



ESCAMBIA PLANT
INTEROFFICE MEMORANDUM

To: W. J. Stueben

Date: 16 November 1978

From: K. J. Femrite

Copies:

Re: Industrial Hygiene Monitoring

J. G. Tolar
R. L. Duggan
S. J. Hardesty

VCM in PVC Plant

Personnel monitoring for VCM consisted of an eight hour TWA and a fifteen minute ceiling exposure sample per man assigned to PVC operations. Laboratory and maintenance personnel were monitored by a single eight hour TWA sample.

Ninety-two percent of the eight hour TWA samples analyzed this month were below the OSHA standard of 1.0 ppm for VCM exposure. Eighty-six percent were below the OSHA action level of 0.5 ppm. Exhibit I details VCM exposure and its frequency of occurrence during October.

A statistical survey of the VCM personnel monitoring determinations from January, 1978, through October, 1978, was undertaken. The average VCM exposure and its standard deviation at the 95 percent confidence level was determined for each job in PVC operations. The results reveal that the outside/recovery operator is routinely exposed to VCM levels over the 1.0 ppm level each eight hour shift. The same operator wears a fresh air mask 10-35% of the time during his work shift which significantly reduces the amount of VCM that he inhales. The results also reveal that the shift supervisor and the senior operator are occasionally exposed to VCM levels over the 1.0 ppm limit. Their exposures are probably due to them working in problem and or upset conditions. Exhibit II details VCM exposure levels versus job in the PVC plant.

DMF in Chemical Cleaning

Two determinations for DMF exposure show levels below 2 ppm for the DMF recovery operator. The eight hour TWA for DMF is 10 ppm.

Results from a statistical survey of DMF monitoring determinations reveal the operator is exposed to DMF levels from non detectable to 10.5 ppm over an eight hour shift. The average and standard deviation of the exposure data at the 95 percent confidence level is 2.8 ppm $\pm$ 6.6 ppm. The DMF exposure determinations are wide ranging with only 20% of the determinations above the OSHA action level of 5.0 ppm. Exhibit II details DMF exposure for the operator.

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Ammonia in the AN Plant

Personnel monitoring results for ammonia revealed levels below the OSHA action level of 12.5 ppm. The eight hour TWA for ammonia is 25 ppm. Samples were taken twice a week for six hours during the work shift. Exhibit-III details ammonia exposure in the AN plant.

A survey of the prill tower operators exposure to ammonia was undertaken. Grab samples were taken in his work area where he was potentially exposed to ammonia fumes. Samples were taken using length of stain detection tubes.

The results show that the operator is exposed to 5 ppm or less ammonia in the permalene solution room. The operator is in the permalene room approximately 30 minutes to one hour each eight hour period. The operator is exposed to 30 to 70 ppm ammonia every time he enters the top of the prill tower. He spends approximately 30 minutes at the top of the prill tower 3 or 4 times an eight hour period.

NO in the An Plant

Four area monitoring samples for NO and NO₂ in the wet bay area of the AN plant showed levels below 0.1 ppm for NO and NO₂. The eight hour TWA limit for NO is 25 ppm while that for NO₂ is 5 ppm. Samples were taken 50 feet downwind of the nitric acid storage tank at ground level and on the second floor.

CO in MeOH Synthesis

The average of two eight hour TWA personnel monitoring samples for carbon monoxide for the methanol synthesis operator was 6.2 ppm. The eight hour TWA limit for CO exposure is 50 ppm.

Allyl Compounds in ICR&D Laboratory

Personnel exposure to allylchloride in the ICR&D laboratory continues to be a problem. The average of four determinations for allylchloride this month was 1.5 ppm. The eight hour TWA exposure limit for allylchloride is 1.0 ppm. All but one of the samples analyzed this month for allylchloride was above the OSHA action level of 0.5 ppm for allylchloride exposure.

Personnel exposure to allyl amines continues to be minimal this month as the ICR&D laboratory has not started separatory distillations. Exhibit IV details allyl compound exposure in the ICR&D laboratory.

AP00032974

Amines Industrial Hygiene Method Development

Development of gas chromatograph columns for analytical separations of butyl, propyl, allyl, and ethyl-butyl amines has been completed. Work that still remains to be accomplished is establishing desorption efficiencies, minor instrument fine tuning, and initial sampling for the amines. The GC columns and what each column separates is listed below for all amine products.

