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

LD-1121

CONTINUING PROGRAM OF MONITORING ATMOSPHERIC CONTAMINANTS WITHIN THE LAKE CHARLES PLANT

by

Mark Wood

February 10, 1970

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LABORATORY DEPARTMENT
MARK WOOD

TECHNICAL REPORT
FEBRUARY 10, 1970

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

ABSTRACT

Early in 1969 a program was started to periodically investigate the occupational environments of plant personnel. This report is a summary of data collected in all plant areas as of January 1970.

INTRODUCTION

Early in 1969 a program was started to periodically investigate the occupational environments of plant personnel. Air-borne contaminants that are irritants or health hazards have been and will continuously be monitored to establish levels in various areas and to insure that no employee's health is endangered.

DISCUSSION

Throughout the survey, concentrations of contaminants near or above the accepted limits have been brought to the attention of the supervision of that particular area.

The new term for the maximum allowable concentration of a contaminant, Threshold Limit Value (T.L.V.), is the highest average concentration permitted in an 8 hour work day.

In addition to the testing at the Mercury Cell area with personnel monitors, routine bi-weekly sampling is done at selected locations. A map of the area with averaged readings at each sampling location is included in the appended survey summary.

Following is a list of contaminants detected, their Threshold Limit Value (T.L.V.), methods of measurement employed, and the range of the methods:

Ammonia — T.L.V. 50 ppm

Measured by MSA Monitaire Sampler and MSA NH_3 Tubes

Range: 1 to 200 ppm

Table 3

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DISCUSSION - (Cont'd.)

Chlorine

T.L.V. 1 ppm

Measured by MSA Monitaire Sampler and MSA NH_3 Tubes

Range: 0.25 to 5 ppm

Tables 1, 3, 4, 5, 6, 7, 8

Chlorine Dioxide

T.L.V. 0.1 ppm

(Can not be measured in presence of Cl_2.)
Measured by Unico Precision Gas Detector and Unico Cl_2 or ClO_2 Tubes

Range: 1 to 40 ppm

Table 7

1,2-Dichloroethane

T.L.V. 200 ppm

Measured by Unico Precision Gas Detector and Unico 1,2-Dichloroethane Tubes

Range: 10 to 400 ppm

Table 10

Ethylene

T.L.V. Not determined.

Measured by Unico Precision Gas Detector and Unico Ethylene Tubes

Range: 0.5 to 100 ppm

Table 10

Hydrogen Chloride

T.L.V. 5 ppm

Measured by Unico Precision Gas Detector and also MSA Monitaire Sampler using the appropriate Tubes

Range: 1 to 20 ppm

Table 7

Lead

T.L.V. 0.2 mg/M^3

Measured by MSA Monitaire Sampler with paper filter head using MSA Lead-in-Air Detector Reagent Kit

Range: 0.05 to 6.3 mg/M^3

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Table 6

DISCUSSION - (Cont'd.)

Mercury

T.L.V. 0.05 mg/M³

Measured by MSA Monitaire Sampler, Unico Precision Gas Detector, or J-W Lemaire Mercury Sniffer

Range: Monitaire Tubes - 0.03 to 1 mg/M³
Unico Tubes - 0.1 to 2 mg/M³
J-W Lemaire Sniffer - 0.010 to 1 mg/M³

Tables 1,2

Methyl Chloroform

T.L.V. 350 ppm

Measured by Unico Precision Gas Detector and Unico 1,1,1-Trichloroethane Tubes

Range: 50 to 800 ppm

Table 10

Particulates - Asbestos and Amorphous Silica

A T.L.V. of 15 mg/M³ or 50 million particles per cubic foot of air (whichever value is smaller) is recommended for "inert" or "nuisance" particles. It must be remembered that respirable silica or silicate is certainly more serious than a mere nuisance.

Toxicity work done with both silicas and silicates has been based on particle count rather than mass; therefore comparison of the recommended T.L.V. with data obtained with the only available methods of collection is difficult or impossible at this time.

