PLAINTIFF'S EXHIBIT
UC-1024

UNION CARBIDE CORPORATION

INTERNAL CORRESPONDENCE

UNION CARBIDE CHEMICALS COMPANY • INSTITUTE PLANT P. O. BOX 2831, CHARLESTON, WEST VIRGINIA

To (Name) Mr. S. C. Giambruno
Company
Location Industrial Relations

Date 23 October 1963
Originating Dept. Medical Department - Plant 512
Answering letter date

Copy to Mr. E. H. Dickinson, Mr. W. S. Eastman, Mr. R. A. Huber, Mr. B. T. King, Dr. E. H. Rest, Dr. C. U. Dernehl, Mr. J. W. Perry, Mr. P. E. Henry, Mr. R. A. Neal, Mr. D. R. Mitheny, Mr. H. H. Ketcham, Mr. L. B. Weddell - Safety Dept.

Subject: Insulation Block Dust Survey
Construction Insulation Shop
Plant 511

Enclosed is a very excellent and very complete Industrial Hygiene report on the potential hazardousness of "Thermobestos", "Kaylo" and "Carey-Temp" insulation blocks which have been processed in the Construction Department's Insulation Shop. The report points out definitely that "Thermobestos" and "Carey-Temp" insulation blocks cannot be fabricated safely with existing equipment, but that "Kaylo" insulation blocks can be fabricated safely. Mr. Peele's recommendations are quite definite and I am sure that you will wish to comply with them. I believe this particular project should be considered completed.

If there are any comments, suggestions or criticism, please direct these to me.

Very truly yours,

R. J. Sexton, M.D.
Plant Medical Director

RJS:hl

Enclosures

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b. The velocity of air through the downdraft hood on both saws with all other hoods on the system open.

c. The velocity of air through the supplementary overhead hood on both saws with all other hoods on the system closed off.

d. The velocity of air through the supplementary overhead hood on both saws with all other hoods on the system open.

PROCEDURES: Both sampling and analytical methods were as follows:

SAMPLING:

1. All samples used in determining the actual concentrations in air were collected with a midget impinger apparatus, sampling 0.1 cubic feet of air per minute through impinger flasks containing 15 milliliters of double distilled dust-free water.

2. All samples used in obtaining particle size distribution data were collected on millipore filters connected to a small battery-operated pump.

ANALYTICAL:

1. Each dust sample was evaluated through the use of a counting procedure referred to as the light field microscopic counting technique.*

2. The particle sizing techniques were derived from two separate sources. First, the sample was prepared for sizing in accordance with a permanent mounting method.+ Second, the actual sizing was accomplished in accordance with the recommended technique depicting the use of a filar micrometer and a standard microscope while using both the 43X (high and dry) and the 97X (oil immersion) objectives.‡

3. The evaluation and free silica determination of "Carey-Temp" material was accomplished through the use of two methods. First, through information supplied by Mr. E. D. Emens, Director of Research of the Philip Carey Manufacturing Company and second, through contracted analysis performed by Mr. Thomas M. Durkan, Chief Chemist for the Trudeau Foundation, Inc., Saranak Lake, N. Y.

RESULTS: See Pages 8, 9, 10 and 11.

* Drinker and Hatch: "Industrial Dust", 2nd Edition, pp. 152-153, McGraw-Hill Book Company, Inc., New York, 1954.

+ Pattus, H. J., Talvitie, N. A., Fraser, D. A., and Keenan, R. G.: "Use of Membrane Filters in Air Sampling", A.I.H.A. Quarterly, Vol. 18, p. 269, September, 1957

‡ Drinker and Hatch: "Industrial Dust", 2nd Edition, pp. 166-179, McGraw-Hill Book Company, Inc., New York, 1954.

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CONCLUSIONS:

Relative to dust exposures from Graph #1 & Tables on Pages 8 & 9:

1. "Thermobestos" insulation blocks should not be fabricated when using only the original downdraft exhaust ventilation.

2. "Kaylo" insulation blocks could be fabricated safely when using only the original downdraft exhaust ventilation if existing leaks, observed on the #1 band saw, are corrected.