Column A

Monomormalbutylamine (MNBA)
Dinormalbutylamine (DNBA)
Mononormalpropylamine (MNPA)
Dinormalpropylamine (DNPA)
Monoallylamine (MAA)
Diallylamine (DAA)

Column B

Monomethylamine (MMA)
Dimethylamine (DMA)
Trimethylamine (TMA)
Monoethylamine (MEA)
Diethylamine (DEA)
Triethylamine (TEA)
Ethyl-normalbutylamine (EBA)¹

Column C

Isobutyronitrile (IBN)
Dimethylformamide (DMF)

Column A - 15 ft X 2 mm glass packed with 10% CW 1500 + 3% KOH on Chromosorb W(HP).

Column B - 10 ft X 2 mm glass packed with 4% CW 20M + 0.8% KOH on Carbopack B.

Column C - 6 ft X 1/8 in stainless steel packed with 0.2% CW 1500 on Carbopack C.

Methyl Chloroform in Maintenance

Results for methylchloroform exposure in the compressor house and Area B maintenance shop show levels below 30 ppm. The eight hour TWA for methylchloroform is 350 ppm. Samples were taken using the Gasbadge, collection system. The samples were analyzed by Gasbadge for methylchloroform content. Exhibit V details methylchloroform exposure in these areas.

- 1) Two synthesis routes are possible for EBA. Columns A&B are required for the analysis.
 1. DEA + MNBA - EBA + TEA
 2. MEA + DNBA - EBA + DEA

AP00032975

EXHIBIT I

PERSONNEL MONITORING FOR VCM

OSHA Standard: 1 ppm 8-hour TWA
5 ppm 15-minute Ceiling Exposure

Fifteen Minute Ceiling Exposure

<u>Concentration Range</u> <u>PPM - VCM</u>	<u>Frequency</u> <u>(Percent)</u>	<u>Number of Samples</u> <u>Analyzed</u>
5	0	0
1.01 - 5	0	0
0.51 - 1	6	2
0.0 - 0.50	94	30
Total	100	32

Eight Hour TWA

<u>Concentration Range</u> <u>PPM - VCM</u>	<u>Frequency</u> <u>(Percent)</u>	<u>Number of Samples</u> <u>Analyzed</u>
5	0	0
1.01 - 5	8	4
0.51 - 1	6	3
0.0 - 0.50	86	42
Total	100	49

AP00032976

PVC/CHEM CLEANING

<u>Job</u>	<u>VCM¹</u> <u>PPM</u>	<u>% of Time¹</u> <u>Air Mask Used</u>	<u>DMF²</u> <u>PPM</u>	<u>AMS</u> <u>PPM</u>	<u>TCE</u> <u>PPM</u>	<u>DUST</u> <u>mg/m³</u>
Supervisor	.4±1.6	0-10	-	No Method	No Method	-
Senior Operator	.3±.9	0-10	-	"	"	-
Solution Operator	.2±.7	10-35	-	"	"	-
Control Rm. Operator	.1±.3	0-10	-	"	"	-
Artisan Operator	.2±.3	0-10	2.8±6.6	"	"	-
Dryer Operator	.2±.4	0-10	-	"	"	-
Outside Operator	1.1±2.4	10-35	-	"	"	-
Maintenance Operator	NED ³	NED ³	-	"	"	-
Bagging Operator	NED ³	NED ³	-	"	"	NED ³
Loading Operator	NED ³	NED ³	-	"	"	NED ³

1) Avg. & std. dev. at 95% confidence level of 29 determinations from 1/78 thru 10/78.

2) Avg. & std. dev. at 95% confidence level of 14 determinations from 1/78 thru 10/78.

3) Not enough data for statistical use.

AP00032977

EXHIBIT III

AMMONIA IN THE AMMONIUM NITRATE PLANT

OSHA Limit: 25 ppm

<u>Date</u>	<u>Job</u>	<u>No. of Hours Sampled</u>	<u>No. of Samples Taken</u>	<u>Average Ammonia Exposure, ppm</u>
10/13	Wet Bay Operator (1)	6	3	3.9
10/13	Wet Bay Operator (2)	6	3	2.0
10/13	Wet Bay Operator (3)	2	1	2.6
10/13	Dry Bay Operator	6	3	4.3
10/16	Extra Operator	6	3	2.4
10/16	Tower Operator	6	3	9.1
10/16	Instrument Technician	6	3	4.9
10/16	Shift Supervisor	6	3	2.2

AP00032978

EXHIBIT IV

ALLYL COMPOUNDS IN ICR&D LABORATORY

OSHA Limit: Allyl Chloride-1 ppm
 Allyl Amines -None

<u>Date</u>	<u>No. of Hours Sampled</u>	<u>Allyl Chloride PPM</u>	<u>Mono Allyl Amine PPM</u>	<u>Di Allyl Amine PPM</u>
10/2	11	3.7	-	-
10/4	8	-	0.06	< .02
10/5	11.5	0.8	-	-
10/16	8.3	1.3	-	-
10/17	11	-	<.02	< .01
10/20	10	0.04	-	-
10/21	6	-	<.04	< .03