Electrostatic precipitation and MSA Monitaire Samplers with filter heads are the methods used for particulate mass evaluation in this survey.

Range: Unlimited

Tables 6, 9

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DISCUSSION - (Cont'd.)

Perchloroethylene

T.L.V. 100 ppm

Measured by Unico Precision Gas Detector and Unico Per/Tri Tubes

Range: 10 to 400 ppm

Table 10

Phosgene

T.L.V. 0.1 ppm

Measured by Unico Precision Gas Detector and Unico Phosgene Tubes

Range: 0.05 to 50 ppm

Table 10

Sodium Hydroxide Mist

T.L.V. 2 mg/M^3

Measured by Gelman High Volume Sampling Pump equipped with Greenburgh-Smith Impinger used as water scrubber.

Sensitivity: 1 mg NaOH

Table 4

Trichloroethylene

T.L.V. 100 ppm

Measured by Unico Precision Gas Detector and Per/Tri Tubes

Range: 10 to 400 ppm

Table 10

Vinyl Chloride

T.L.V. 500 ppm or 0.05 Volume %

Measured by Unico Precision Gas Detector and Vinyl Chloride Tubes

Range: 0.05 to 1.0%

Table 10

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RECOMMENDATIONS

It is recommended that the program be continued and expanded as necessary and that a report containing the new data be issued each year as an addendum to LD-1121.

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Mark Wood

Approved: C. P. LeBlanc 3/6/70
C. P. LeBlanc

MW:rw

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TABLE 1
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
ercury Cell Circuit	Cell Operator	4-1-69 (Mid-day)	Chlorine	< 1/2 ppm		Monitaire Sampler
	Brine Operator	4-1-69 (Mid-day)	Chlorine	< 1/2 ppm		" "
	Lead Operator	4-25-69 (A.M.)	Chlorine	< 1/2 ppm	Stays inside Control Room	" "
	Brine Operator	10-6-69 (A.M.)	Chlorine	1/2 ppm		" "
	Cell Repairman	10-6-69 (A.M.)	Chlorine	1 ppm	Uses respirator around open cells.	" "
	Cell Operator	10-8-69 (Mid-day)	Chlorine	1/2 ppm		" "
	Cell Operator	4-1-69 (Mid-day)	Mercury	0.05 mg/M^3		Monitaire Sampler
	Brine Operator	4-1-69 (Mid-day)	Mercury	0.05 mg/M^3		" "
	Lead Operator	4-25-69 (A.M.)	Mercury	0.05 mg/M^3	Stays inside Control Room	" "
	Brine Operator	10-6-69 (A.M.)	Mercury	0.10 mg/M^3		" "
	Cell Repairman	10-6-69 (A.M.)	Mercury	0.13 mg/M^3	Uses respirator around open cells.	" "
	Cell Operator	10-8-69 (Mid-day)	Mercury	0.08 mg/M^3		" "

