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PPG INDUSTRIES, INC.
INDUSTRIAL CHEMICAL DIVISION
LAKE CHARLES, LOUISIANA

LD-1121F

CONTINUING PROGRAM OF MONITORING ATMOSPHERIC CONTAMINANTS
WITHIN THE LAKE CHARLES PLANT

by

Mark Wood

July 31, 1973

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Key Words

Occupational Environment
Atmospheric Contaminants
Monitaire Sampler
MSA Universal Pump
Electrostatic Precipitation
Unico Gas Detector
Mercury Vapor Detector
NIOSH
Coal Tar Pitch Volatiles
Carbon Adsorption

SL 093258

LABORATORY DEPARTMENT
MARK WOOD

TECHNICAL REPORT
JULY 31, 1973

CONTINUING PROGRAM OF MONITORING ATMOSPHERIC CONTAMINANTS
WITHIN THE LAKE CHARLES PLANT
LD-1121F

ABSTRACT

The tables composing this report are continuations of occupational environment surveys started early in 1969 and contain data from all plant areas from January 1973 to July 1973.

INTRODUCTION

The periodic investigation of employee's occupational environments initiated in 1969 is described in detail in LD-1121. This report is an addendum and contains tabulated data collected from January 1973 through July 1973.

DISCUSSION

Included in Table 6 are data on mastic pot workers monitored for benzene-soluble coal tar pitch volatiles. A method (1) developed by Union Carbide and adopted by NIOSH was used. Another addition to Table 6 is carbon monoxide levels.

In Table 10, a new method (2) for chlorinated hydrocarbons has been used. Developed by Dow Corporation, the procedure involves adsorption on activated carbon. The carbon is extracted with carbon disulfide and the extractate analyzed for specific compounds by F.I.D. gas chromatography. Thus far the technique has been used strictly for area monitoring but can be used for personnel monitoring.

Due to a mathematical error of the lab performing asbestos fiber counting, the fiber counts in LD-1121D, page 18 and LD-1121E, page 11, should be corrected by multiplying by 2.2.

Results of occupational environment surveys, tabulated by areas, are appended. Table 7 on the Sodium Chlorate Plant has been deleted.

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Approved: C. P. LeBlanc 8/13/73
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Approved: H. J. Hoenes, Jr. 8-2-73
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MW:rw

1. PARMA Standard Test Methods, Union Carbide Corporation, Parma Technical Center, Method No. PSM-1013.
2. Monitoring Personnel Exposure to Chlorinated Hydrocarbons in an Industrial Work Environment, Allemang, A. A., and Goudeau, R. A., Dow Corporation, presented at Southeast ACS Meeting, Baton Rouge, Louisiana, 12/72.

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A P P E N D I X

Threshold Limit Values
of
Airborne Contaminants
 (Exposure Possible within Lake Charles Plant)

<u>Contaminant</u>	<u>T.L.V. Concentration</u>
Ammonia	50 ppm (Intended change - 25 ppm)
Carbon Monoxide	50 ppm
Carbon Tetrachloride	10 ppm
Coal Tar Pitch Volatiles (Benzene Soluble)	0.2 mg/M ³
Chlorine	1 ppm
1,2-Dichloroethane (EDC)	50 ppm
Ethyl Chloride	1000 ppm
Hydrogen Chloride	5 ppm
Hydrogen Sulfide	10 ppm
Lead	0.15 mg/M ³
Mercury	0.05 mg/M ³
Methyl Chloroform	350 ppm
Perchloroethylene	100 ppm
Phosgene	0.1 ppm
Sodium Hydroxide	2 mg/M ³
1,1,2-Trichloroethane (TCE)	10 ppm
Trichloroethylene	100 ppm
sym-Tetrachloroethane	5 ppm
Vinyl Chloride	200 ppm 50
<u>Mineral Dusts</u>	
Nuisance Dust	10 mg/M ³
Asbestos	5 fibers > 5 µ/ml
Silica Pigments	6 mg/M ³ (Adopted by PPG Industries, Inc.)