3. "Kaylo" insulation blocks definitely may be safely fabricated when using the entire exhaust ventilation facilities now available, i.e., hoods above the blocks as well as below.

From Graph #2 & Tables on Pages 8 & 9:

1. Methods of handling "Thermobestos" blocks (preparatory to sawing) and scraps (after sawing) contribute greatly to specific individual exposures as demonstrated by the following facts:

   a. The fabrication process, which always begins at the #2 band saw with the simple cutting of each 18" x 36" x 4" block into three smaller blocks about 18" x 12" x 4", is normally the least dusty of all the fabrication operations as revealed by the samples taken on 24 Jan 1963.

   b. However, on 6 Mar 1963, this operation was revealed as being one of the dustiest, regardless of the ventilation being used.

   c. There was only one major variable between the samples taken on the two dates, i.e., the method of handling the blocks preparatory to sawing. Consideration of the procedure used on these dates reveals: (1) that on 24 Jan 1963, the blocks were rolled up to the saw after having been removed from their shipping cartons and stacked on a "dolly" for easy individual removal and (2) on 6 Mar 1963, the blocks were not removed from their shipping cartons until needed by the worker. A large amount of dust is produced when blocks are removed individually from the cartons as a result of the natural abrasion produced when one block is pulled over the surface of the other. Consequently, the dust concentrations on this date at this location were greater than normal.

2. The supplementary overhead ventilation (added since the time of the preceding two reports) does successfully reduce the dust exposures. However, it does not reduce "Thermobestos" dust exposures to within safe acceptable limits when cutting radii.

From Graph #3 & Table on Page 9:

1. "Carey-Temp" dust concentrations for each exposure was substantially greater than the comparable "Thermobestos" dust concentrations and in excess of even the most lenient TLV established for human exposures, i.e., 50 mppcf of air.

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2. The existing exhaust ventilation system as installed on both band saws is incapable of reducing the dust hazard, associated with the fabrication of "Carey-Temp", to within safe acceptable limits, i.e., 20 mppcf of air.

Relative to the exhaust ventilation system:

1. The duct velocity in the downdraft ventilation system on both band saws is far below the recommended value of 4000 fpm.

2. The duct velocity in the overhead ventilation system on both band saws is equal to or more than the recommended value of 4000 fpm.

3. The velocity in the downdraft ventilation systems for both band saws could be increased by patching all holes, leaks, etc., now in existence.

RECOMMENDATIONS:

1. Do not fabricate 18" x 36" x 4" "Carey-Temp" or "Thermolectos" insulation materials unless:

   a. The atmospheric dust problem can be reduced to below 20 mppcf of air through the use of improved ventilation techniques or repairs to the existing system, or

   b. The manufacturers of the two makes of insulation materials are able to produce a product which will not release, upon fabrication with a band saw, dust concentrations in excess of 20 mppcf of air.

Submitted by: R. J. Peele

F. L. Peele
Industrial Hygienist

RLP:hl

23 October 1963

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INDUSTRIAL HYGIENE SURVEY

Evaluation of Atmospheric Dust Conditions at the Construction Insulation Shop

Table #1

Atmospheric Dust Concentration Data
Collected When Using Only Partial
Ventilation, i.e., Only Below the Blocks

Cutting & Edging Insulation Blocks

Date	Type of Material	Description of Location	Concentration in mppcf
25 Feb 63	Kaylo	#1, i.e., South Side of the #2 Band Saw	9.32
24 Jan 63	Thermobestos	#1, " " " " " " " "	10.00
6 Mar 63	"	#1, " " " " " " " "	51.50
25 Feb 63	Kaylo	#2, i.e., South Side of the #1 Band Saw	17.32
24 Jan 63	Thermobestos	#2, " " " " " " " "	20.36
6 Mar 63	"	#2, " " " " " " " "	42.70

Cutting a Radius on Insulation Blocks

Date	Type of Material	Description of Location	Concentration in mppcf
Mar 62	Kaylo	#3, i.e., South Side of the #2 Band Saw	17.10
25 Feb 63	"	#3, " " " " " " " "	3.39
Mar 62	Thermobestos	#3, " " " " " " " "	101.40
24 Jan 63	"	#3, " " " " " " " "	69.59
6 Mar 63	"	#3, " " " " " " " "	36.62
Mar 62	Kaylo	#4, i.e., South Side of the #1 Band Saw	3.06
25 Feb 63	"	#4, " " " " " " " "	29.35
Mar 62	Thermobestos	#4, " " " " " " " "	83.30
24 Jan 63	"	#4, " " " " " " " "	66.69
6 Mar 63	"	#4, " " " " " " " "	70.00