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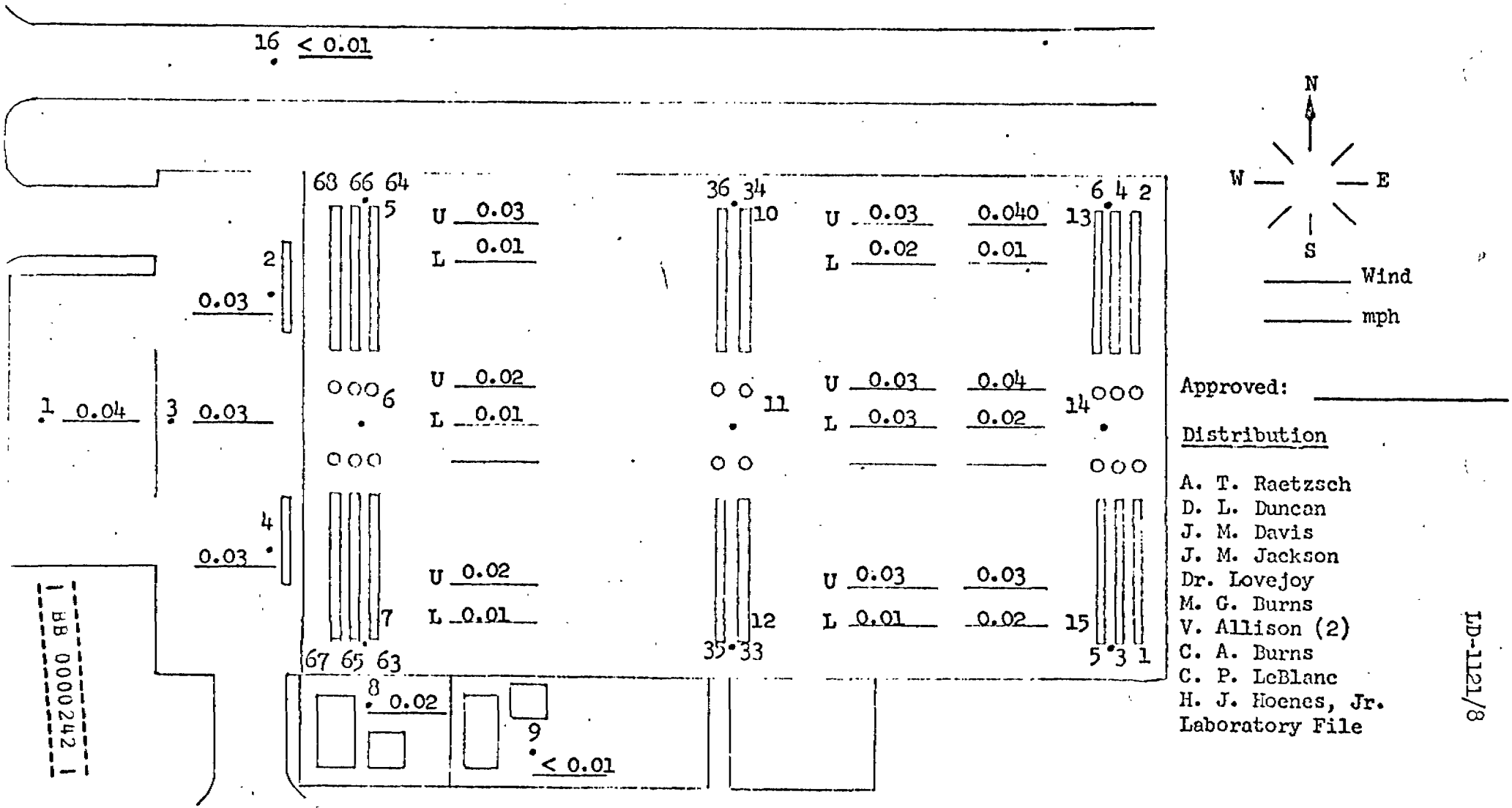
(Rev. 10/[illegible])

TABLE 2 - [illegible] AVERAGES
MERCURY IN AIR AT MERCURY CELL
(Hg in mg/M³)

Date: 10-3-69 through 2-2-70

Laboratory	0.03	Control Room	0.03	H_2 Stack Area	< 0.01
Lunch Room	0.04	Office	0.03	Open Cells	
No. of People	--	Motor Control	< 0.01		
Rest Room	0.03	Area Maintenance	< 0.01		
Locker Room	0.03	13.8 KV Sw. Gr.	< 0.01		



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U - Cell Floor

TABLE 3
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method	
Brine Treatment - Liquefaction	Liquefaction Operator	4-1-69 (A.M.)	Chlorine	1/2 ppm		Monitaire	Sampler
	"	4-28-69 (Mid-day)	Chlorine	1/2 ppm		"	"
	"	10-9-69 (Mid-day)	Chlorine	1/2 ppm		"	"
	Brine Treatment Operator	10-9-69 (Mid-day)	Chlorine	1/2 ppm		"	"
	Liquefaction Operator	4-1-69 (A.M.)	Ammonia	3 ppm		"	"
	"	4-28-69 (Mid-day)	Ammonia	< 1 ppm		"	"
	"	10-9-69 (Mid-day)	Ammonia	5 ppm		"	"
	Brine Treatment Operator	10-9-69 (Mid-day)	Ammonia	< 1 ppm		"	"

