

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

JUN 7 1972

LD-1121D

CONTINUING PROGRAM OF MONITORING ATMOSPHERIC CONTAMINANTS
WITHIN THE LAKE CHARLES PLANT

by

Mark Wood

May 12, 1972

Distribution

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T. Taylor
R. Kaspar
E. McVicker
W. Chapman
C. P. LeBlanc
Central Files - G.O.
Technical Files (6)
Author
Laboratory File

Key Words

Occupational Environment
Atmospheric Contaminants
Montaire Sampler
MSA Universal Pump
Andersen Mini Sampler
Electrostatic Precipitation
Unico Gas Detector
Mercury Vapor Detector
OSHA
Heat Stress
ACGIH
Asbestos Fibers
Wet Bulb Globe Temperature

SL 093303

LABORATORY DEPARTMENT
MARK WOOD

TECHNICAL REPORT
MAY 12, 1972

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

ABSTRACT

The tables composing this report are continuations of occupational environment surveys started early in 1969 and contain data from all plant areas from November 1971 to May 1972.

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 November 1971 through May 1972.

DISCUSSION

The methods and sampling times stated in previous reports have not been changed. Two additional surveys are included in anticipation of more rigid regulations. The first addition, Table 11, is airborne asbestos with regard to diaphragm cell manufacturing and maintenance insulators. The second, Tables 12 and 13, is heat stress analysis in Mercury Circuit and Diaphragm Areas.

Airborne asbestos samples were taken with personnel monitoring equipment pulling an air sample through a membrane. The membranes were sent to Barberton for sizing and counting of the asbestos particles.

Heat stress measurements were accomplished using natural wet bulb, dry bulb, and globe thermometers as outlined in the "Notice of Intent to Establish" section of the 1971 American Conference of Governmental Industrial Hygienists booklet. For each job classification where men work in high heat exposures, a threshold limit value is obtained from their energy output. The exposure is expressed as degrees wet bulb-globe temperature. WBGT takes into consideration variables such as radiant heat and evaporative effect due to air currents and humidity.

Since some threshold limit values have been changed, a new tabulation of these values is appended.

Results of these surveys, tabulated by areas, are appended. Table 7 on sodium chlorate has been removed.

Author: Mark Wood 5-16-72
Mark Wood Date

Approved: C. P. LeBlanc 5-25-72
C. P. LeBlanc Date

MW:rw

SL 093304

A P P E N D I X

Threshold Limit Values
of
Airborne Contaminants and Physical Agents¹
 (Existing within the Lake Charles Plant)

<u>Contaminant</u>	<u>T.L.V. Concentration</u>
Ammonia	50 ppm (intended change - 25 ppm)
Chlorine	1 ppm
Hydrogen Chloride	5 ppm
Lead	0.20 mg/M ³ (intended change - 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
Trichlorethylene	100 ppm
Vinyl Chloride	500 ppm (intended change - 200 ppm)
<u>Mineral Dusts</u>	
Nuisance Dust	10 mg/M ³
Asbestos	20 m.p.p.c.f. (intended change - 5 fibers > 5 μ /ml)
Silica Pigments	6 mg/M ³ (adopted by PPG Industries, Inc.)
<u>Heat Stress</u>	See graph - page LD-1121D/5

From 1971 Edition, Threshold Limit Values of Airborne Contaminants
Adopted by ACGIH (American Conferences of Governmental Industrial Hygienists).