From: 1972 Edition, Threshold Limit Values of Airborne Contaminants
 Adopted by ACCIH (American Conference of Governmental Industrial
 Hygienists) and Federal Register, Volume 36, No. 105.

TABLE 1
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Mercury Cell Circuit	Cell Operator	6-11-73 (A.M.)	Chlorine	< 0.5 ppm		Monitaire Sampler
	Cell Repairman	Ditto	Ditto	0.5 ppm		Ditto
	Cell Cut-Out Man	Ditto	Ditto	0.5 ppm		Ditto
	Brine Treatment Operator	Ditto	Ditto	< 0.5 ppm		Ditto
	Cell Operator	6-11-73 (A.M.)	Mercury Vapor	< 0.5 mg/M ³		Monitaire Sampler
	Cell Repairman	Ditto	Ditto	< 0.5 mg/M ³		Ditto
	Cell Cut-Out Man	Ditto	Ditto	< 0.5 mg/M ³		Ditto
	Brine Treatment Operator	Ditto	Ditto	< 0.5 mg/M ³		Ditto
	Cell Auxiliary Operator	7-27-73	Hydrogen Sulfide	< 0.01 ppm		H ₂ S Badge
	Brine Area Operator	Ditto	Ditto	< 0.01 ppm		Ditto

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(Rev. 1/73)

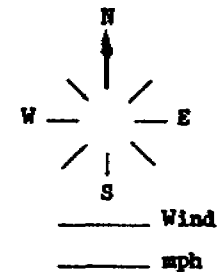
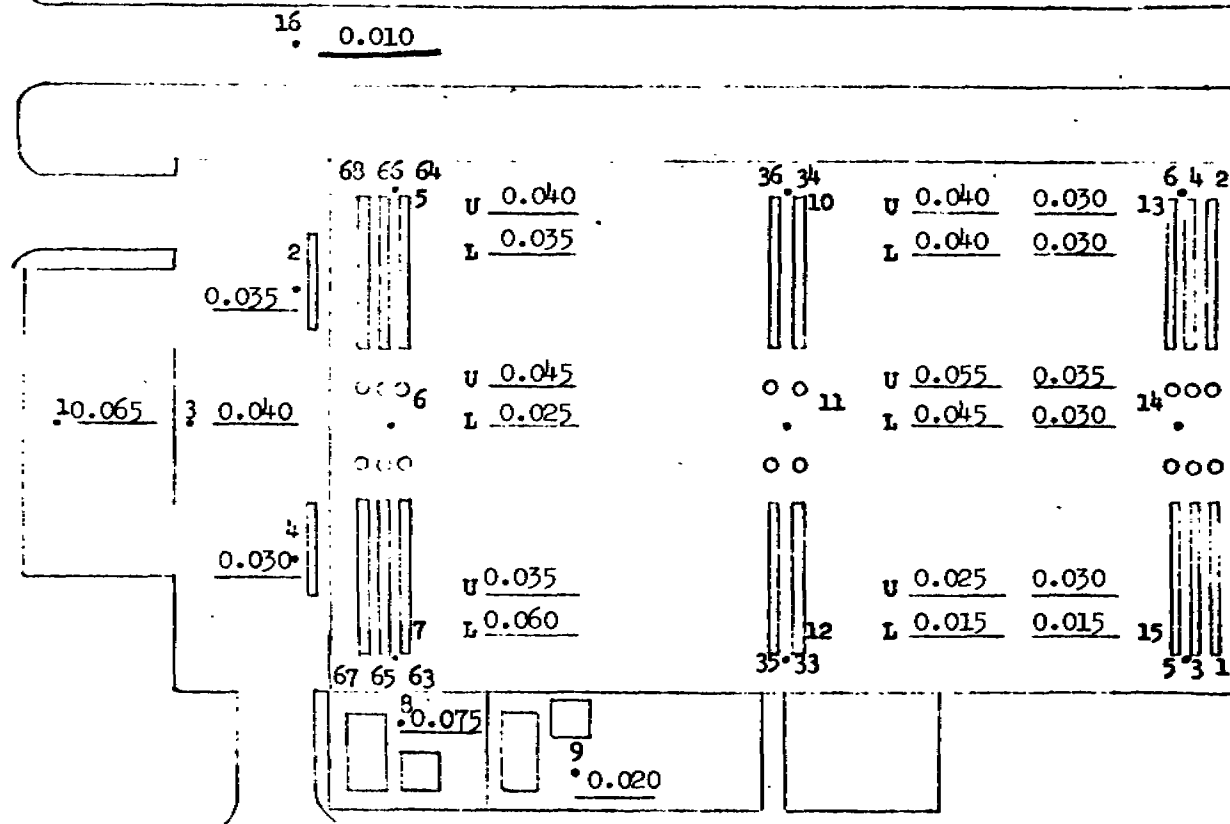
MERCURY IN AIR AT MERCURY CELL
(H_g in $\mu\text{g}/\text{M}^3$)