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TABLE 4
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Caustic Plant	Evaporator Operator	4-10-69 (Mid-day)	Chlorine	< 1/2 ppm		Monitaire Sampler
	Lead Operator	4-10-69 (A.M.)	Chlorine	< 1/2 ppm		" "
	Lead Operator	10-8-69 (A.M.)	Chlorine	1/2 ppm		" "
Caustic Byrd Platform		10-8-69 (A.M.)	NaOH Mist	< 10 mg/M³		Water Scrubbers

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TABLE 5
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Diaphragm Cell Circuits	Tender, Circuits 1,2	4-11-69 (A.M.)	Chlorine	> 1 ppm	Forgot to turn off sampler when respirator was in use.	Monitaire Sampler
	"	4-23-69 (Mid-day)	Chlorine	1/2 ppm		" "
	Tender, Circuits 3,4	4-11-69 (A.M.)	Chlorine	1/2 to 1 ppm		" "
	Tender, Circuits, 7,8	4-23-69 (Mid-day)	Chlorine	>> 1 ppm	Forgot to turn off sampler when respirator was in use.	" "
	Tender, Circuits 1,2	10-10-69 (A.M.)	Chlorine	1/2 ppm		" "
	Tender, Circuits 5,6	10-10-69 (A.M.)	Chlorine	1/2 ppm		" "
	Tender, Circuits 7,8	10-10-69 (A.M.)	Chlorine	< 1/2 ppm		" "

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TABLE 6

OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Diaphragm Cell Repair and Manufacturing	Utility Man	4-2-69 (Mid-day)	Chlorine	1 ppm		Monitaire Sampler
	"	4-25-69 (Mid-day)	Chlorine	1/2 ppm		" "
	Lead Man	10-8-69 (Mid-day)	Chlorine	1/2 ppm		" "
	Lead Pot Operator	4-2-69 (A.M.)	Lead	< 0.05 mg/M^3		Monitaire Sampler
	Solder Pot Operator	4-25-69 (A.M.)	Lead	0.20 mg/M^3		" "
	"	5-2-69 (P.M.)	Lead	0.1 to 0.15 mg/M^3		" "
	Lead Pot Operator	10-7-69 (P.M.)	Lead	0.05 mg/M^3		" "
	Solder Pot Operator	10-7-69 (P.M.)	Lead	> 0.40 mg/M^3	While wiping solder onto bars.	" "
	"	10-7-69 (P.M.)	Lead	0.10 mg/M^3	Average throughout work routine.	" "
	Diaphragm Depositor	4-2-69 (P.M.)	Particulates	6 mg/M^3		" "

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TABLE 7
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Sodium Chlorate	Operator	4-21-69 (Mid-day)	Chlorine - Chlorine Dioxide	1/2 ppm		Monitaire Sampler
	Maintenance Man	4-21-69 (Mid-day)	Chlorine - Chlorine Dioxide	1/2 to 1 ppm	Working over drier and crystallizer.	" "
	Lead Operator	10-13-69 (P.M.)	Chlorine - Chlorine Dioxide	< 1/2 ppm		" "
	Operator	10-13-69 (P.M.)	Chlorine - Chlorine Dioxide	3/4 ppm		" "
	Operator	4-21-69 (Mid-day)	Hydrogen Chloride	< 2 ppm		" "
	Maintenance Man	4-21-69 (Mid-day)	Hydrogen Chloride	< 2 ppm		" "
	Lead Operator	10-13-69 (P.M.)	Hydrogen Chloride	< 2 ppm		" "
	Operator	10-13-69 (P.M.)	Hydrogen Chloride	< 2 ppm		" "

