	-	-	-	-	13
1,1 Dichloroethane	200 ppm	-	-	-	-	13
Dimethyl Ether	400 ppm	-	-	-	-	13
Propylene Oxide	20 ppm	-	-	-	-	13
Noise	85 dBA	-	1	3	4	5
TOTAL		0	2	4	6	144
% of TOTAL JOBS		0.00	1.28	2.56	3.85	92.31

Data based on TWA, excursion monitoring is excluded.

^a This represents 13 job classifications with the average exposure levels to methylene chloride being less than 10 ppm or <10% of the standard.

E. Noise - By Job

<u>Job</u>	<u># of Samples</u>	<u>Average Dose %</u>	<u>Average dBA</u>	<u>Maximum dBA</u>
Operations Technician	6	24	78	112
Sr. Operations Technician	5	25	78	111
Operations Specialist	9	08	71	112
Shift Supervisor	6	11	74	111
EDO	2	68	89	120
Clerical (includes Computer Tech)	1	01	50	105
Instrument Technician	5	07	70	110
Laborer	2	14	83	106
Contract Maintenance	8	38	83	115
Material Controller	1	01	58	100
Technical	4	10	72	106
Chemist	2	06	71	106
Loading	3	20	79	112

CMP NOISE SURVEY BY AREA

11/21/85

<u>Area</u>	<u>DBA</u>
Office	58
Control room	61
Lab	62-64
Instrument shop	60
Warehouse	70
Distillation, ground	82-92
Distillation, upper	76-90
V-800 filters	80-82
Acid area	81-87
R-600 area	80-84
K-350 area	84-93
HCL purification, ground (outside chain area)	82-88
HCL purification, upper	79-86
R-250 area, ground	83-87
Lewis unit deck	83-93
Upper decks	73-91
R-200 & R-300 area	80-87
E-200 & E-300 deck	deck 77-81
	fans 92-95
Waste heat boiler & D-1 area	79-86
C-500 area	79-91
K-1002 (outside chain area)	88-101
T/T load rack	75
T/C load rack	70-78
Check tanks	79-87
T-814, T-104's, T-100, & T-101 areas	70-84

ENVIRONMENTAL GOALS FOR 1986

- 1 - Monitor operators more closely to determine if respiratory equipment is adequate for the jobs they are performing. In the meantime, look at whether the equipment is really needed for the particular job at hand.
- 2 - Get input from operators as to the possibility that certain jobs are being overlooked as potential causes of exposure.
- 3 - Do more excursion monitoring since many jobs are of short duration.
- 4 - Work with loading people to solve the fogging they have when they use the Scott-O-Vista.
- 5 - Look closely at noise problems which were generated by new equipment and/or modifications in our block.
- 6 - Monitor for amylene and cyclohexane, especially when operators inhibit check tanks.
- 7 - Monitor the loading and unloading of honeywagons as well as cleaning of these honeywagons.
- 8 - Do extensive monitoring of open-dome loading.
- 9 - Monitor venting from check tanks.

1. For organic vapors collected and desorbed with CS₂.

Instruments - Hewlett Packard 5890 gas chromatograph with FID and Spectra Physics 4270 integrator.

Conditions

a. Temperatures

1. injector - 200°C
2. detector - 250°C
3. Column - initial of 40°C programmed to 105°.

b. Column - J & W - DB-1701, 30M, 1.0 micron film.

c. Range - 1

d. Sample size - 1.8 ul injected with split injection.

e. Calibrated weekly, blanks prepared daily.

2. For methanol vapors collected on alumina and desorbed with distilled water.

Instruments - Varian Vista 44 chromatograph and Vista 401 data system.

Conditions

a. Temperatures

1. injector - 250°
2. detector - 270°
3. column - 160° operated isothermally

b. Carrier gas flow - 42 cc/min.

c. Column - 16' x 1/8" od Porapak Q 50/80 mesh

d. Range setting - 11

e. Attenuator - 1

f. Sample size - 1.2 ul

g. Calibrated weekly, blanks prepared daily

JOB DUTIES BY CLASSIFICATION
CHLORINATED METHANES PLANT
1985

REV
4/85

Operations Technician (OT)

He conducts sampling rounds in the finished products and distillation area. He also walks through the area checking temperatures, pressures, pump seals, etc. He will also perform lubrication checks. Generally, three rounds are made on each twelve-hour shift.

Senior Operations Technician (SOT)

The SOT is responsible for the reaction area. He performs basically the same duties in this area as the OT does in his area. In addition, he also collects check tank samples and performs lab analysis on them before transferring the finished product to the storage tanks.

Operations Specialist (OS)

There are two operations specialists on each shift. One serves as the control board operator while the other one performs duties wherever needed. He covers vacation relief and personal illness for all job classifications including shift supervisor.

Shift Supervisor (SS)

The shift supervisor is responsible for overseeing all personnel on his shift. His primary goal is to make sure that the plant is run safely and efficiently.

Expanded Day Operations (EDO)

This is a very versatile group which performs minor repairs, maintenance, and small fabrication jobs. They serve frequently as safety observers for "Hot Work" and vessel entry jobs. All OT's, SOT's, and OS's rotate through this job every three months. (The EDO job duration is three weeks.)

Material Controller

The material controller is responsible for ordering necessary supplies for daily operations and special projects. He also maintains shelf item inventories. His duties require him to spend very minimal time in the operational area.

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I. Monitoring Equipment Used in the Survey

A. For Chemicals

1. Personnel Monitoring

MDA Pump, model 808

DuPont pump, model P-200

Sipin pump, model SP-1

DuPont constant flow sample calibrator for checking
flow rates

Dow LA Division Chlorine Dosimeter

2. Area monitoring

Gillian pump, model HFS 113A

B. For Noise

1. Personnel Monitoring

DuPont dosimeter, model MK-2

2. Area Monitoring

Edmont-Wilson dosimeter, model 60-510

Dosimeters calibrated on DuPont Audio Dosimeter
Calibrator model C-114