TABLE 1
OCCUPATIONAL ENVIRONMENT AIR MONITORING

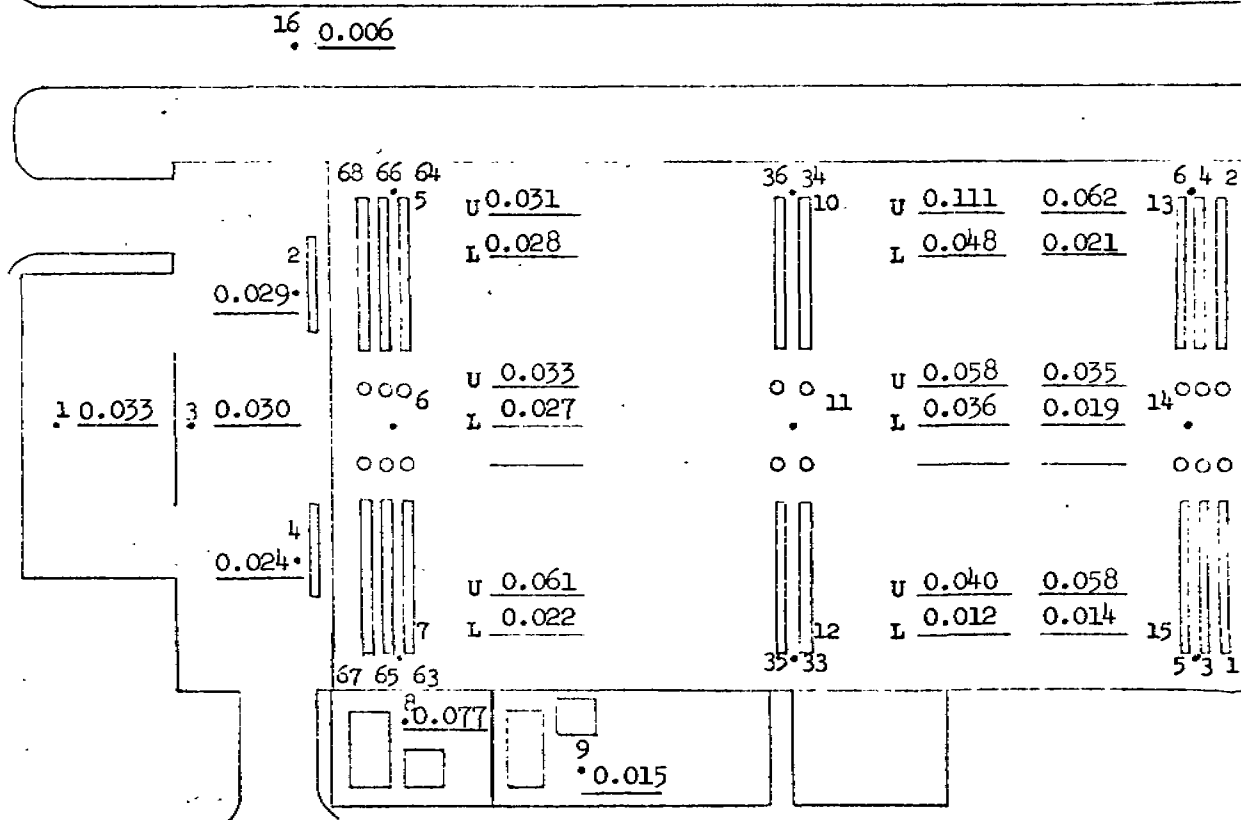
<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Mercury Cell Circuit	Cell Operator	3-15-72 (A.M.)	Chlorine	1/2 ppm	-	Monitaire Sampler
	Cell Auxiliary Operator	Ditto	Chlorine	< 1/2 ppm	-	Ditto
	Cell Repairman	Ditto	Chlorine	< 1/2 ppm	-	Ditto
	Cell Cut-Out Man	Ditto	Chlorine	1/2 ppm	-	Ditto
	Cell Operator	3-15-72 (A.M.)	Mercury	0.05 mg/M ³	Numerous Cells being Cut Out	Monitaire Sampler
	Cell Auxiliary Operator	Ditto	Mercury	0.10 mg/M ³	Ditto	
	Cell Repairman	Ditto	Mercury	< 0.05 mg/M ³	Ditto	
	Cell Cut-Out Man	Ditto	Mercury	0.10 mg/M ³	Ditto	

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(Rev. 10/69)

TABLE 2
MERCURY IN AIR AT MERCURY CELL
(Hg in ug/m³)

Date: 11/16/71 thru 5/3/72
(Average of 33 surveys)

Laboratory	0.008	Control Room	0.012	H ₂ Stack Area	< 0.005
Lunch Room	0.040	Office	0.010	Open Cells	-
No. of People	6	Motor Control	0.026	Relative Humidity	-
Rest Room	0.020	Area Maintenance	0.013	Temperature	-
Locker Room	0.013	13.8 KV Sw. Gr.	< 0.005	Maintenance	< 0.005
				Lunch Room	



Surveys taken with J-W Lemare Mercury Sniffer, Model MV-2.