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TABLE 8
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Powerhouses	"A" Turbine Operator	4-22-69 (Mid-day)	Chlorine	None detected	Stays in Powerhouse "A"	Monitaire Sampler
	Watch Engineer	4-22-69 (Mid-day)	Chlorine	1/2 ppm	Works in both powerhouses and surrounding areas.	" "
	Watch Engineer	12-30-69 (Mid-day)	Chlorine	1/2 ppm	Same as above.	" "
	Utility Operator	12-30-69 (Mid-day)	Chlorine	1/2 ppm	Same as above.	" "

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TABLE 9

OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Silica Pigments (See note for locations of sampling.)	A	10-28-68 (A.M.)	Particulates	1 mg/M^3		Monitaire Sampler
		10-29-68 (A.M.)		1 mg/M^3		
		10-31-68 (A.M.)		< 1 mg/M^3		
		11-1-68 (A.M.)		< 1 mg/M^3		
	B	10-28-68 (A.M.)		1 mg/M^3		
		10-29-68 (A.M.)		1 mg/M^3		
		10-30-68 (A.M.)		2 mg/M^3		
		10-31-68 (A.M.)		< 1 mg/M^3		
		11-1-68 (A.M.)		2 mg/M^3		
	C	3-27-69 (P.M.)		5 mg/M^3	During bagging.	Electrostatic Precipitation
		3-27-69 (P.M.)		.3 mg/M^3	Bagging ceased.	
		3-27-69 (P.M.)		3 to 4 mg/M^3	Bagging 50% of sampling period.	Monitaire Samp.
		10-22-69 (P.M.)		0.7 mg/M^3	No activity in building.	Electrostatic Precipitation
		1-29-70 (P.M.)		15 mg/M^3	Bagging operations had just ceased.	

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TABLE 9 - (Cont'd.)
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Silica Pigments (See note for locations of sampling.)	D	3-28-69 (A.M.)	Particulates	5 mg/m^3	Not bagging.	Electrostatic Precipitation
		3-28-69 (A.M.)		6 mg/m^3	"	
		3-28-69 (A.M.)		1 to 2 mg/m^3	"	Monitaire Sampler
		10-22-69 (P.M.)		8 mg/m^3	No activity in building.	Electrostatic Precipitation
		1-29-70 (P.M.)		41 mg/m^3	Bagging had just ceased.	
	E	5-5-69 (A.M.)		55 mg/m^3	During bagging.	
		5-5-69 (A.M.		40 mg/m^3	During Baggers' coffee break.	
		5-20-69 (A.M.)		58 mg/m^3	During bagging.	
		5-20-69 (A.M.)		28 mg/m^3	Bagging part of sampling period.	
		5-20-69 (P.M.)		69 mg/m^3	During bagging.	
	F	1-29-70 (P.M.)		147 mg/m^3	Bagging had just ceased.	

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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 North-East 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