Date: 1-5/7-13-73
(Average of 33 surveys)

Laboratory 0.010
Lunch Room 0.045
No. of People 12
Rest Room 0.015
Locker Room 0.010

Control Room 0.010
Office 0.010
Motor Control 0.020
Area Maintenance 0.005
13.8 KV Sw. Gr. < 0.005

H₂ Stack Area 0.010
Open Cells
Relative Humidity
Temperature
Maintenance < 0.005
Lunch Room



Approved: _____

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U - Cell Floor
L - Ground Floor

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TABLE 3
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Brine Treatment/ Liquefaction	Liquefaction Operator	6-7-73 (A.M.)	Chlorine	< 0.5 ppm		Monitaire Sampler
	Brine Treatment Operator	Ditto	Ditto	< 0.5 ppm		Ditto
	Liquefaction Operator	6-7-73 (A.M.)	Ammonia	< 5 ppm		Monitaire Sampler
	Brine Treatment Operator	6-7-73 (A.M.)	Ditto	< 5 ppm		Ditto

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TABLE 4
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Caustic Plant	Evaporator Operator	6-21-73 (A.M.)	Chlorine	< 0.5 ppm		Monitaire Sampler
	Area Janitor	Ditto	Ditto	< 0.5 ppm		Ditto
	Evaporator Operator	6-21-73 (A.M.)	Ammonia	< 5 ppm		Monitaire Sampler
	Area Janitor	Ditto	Ditto	< 5 ppm		Ditto
Caustic Bird Area	-	6-12-73 (A.M.)	NaOH Mist	0.2 mg/M ³		Water Scrubber/ Atomic Absorption Sodium Anal.
PELS [®] /Anhydrous	Operator	6-7-73 (A.M.)	Chlorine	< 0.5 ppm		Monitaire Sampler
	Shipping Packer	Ditto	Ditto	< 0.5 ppm		Ditto

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TABLE 5
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Diaphragm Cell Circuits	Tender, Circuits 1, 2	6-8-73 (A.M.)	Chlorine	< 0.5 ppm		Monitaire Sampler
	Tender, Circuits 5, 6	Ditto	Ditto	< 0.5 ppm		Ditto
	Tender, Circuits 7, 8	Ditto	Ditto	< 0.5 ppm		Ditto
	Operator	Ditto	Ditto	< 0.5 ppm		Ditto

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TABLE 6
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Diaphragm Cell Repair and Manufacturing	Lead Pot Area	6-21-73 (P.M.)	Lead	< 0.05 mg/M ³	While pouring lead	MSA Universal Pump with Pb Kit
	Solder Wiping Area	Ditto	Ditto	< 0.05 mg/M ³	While wiping tinned bus bars.	Ditto
	Repairman	6-21-73 (A.M.)	Chlorine	0.5 ppm	Tow Motor Driver	Monitaire Sampler
	Cell Builder	Ditto	Ditto	< 0.5 ppm	Stays in Repair Area	Ditto
	Repairman	6-21-73 (A.M.)	Carbon Monoxide	12 ppm		Monitaire Sampler
	Cell Builder	Ditto		< 5 ppm		Ditto
	Diaphragm Depositer	6-20-73 (A.M.)	Asbestos	0.65 fibers > 5 μ /ml		Personnel Monitor with Membrane Filter
		7-10-73 (Mid-day)	Ditto	0.26 fibers > 5 μ /ml		Ditto