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	3-17-72 (A.M.)	Chlorine	< 1/2 ppm		Monitaire Sampler
	Brine Treatment Operator	Ditto	Chlorine	< 1/2 ppm		Ditto
	Liquefaction Operator	3-17-72 (A.M.)	Ammonia	< 5 ppm		Monitaire Sampler
	Brine Treatment Operator	Ditto	Ammonia	< 5 ppm		Ditto

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	DH Operator	3-16-72 (A.M.)	Chlorine	< 1/2 ppm		Monitaire Sampler
	"A" Evaporator Operator	Ditto	Chlorine	< 1/2 ppm		Ditto
	Filter Operator	Ditto	Chlorine	1/2 ppm		Monitaire Sa er
	Lead Operator	Ditto	Chlorine	< 1/2 ppm		Ditto
	DH Operator	3-16-72 (A.M.)	Ammonia	< 5 ppm		Monitaire Sampler
	"A" Evaporator Operator	Ditto	Ammonia	< 5 ppm		Ditto
	Filter Operator	Ditto	Ammonia	< 5 ppm		Ditto
	Lead Operator	Ditto	Ammonia	< 5 ppm		Ditto
Caustic Bird Area	-	4-20-72 (A.M.)	NaOH Mist	0.2 mg/M ³		Water Scrubber/ Atomic Absorption Sodium Anal.
PELS®/Anhydrous	Operator	3-17-72 (A.M.)	Chlorine	< 1/2 ppm		Monitaire Sampler
	PELS® Shipping Packer	4-03-72 (A.M.)	Chlorine	< 1/2 ppm		Ditto

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	3-14-72 (P.M.)	Chlorine	1/2 ppm		Monitaire Sampler
	Tender, Circuits 5,6	Ditto	Chlorine	1/2 ppm		Ditto
	Tender Circuits 7,8	Ditto	Chlorine	1/2 ppm		Ditto
	Operators	Ditto	Chlorine	1/2 ppm		Ditto

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TABLE 6
OCCUPATIONAL ENVIRONMENT AIR MONITORING

Area	Monitored Personnel	Date-Time	Contaminant	Concentration	Conditions	Method
Diaphragm Cell Repair and Manufacturing	Lead Pot Area (No. 3)	3-14-72	Lead	0.05 mg/M ³	Removing graphite chips.	MSA Universal Pump with Pb Kit
	Lead Pot Area (No. 3)	Ditto	Lead	< 0.05 mg/M ³	Pouring Lead	Ditto
	Lead Pot Area (No. 6)	Ditto	Lead	< 0.05 mg/M ³	Pouring Lead	Ditto
	Solder Wiping Area	Ditto	Lead	< 0.05 mg/M ³	Wiping "	Ditto
	Solder Wiping Area	Ditto	Lead	< 0.05 mg/M ³	Not Wiping	Ditto
	Repairman at Mastic Area	3-14-72	Chlorine	< 1/2 ppm		Monitaire Sampler
	Repairman at Acid Dipping Area	5-11-72 (A.M.)	Hydrogen Chloride	< 1 ppm	Submerging cathodes.	MSA Universal Test Kit
		5-11-72 (A.M.)	Hydrogen Chloride	2 ppm	Raising cathodes.	Ditto
		Ditto	Hydrogen Chloride	10 ppm	Draining cathodes. (Respirator in use.)	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>
Powerhouses	"A" Watch Engineer	4-3-72 (A.M.)	Chlorine	< 1/2 ppm		Monitaire Sampler
	"A" Utility Operator	Ditto	Chlorine	< 1/2 ppm		Ditto
	"B" Watch Engineer	Ditto	Chlorine	< 1/2 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	3-14-72 (A.M.)	Particulates	1.7 mg/M ³	No activity.	Electrostatic precipitation.
	D	Ditto	Particulates	4.3 mg/M ³	Bagging and loading.	Ditto
	E	Ditto	Particulates	42.3 mg/M ³	Bagging and loading.	Ditto
	F	Ditto	Particulates	28.8 mg/M ³	Ditto.	Ditto
Sampling personnel wearing Midget Cascade Impactor while sampling above points - 1 hour.		3-14-72 (A.M.)	Total Particulates	21.6 mg/M ³		Andersen Mini Sampler
			Respirable Portion	11.5 mg/M ³	or 53% respirable.	
					(Wind - SW at 5 mph)	
Furnace Building Upper Floor - South Entrance		5-15-72 (Mid-day)	NaOH Mist	4.0 mg/M ³		Water Scrubber/ "AA" Sodium Analysis

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

TABLE 10
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>
Organics Area (See map for sample locations)	1 thru 8	4-13-72	Phosgene	None detected.	12 mph South wind.	Unico Gas Detection Tubes.
	1 thru 8	4-13-72	Methyl Chloroform	None detected.	12 mph South wind.	Ditto.