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Organics Area

Sampling

Points

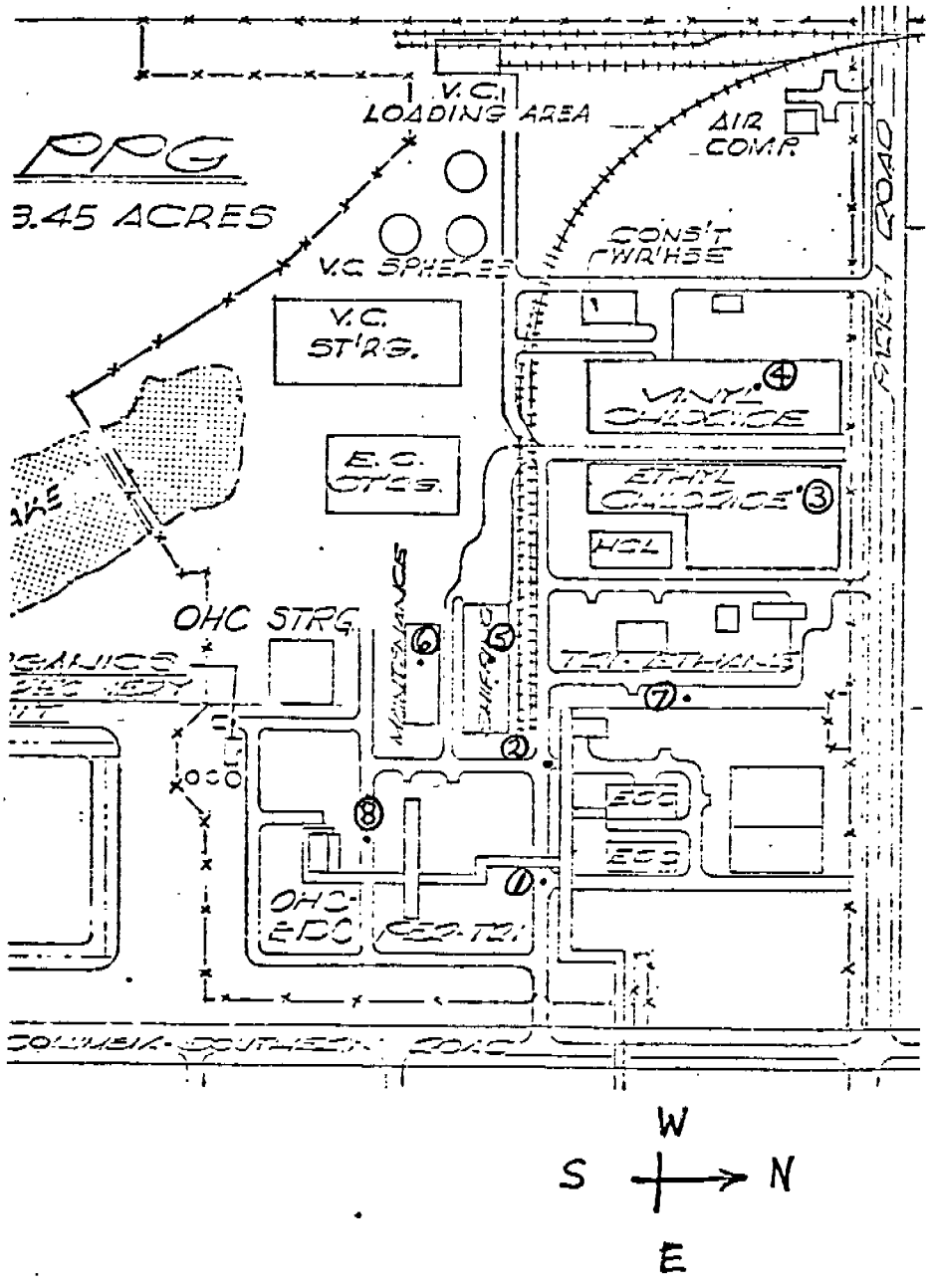

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TABLE 10
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Organics (See map for sample points.)	Sample Point 1	10-17-69 (P.M.)	Ethylene	None Detected	3-5 mph E wind	Unico Gas Detection Tube
	Sample Point 2	"	"	"	"	"
	Sample Point 3	"	"	50 ppm	"	"
	Sample Point 4	"	"	None Detected	"	"
	Sample Point 5	"	"	"	-	"
	Sample Point 7	"	"	"	3-5 mph E Wind	"
	Sample Point 8	"	"	"	5-7 mph N-E Wind	"
	Sample Point 1	12-29-69 (P.M.)	"	"	Variable Strong Wind	"
	Sample Point 2	"	"	"	10-13 mph S Wind	"
	Sample Point 3	"	"	"	4-7 mph S-W Wind	"
	Sample Point 4	"	"	"	10-15 mph S-S Wind	"
	Sample Point 1	1-12-70 (A.M.)	"	"	10 mph NNE Wind	"
	Sample Point 2	"	"	.1ppm	"	"
	Sample Point 3	"	"	None Detected	"	"
	Sample Point 4	"	"	"	"	"
	Sample Point 5	"	"	"	"	"
	Sample Point 7	"	"	"	"	"