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TABLE 6 - (CONT'D.)
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
	Mastic Pot Worker	6-20-73 (Mid-day)	Benzene- Soluble Coal Tar Pitch Volatiles	5.5 mg/M ³	Blower out of service.	PSM-1013
		7-10-73 (Mid-day)	Ditto	3.8 mg/M ³	Ditto	Ditto
	Mastic Pot Area Monitoring	7-27-73 (Mid-day)	Ditto	3.6 mg/M ³	Ditto	Ditto
	Rest Table Area	7-27-73 (Mid-day)	Ditto	0.96 mg/M ³	Ditto	Ditto

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TABLE 8
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Power Houses	"A" Watch Engineer	6-12-73	Chlorine	< 0.5 ppm		Monitaire Sampler
	"A" Utility Operator	6-12-73	Ditto	< 0.5 ppm		Ditto
	"B" Watch Engineer	6-12-73	Ditto	< 0.5 ppm		Ditto

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TABLE 9
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Silica Pigments (See note for locations of sampling.)	C	6-12-73 (A.M.)	Particulates	4.4 mg/M ³	Loading	Electrostatic Precipitation
	D	Ditto	Ditto	3.5 mg/M ³	No activity.	Ditto
	E	Ditto	Ditto	13.0 mg/M ³	Bagging	Ditto
	F	Ditto	Ditto	2.4 mg/M ³	Bagging 30% of sample period.	Ditto
Furnace Building Upper Floor		6-12-73 (A.M.)	NaOH Mist	1.2 mg/M ³		Water Scrubber/ Atomic Absorption Sodium Analysis

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SILICA PIGMENTS AREA
PARTICULATE AIR SAMPLING LOCATIONS

- A Downstairs in Frit Reactor area of Furnace Building
- B Upstairs, over the south end of the furnace in Furnace Building
- C Northeast corner of the Pigments Shipping Building where trucks and boxcars are loaded
- D Center of Pigments Shipping Building, under North-South conveyors
- E On the Bagging Platform between Baggers in Pigments Shipping Building
- F Center of Lower Roadway leading out the west door of Pigments Shipping Building, adjacent to Bagging Area and Hopper Car Loading

TABLE 10
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Organics Area (See map for sample locations)	1 thru 9	6-7-73 (P.M.)	Phosgene	None Detected		Unico Gas ' Detection Tubes
	8	6-22-73 (P.M.)	Phosgene	1 ppm	DH Still Feed Tank Open for Cleaning	Ditto
	1 thru 9	6-7-73 (P.M.)	Carbon Tetrachloride	None Detected		Unico Gas Detection Tubes
	3, 4, 8, 9	6-7-73 (P.M.)	Hydrogen Chloride	None Detected		Unico Gas Detection Tubes
S.W. Corner of 6-20-73 VCM Cracker Pad			VC	None Detected	N.E. Wind at 6 mph	Activated Carbon Adsorption, G.C.
			EC	0.15 ppm		
			VDC	0.05 ppm		
			EDC	0.06 ppm		
			MC	0.05 ppm		
			Tri	0.16 ppm		
			TCE	< 0.01 ppm		
			Per	0.20 ppm		

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TABLE 10 - (CONT'D.)
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
	VCM Plant Lab	6-21-73	VC	4.5 ppm		Activated Carbon Adsorption/G.C.
			EC	0.74 ppm		
			VDC	0.03 ppm		
			EDC	0.48 ppm		
			MC	0.46 ppm		
			Tri	0.17 ppm		
			TCE	None Detected		
			Per	0.25 ppm		
			Unsym	None Detected		
			Sym	None Detected		
			Penta	None Detected		
	Area "B" Maintenance Shop	6-21-73	VC	0.09 ppm		Activated Carbon Adsorption/G.C.
			EC	0.22 ppm		
			VDC	0.06 ppm		
			EDC	0.15 ppm		
			MC	0.95 ppm		
			Tri	0.14 ppm		
			TCE	0.50 ppm		
			Per	0.44 ppm		
			Unsym	0.18 ppm		
			Sym	0.54 ppm		
			Penta	0.03 ppm		
	S.E. Corner of OHC Plant	6-27-73	VC	0.03 ppm		Activated Carbon Adsorption/G.C.
			EC	0.09 ppm		
			VDC	0.04 ppm		
			EDC	0.37 ppm		
			MC	0.06 ppm		
			Tri	0.08 ppm		
			TCE	0.14 ppm		
			Per	0.14 ppm		