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

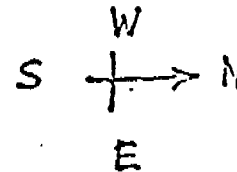
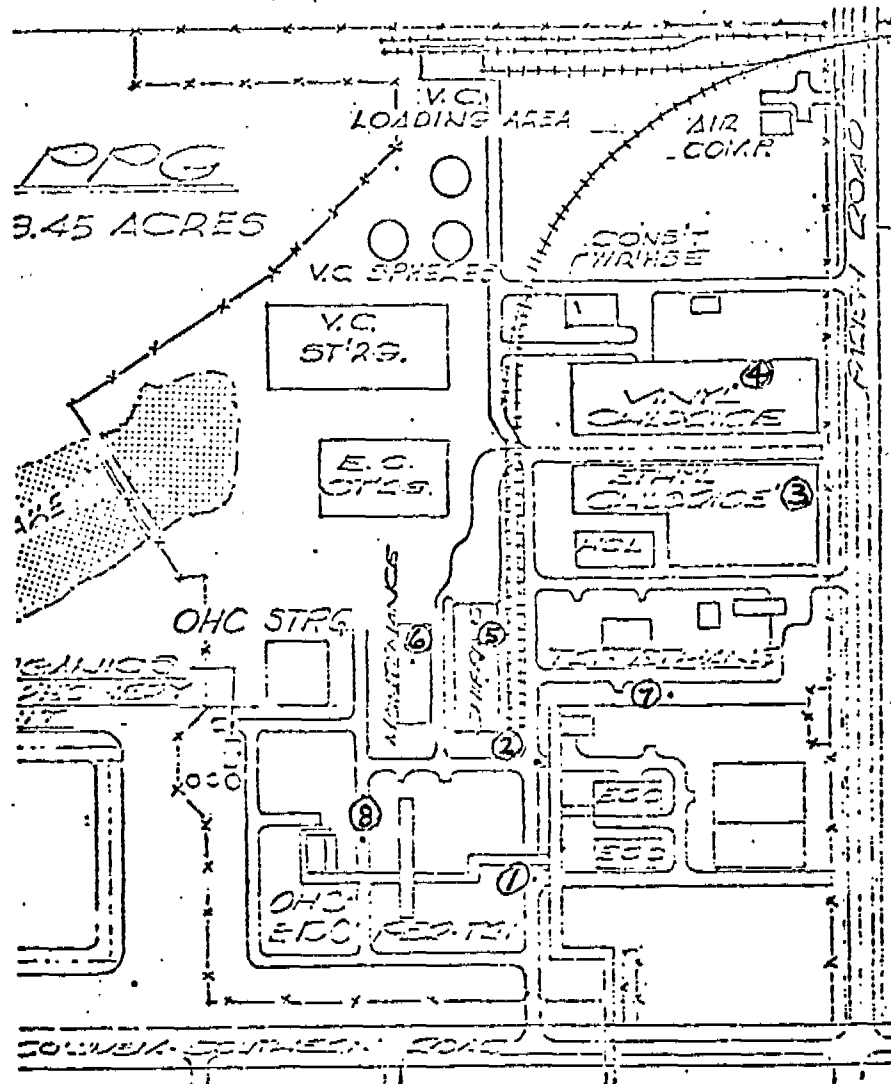
<u>Area</u>	<u>Monitored Personnel</u>	<u>Date-Time</u>	<u>Contaminant</u>	<u>Concentration</u>	<u>Conditions</u>	<u>Method</u>
Organics	1	4-13-72	Per/Tri	10 ppm	12 mph South Wind	Unico Gas Detection Tubes
	2	Ditto	Ditto	10 ppm	Ditto	Ditto
	3	Ditto	Ditto	< 10 ppm	Ditto	Ditto
	5	Ditto	Ditto	< 10 ppm	Ditto	Ditto
	6	Ditto	Ditto	< 10 ppm	Ditto	Ditto
	7	Ditto	Ditto	< 10 ppm	Ditto	Ditto
	8	Ditto	Ditto	< 10 ppm	Ditto	Ditto
	3	4-13-72	Vinyl Chloride	None Detected	12 mph South Wind	Ditto
	4	Ditto	Ditto	Ditto	Ditto	Ditto

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Organics Area

LD-1121D/17

Points



SL 093318

Asbestos in Air

<u>Personnel</u>	<u>Date</u>	<u>Concentration</u>
<u>Diaphragm Cell Repair</u>	(4-3-72)	0.22 fibers > 5 microns/ml
Sampler worn by Depositor during 3-5 hours of work routine - fluffing asbestos and slurry making.	(4-6-72)	0.24 fibers > 5 microns/ml
<u>Insulator - Maintenance</u>		
Insulating experimental Cl ₂ Cell with thermobestos (3 hours). Involved much cutting and fitting.	(4-5-72)	0.30 fibers > 5 microns/ml
Insulating in DH Plant. Very little cutting. Fitting pre-cut pipe insulation with thermobestos (2 hours).	(4-5-72)	0.15 fibers > 5 microns/ml