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Table 10 (cont'd)
OCCUPATIONAL ENVIRONMENT AIR MONITORING

rea	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
ganics e map for mple points.)	Sample Point 1	10-17-69 (A.M.)	Phosgene	None Detected	3-5 mph NE Wind	Unico Gas Detection Tube
	Sample Point 2	"	"	"	"	"
	Sample Point 3	"	"	"	"	"
	Sample Point 5	"	"	"	-	"
	Sample Point 6	"	"	"	-	"
	Sample Point 7	"	"	"	3-5 mph N-E Wind	"
	Sample Point 8	"	"	"	"	"
	Sample Point 1	12-29-69 (P.M.)	"	"	5-14 mph Variable wind	"
	Sample Point 2	"	"	"	10-13 mph, S Wind	"
	Sample Point 3	"	"	"	4-7 mph, S Wind	"
	Sample Point 1	1-12-70 (A.M.)	Phosgene	"	10 mph N-NE Wind	"
	Sample Point 2	"	"	"	"	"
	Sample Point 8	"	"	"	"	"
	Sample Point 3	10-17-69 (P.M.)	Vinyl Chloride	None Detected	3-5 mph E Wind	"
	Sample Point 4	"	"	<.05%	"	"
	Sample Point 3	12-29-69 (P.M.)	"	<.05%	4-7 mph S-W Wind	"
	Sample Point 4	"	"	<.05%	10-15 S-SW Wind	"
	Sample Point 4	1012-69 (A.M.)	"	<.05%	10 mph N-NE Wind	"

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Table 10 (cont'd)
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Organics	Sample Point 1	10-16-69 (P.M.)	Per & Tri	5ppm	3-5 mph E Wind	Unico Gas Detection Tube
	Sample Point 2	"	"	7ppm	"	"
	Sample Point 5	"	"	5ppm	-	"
	Sample Point 6	"	"	<5ppm	-	"
	Sample Point 7	"	"	<5ppm	3-5 mph N-E Wind	"
	Sample Point 8	"	"	5ppm	"	"
	Sample Point 1	12-29-69 (P.M.)	"	5ppm	10-13 mph S Wind	"
	Sample Point 2	"	"	5ppm	"	"
	Sample Point 1	1-12-70 (A.M.)	"	None Detected	10 mph N-NE Wind	"
	Sample Point 2	"	"	"	"	"
	Sample Point 5	"	"	5ppm	-	"
	Sample Point 6	"	"	5ppm	-	"
	Sample Point 8	"	"	15ppm	10 mph N-NE Wind	"
	Sample Point 1	12-29-69 (P.M.)	Methyl Chloroform	25ppm	10-13 mph Variable Wind	"
	Sample Point 2	"	"	None Detected	10-13 mph S Wind	"
	Sample Point 1	1-12-70 (A.M.)	"	"	10 mph N-NE Wind	"
	Sample Point 2	"	"	"	"	"
	Sample Point 3	"	"	"	"	"
	Sample Point 5	"	"	"	-	"

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Table 10 (cont'd)
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Organics	Sample Point 6	1-12-70 (A.M.)	Methyl Chloroform	None Detected	-	Unico Gas Detection Tube
	Sample Point 7	"	"	"	10 mph N-NE Wind	"
	Sample Point 1	1-12-70 (A.M.)	1,2 Dichloroethane	"	10mph N-NE Wind	"
	Sample Point 2	"	"	10ppm	"	"
	Sample Point 3	"	"	None Detected	"	"
	Sample Point 4	"	"	"	"	"
	Sample Point 5	1-12-70	"	15ppm	-	"
	Sample Point 6	"	"	5ppm	-	"
	Sample Point 7	"	"	10ppm	10 mph N-NE Wind	"
	Sample Point 8	"	"	10ppm	"	"

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