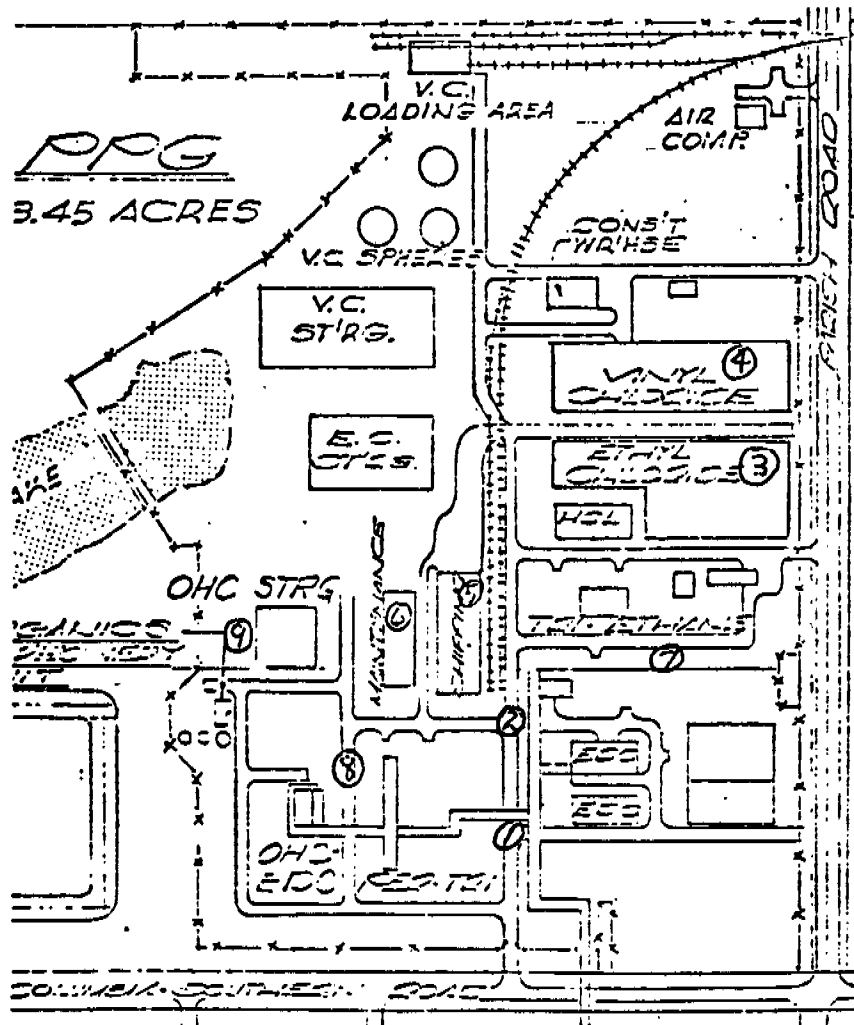
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Organics Area

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Sampling

Points



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TABLE 11
OCCUPATIONAL ENVIRONMENT AIR MONITORING

<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Maintenance Personnel	Insulator	7-12-73 (Mid-day)	Asbestos	0.08 fibers > 5 μ /ml	Typical insulating job - fitting pre- formed asbestos insulation.	Personnel monitor with membrane filter.
	Area "B" Shop	-----	Chlorinated Hydrocarbons	-----	-----	See Table 10
	Mercury Circuit Shop	-----	Mercury	-----	-----	See Table 2

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