PROPOSED LIMITS FOR HEAT-WORK STRESS

(Source: ACGIH-1971)

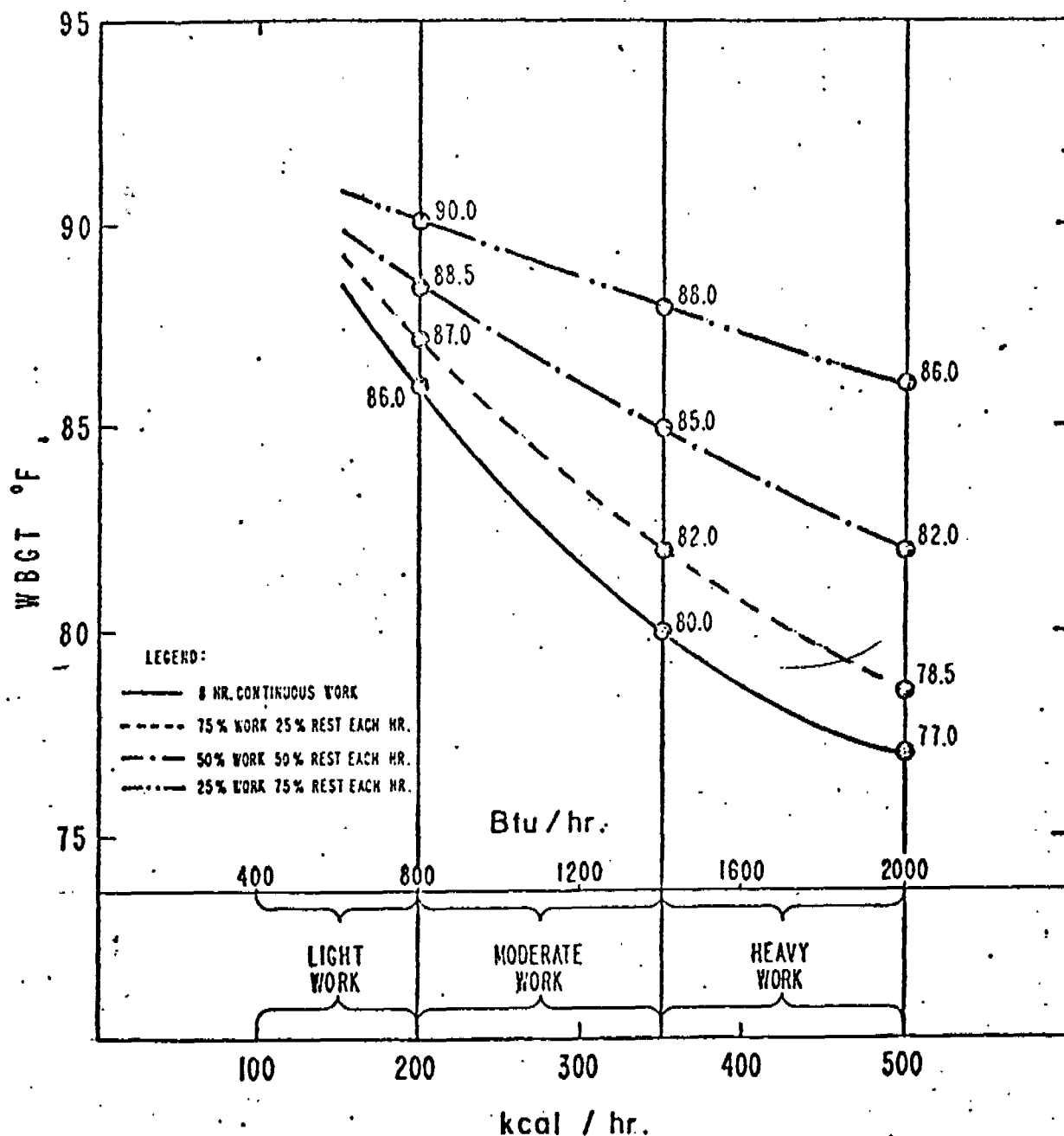


Table 12
PPG INDUSTRIES, INC.
INDUSTRIAL CHEMICAL DIVISION
LAKE CHARLES, LOUISIANA

LD-1121D/19

Heat Analysis - Baseline Environmental Data

Unit	<u>Mercury Circuit</u>	Subtask	<u>Cut Out Crew Men</u>
Date	<u>4/17/72</u>	Shift	<u>Day</u>