AP00032979

EXHIBIT V

METHYL CHLOROFORM IN MAINTENANCE

TLU: 350 ppm

<u>Date</u>	<u>Job</u>	<u>Sampled</u>	<u>Methylchloroform</u> <u>PPM</u>
8/16	Compressor house mechanic	7.0	9.4
8/16	" " "	7.0	8.3
8/16	" " "	7.0	29.0
8/16	" " "	7.0	8.8
8/16	" " "	7.0	8.2
8/20	" " "	5.7	1.8
8/20	" " "	6.0	15.3
8/20	" " "	6.0	1.0
8/20	" " "	6.0	1.1
8/20	" " "	6.0	0.7
9/7	Area B Mechanic	7.5	6.5
9/7	" " "	7.5	0.8
9/8	" " "	6.5	0.2
9/8	" " "	6.0	0.3

AP00032980

FILE ACT 8.30

Industrial Hygiene Report
February 1994

To: B. G. Roberson
D. M. Ward
H. J. Smith

From: R. L. Heath

Monitoring was performed in B-Area during the month of February. The results are on the following pages.

There were no alerts issued in February.

The St. Gabriel plant borrowed our noise monitors during the month.

W. A. Lowery requested a noise survey on the train engine to compare the noise levels with and without the windows and doors open. That monitoring was completed.

To improve the dust monitoring, preweighed matched filters are being used.

Reba Heath
Reba Heath

AP00032981

Hygiene Monitoring

During the month of February, hygiene monitoring was conducted for Noise (1 sample), Ammonia (6), Chloroform (3), Formaldehyde (5), and Respirable Dust (8).

Completed Hygiene Monitoring

Chemical-Area	<Action Level	>Action Level	Permissible Exposure Limit
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Noise

-B Area Maint	1		
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Ammonia

-Wet Bay\Dry Bay	3		
-Solutions	3		

Formaldehyde

-Wet Bay\Dry Bay	3		
-Solutions	4		

AP00032982

Year to Date Industrial Hygiene Monitoring Results

Chemical-Area	Action Level	Action Level	Permissible Exposure Limit
Ammonia			
-AN Wet Bay	3		
-AN Solutions	3		
-NH3 Loading	1		
-NH3 Operator			
Asbestos			
-30 min			
-Duration			
-Area samples			
Benzene			
-#2 Amines Oper.			
Carbon Monoxide			
-Compressor House	2		
Chloroform			
-AN Dry Bay			
Diethanolamine			
-NH3/MeOH Oper.			
Dimethylamine			
-Drum Filler			
-Bung Tightner			
-Unhooking Car			
Dimethylformamide			
-Amines Loader			
-Drum Filler			
-Bung Tightner			
Fibers			
-Fiberglass			
-Ceramic fiber			
Formamide			
-Pilot Plant Oper.			
Formaldehyde			
-AN Solution Oper.	3		
-AN Dry Bay Oper.	4		
Hydrogen Cyanide			
-Pilot Plant Oper.			

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Year To Date Industrial Hygiene Monitoring Results

continued

Chemical-Area	<Action Level	>Action Level	Permissible Exposure Limit
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ethanol

- Truck Loader
- Tankcar Loader
- Loading Oper.

thylamines

- #1 Amines Oper.
- Drum Filler
- Bung Tightner

trogen Dioxide

- Nitric Acid Loader

ise

- NH3/MeOH
 - Process
 - Maint
 - I&E
- Compressor House
- Pilot Plant
- HNO3
 - Process 1
 - Maint 3
 - I&E
- AN
 - Process
 - Maint 1
 - I&E
- Amines
 - Process
 - Maint
 - I&E
- Train Crew
 - Engine Oper
 - Switchman
- Main Shop 2
- Warehouse Receiving
- Engineering
- Pilot Plant Office
- Hydrogen
 - Process
 - Maint
 - I&E

AP00032984

Industrial Hygiene Alerts For FY94

Alert #	Date	Explanation

AP00032985

Monitoring Activity

December

Benzene Complete

November

Lead Complete

CO Complete

Noise No samples taken-pumps out for calibration

December

Noise survey-B Area Complete

Noise Main Shop Two samples taken

January

Noise HNO₃ area 3 in Maint. and 1 in process.

TEA Drumming 4 samples taken

DMA Drumming 2 samples taken

DMF Drumming no samples

DMF Loading no samples

Ventilation B Area incomplete

Formamide Pilot Plant incomplete

HCN Pilot Plant incomplete

Noise Pilot Plant incomplete

AP00032986