Location No. 1 thru 6 (See note for locations.)Subtask DescriptionFormal Rest Breaks (excluding lunch): 2 X 1/2 hours

Body Position:

40 % Walking X 2.5 = 1 K cal/min60 % Standing X 0.6 = 0.4 K cal/min

Work Type:

With body/moderate 5 K cal/minBasal Metabolism 1 K cal/minTotal: 7.4 X 60 = 445 K cal/hr50 % Rest Each Hour

Permissible Heat Exposure TLV:

83	°F
(wbgt)	

Observed Heat Exposure:

xxxx	°F
(wbgt)	

Average of 8 hourly readings
at 6 locations (48 temperatures)

81.2	°F
(wbgt)	

Table 12
PPG INDUSTRIES, INC.
INDUSTRIAL CHEMICAL DIVISION
LAKE CHARLES, LOUISIANA

LD-1121D/20

Heat Analysis - Baseline Environmental Data

Unit Mercury Circuit Subtask Cut Out Crew Men
Date 4/17/72 Shift Evening

Location No. 1 thru 6 (See note for locations.)Subtask DescriptionFormal Rest Breaks (excluding lunch): 2 X 1/2 hours

Body Position:

40 % Walking X 2.5 = 1 K cal/min60 % Standing X 0.6 = 0.4 K cal/min

Work Type:

With body/moderate 5 K cal/minBasal Metabolism 1 K cal/minTotal: 7.4 X 60 = 445 K cal/hr50 % Rest Each Hour

Permissible Heat Exposure TLV:

83 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)82.0 °F
(wbgt)

Table 12
PPG INDUSTRIES, INC.
INDUSTRIAL CHEMICAL DIVISION
LAKE CHARLES, LOUISIANA

LD-1121D/21

Heat Analysis - Baseline Environmental Data

Unit Mercury Circuit Subtask Cut Out Crew Men
Date 4/18/72 Shift Day

Location No. 1 thru 6 (See note for locations)Subtask DescriptionFormal Rest Breaks (excluding lunch): 2 X 1/2 hours

Body Position:

40 % Walking X 2.5 = 1 K cal/min60 % Standing X 0.6 = 0.4 K cal/min

Work Type:

With body/moderate 5 K cal/minBasal Metabolism 1 K cal/minTotal: 7.4 X 60 = 445 K cal/hr50 % Rest Each Hour

Permissible Heat Exposure TLV:

83 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)83.6 °F
(wbgt)

Table 12
 PPG INDUSTRIES, INC.
 INDUSTRIAL CHEMICAL DIVISION
 LAKE CHARLES, LOUISIANA

LD-1121D/22

Heat Analysis - Baseline Environmental Data

Unit Mercury Circuit Subtask Cut Out Crew Men
 Date 4/18/72 Shift Evening

Location No. 1 thru 6 (See note for locations.)

Subtask Description

Formal Rest Breaks (excluding lunch): 2 X 1/2 hours

Body Position:

40 % Walking X 2.5 = 1 K cal/min

60 % Standing X 0.6 = 0.4 K cal/min

Work Type:

With body/moderate 5 K cal/min

Basal Metabolism 1 K cal/min

Total: 7.4 X 60 = 445 K cal/hr

50 % Rest Each Hour

Permissible Heat Exposure TLV:

83 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
 at 6 locations (48 temperatures)

83.6 °F
(wbgt)

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

LD-1121D/23

Heat Analysis - Baseline Environmental Data

Unit Mercury Circuit Subtask Adjustment Crew
Date 4/17/72 Shift Day

Location No. 1 thru 6 (See note for locations.)Subtask DescriptionFormal Rest Breaks (excluding lunch): 2 X 1/2 hours

Body Position:

25 % Walking X 2.5 = 0.6 K cal/min75 % Standing X 0.6 = 0.5 K cal/min

Work Type:

Both Arms/Moderate 2.0 K cal/minBasal Metabolism 1 K cal/minTotal: 4.1 X 60 = 246 K cal/hr0 % Rest Each Hour

Permissible Heat Exposure TLV:

84 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)81.2 °F
(wbgt)

Table 12
PPG INDUSTRIES, INC.
INDUSTRIAL CHEMICAL DIVISION
LAKE CHARLES, LOUISIANA

LD-1121D/24

Heat Analysis - Baseline Environmental Data

Unit Mercury Circuit Subtask Adjustment Crew
Date 4/17/72 Shift Evening

Location No. 1 thru 6 (See note for locations)Subtask DescriptionFormal Rest Breaks (excluding lunch): 2 X 1/2 hours

Body Position:

25 % Walking X 2.5 = 0.6 K cal/min75 % Standing X 0.6 = 0.5 K cal/min

Work Type:

Both Arms/Moderate 2.0 K cal/minBasal Metabolism 1 K cal/minTotal: 4.1 X 60 = 246 K cal/hr0 % Rest Each Hour

Permissible Heat Exposure TLV:

84 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)82.0 °F
(wbgt)

Table 12
PPG INDUSTRIES, INC.
INDUSTRIAL CHEMICAL DIVISION
LAKE CHARLES, LOUISIANA

LD-1121D/25

Heat Analysis - Baseline Environmental Data

Unit Mercury Circuit Subtask Adjustment Crew
Date 4/18/72 Shift Day

Location No. 1 thru 6 (See note for locations)Subtask DescriptionFormal Rest Breaks (excluding lunch): 2 X 1/2 hours

Body Position:

25 % Walking X 2.5 = 0.6 K cal/min75 % Standing X 0.6 = 0.5 K cal/min

Work Type:

Both Arms/Moderate 2.0 K cal/minBasal Metabolism 1 K cal/minTotal: 4.1 X 60 = 246 K cal/hr0 % Rest Each Hour

Permissible Heat Exposure TLV:

84 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)83.6 °F
(wbgt)

Table 12
PPG INDUSTRIES, INC.
INDUSTRIAL CHEMICAL DIVISION
LAKE CHARLES, LOUISIANA

LD-1121D/26

Heat Analysis - Baseline Environmental Data

Unit Mercury Circuit Subtask Adjustment Crew
Date 4/18/72 Shift Evening

Location No. 1 thru 6 (See note for locations.)Subtask DescriptionFormal Rest Breaks (excluding lunch): 2 X 1/2 hours

Body Position:

25 % Walking X 2.5 = 0.6 K cal/min75 % Standing X 0.6 = 0.5 K cal/min

Work Type:

Both Arms/Moderate 2.0 K cal/minBasal Metabolism 1 K cal/minTotal: 4.1 X 60 = 246 K cal/hr0 % Rest Each Hour

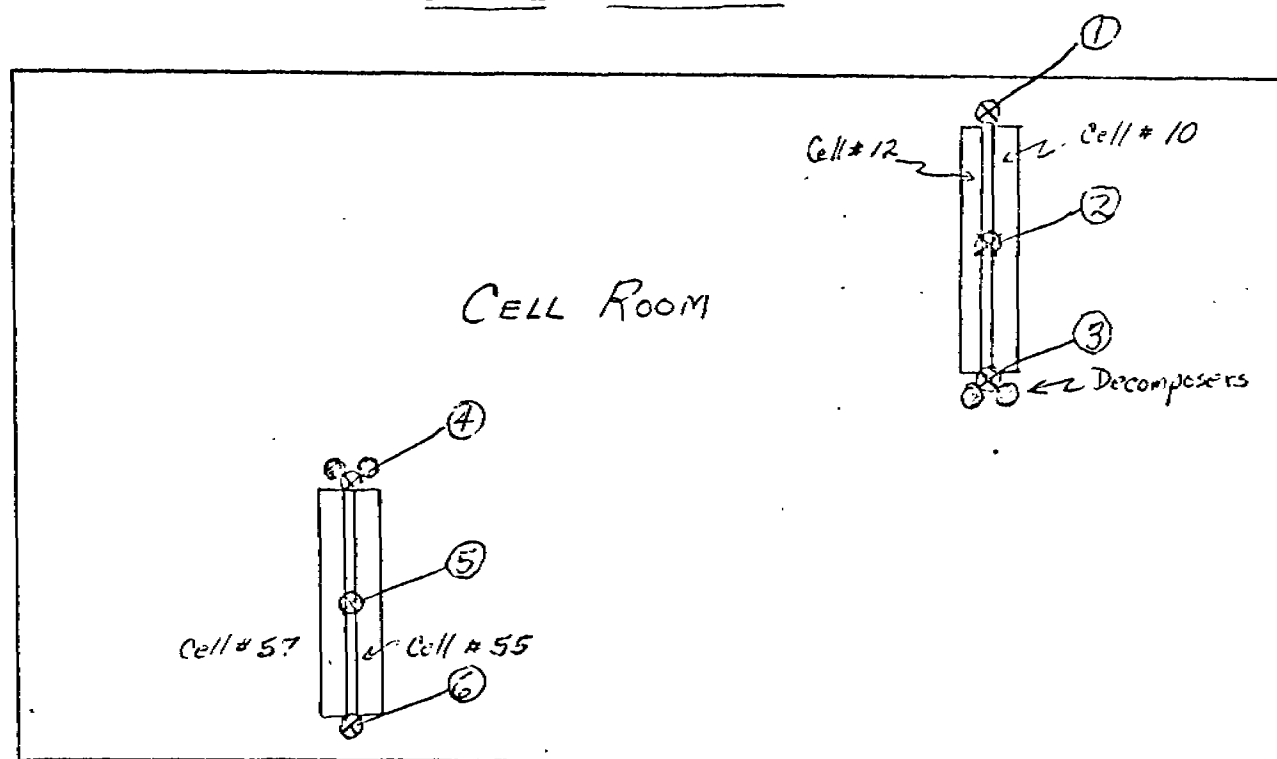
Permissible Heat Exposure TLV:

84 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)83.6 °F
(wbgt)

MERCURY CIRCUIT
HEAT STRESS
SAMPLE LOCATIONS



LD-1121D/27

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

LD-1121D/28

Heat Analysis - Baseline Environmental Data

Unit Diaphragm Circuits Subtask Cut Out Crew
Date 5/4/72 Shift Day

Location No. 1 thru 6 (See note for locations.)Subtask DescriptionFormal Rest Breaks (excluding lunch): 0 X hours

Body Position:

30 % Walking X 2.5 = 0.75 K cal/min70 % Standing X 0.6 = 0.4 K cal/min

Work Type:

Both arms/moderate 2.0 K cal/minBasal Metabolism 1 K cal/minTotal: 4.15 X 60 = 249 K cal/hr75 % Rest Each Hour

Permissible Heat Exposure TLV:

89.5 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)84.2 °F
(wbgt)

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

LD-1121D/29

Heat Analysis - Baseline Environmental Data

Unit Diaphragm Circuits Subtask Cut Out Crew
Date 5/4/72 Shift Evening

Location No. 1 thru 6 (See note for locations)Subtask DescriptionFormal Rest Breaks (excluding lunch): 0 X hours

Body Position:

30 % Walking X 2.5 = 0.75 K cal/min70 % Standing X 0.6 = 0.4 K cal/min

Work Type:

Both arms/Moderate	<u>2.0</u>	K cal/min
Basal Metabolism	<u>1</u>	K cal/min

Total: 4.15 X 60 = 249 K cal/hr75 % Rest Each Hour

Permissible Heat Exposure TLV:

89.5 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)86.3 °F
(wbgt)

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

LD-1121D/30

Heat Analysis - Baseline Environmental Data

Unit Diaphragm Circuits Subtask Cut Out Crew
Date 5/5/72 Shift Day

Location No. 1 thru 6 (See note for locations.)Subtask DescriptionFormal Rest Breaks (excluding lunch): 0 X hours

Body Position:

30 % Walking X 2.5 = 0.75 K cal/min70 % Standing X 0.6 = 0.4 K cal/min

Work Type:

Both arms/moderate	<u>2.0</u>	K cal/min
Basal Metabolism	<u>1</u>	K cal/min

Total: 4.15 X 60 = 249 K cal/hr75 % Rest Each Hour

Permissible Heat Exposure TLV:

89.5 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at 6 locations (48 temperatures)85.0 °F
(wbgt)

Table 13
PPG INDUSTRIES, INC.
INDUSTRIAL CHEMICAL DIVISION
LAKE CHARLES, LOUISIANA

LD-1121D/31

Heat Analysis - Baseline Environmental Data

Unit Diaphragm Circuits Subtask Cut Out Crew
Date 5/5/72 Shift Evening

Location No. 1 thru 6 (See note for locations)Subtask DescriptionFormal Rest Breaks (excluding lunch): 0 X hours

Body Position:

30 % Walking X 2.5 = 0.75 K cal/min70 % Standing X 0.6 = 0.4 K cal/min

Work Type:

Both arms/Moderate 2.0 K cal/minBasal Metabolism 1 K cal/minTotal: 4.15 X 60 = 249 K cal/hr75 % Rest Each Hour

Permissible Heat Exposure TLV:

89.5 °F
(wbgt)

Observed Heat Exposure:

Average of 8 hourly readings
at locations (48 temperatures)86.8 °F
(wbgt)

DIAPHRAM CIRCUIT
HEAT STRESS
SAMPLE LOCATIONS