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Table #2
Atmospheric Dust Concentration Data
Collected When Using All Available
Ventilation, i.e., Both Above & Below the Blocks

Cutting & Edging Insulation Blocks

Date	Type of Material	Description of Location	Concentration in mppcf
6 Mar 63	Thermolestos	#1a, i.e., South Side of the #2 Band Saw	30.20
26 Feb 63	Carey-Temp	#1a, " " " " " " " "	51.70
6 Mar 63	Thermolestos	#2a, i.e., South Side of the #1 Band Saw	17.50
26 Feb 63	Carey-Temp	#2a, " " " " " " " "	99.20

Cutting a Radius on Insulation Blocks

Date	Type of Material	Description of Location	Concentration in mppcf
6 Mar 63	Thermolestos	#3a, i.e., South Side of the #2 Band Saw	22.42
6 Mar 63	Thermolestos	#4a, i.e., South Side of the #1 Band Saw	51.70
26 Feb 63	Carey-Temp	#4a, " " " " " " " "	85.40
26 Feb 63	Carey-Temp	#5a, i.e., North Side of the #1 Band Saw	100.90

Index for Graphs #1, #2 & #3

#1 - South Side #2 Band Saw - Cutting Blocks - Ventilation Only Below
#2 " " #1 " " - Edging " - " " "
#3 " " #2 " " - Cutting a Radius - " " "
#4 " " #1 " " - " " " - " " "
#1a " " #2 " " - Cutting Blocks - " Both Above & Below
#2a " " #1 " " - Edging " - " " " "
#3a " " #2 " " - Cutting a Radius - " " " "
#4a " " #1 " " - " " " - " " " "
#5a - North Side #1 Band Saw - Cutting a Radius - Ventilation Both Above & Below

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Table #3
Determination of Percentage Crystalline Free Silica
Present in "Thermolestos", "Kaylo" & "Carey-Temp"
as Quartz by the "Talvitie" Method

"Thermolestos"
(As Contained in Report 62-III-1-G-1)

Trial #	W_1 in Grams	W_2 in Grams	W_3 in Grams	% Free SiO_2
1	0.5002	0.0390	0.0069	6.42
2	0.5000	0.0347	0.0068	5.58
3	0.5002	0.0396	0.0082	6.29
Average Percentage Crystalline Free SiO_2 = 6.4				

"Kaylo"
(As Contained in Report 62-III-1-G-1)

Trial #	W_1 in Grams	W_2 in Grams	W_3 in Grams	% Free SiO_2
1	0.5000	0.0807	0.0433	7.48
2	0.5000	0.0730	0.0360	7.32
3	0.5000	0.0563	0.0190	7.06
Average Percentage Crystalline Free SiO_2 = 7.4				

"Carey-Temp"
(As Reported by Mr. Thomas H. Durkan)
4 October 1963

Components Soluble in Hcl	10.8%
Other Components Soluble in Phosphoric Acid	88.8%
	99.6%
Percentage Crystalline Free SiO_2 as Quartz	00.0%

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Table #4
Ventilation Rates on Two Band Saws

Date	Band Saw	Hood Being Checked	Description of Condition	Ventilation Rate in fpm
25 Feb 63	#2	Downdraft	Only Downdraft System in Operation	1500
6 Mar 63	#2	"	" " " " "	1050
25 Feb 63	#2	"	Downdraft & Overhead System in Operation	1200
6 Mar 63	#2	"	" " " " "	1200
25 Feb 63	#2	"	Every Hood in the System Open	950
6 Mar 63	#2	"	" " " " "	900
25 Feb 63	#2	Overhead	Downdraft & Overhead System in Operation	6500
Mar 63	#2	"	" " " " "	4900
25 Feb 63	#2	"	Every Hood in the System Open	4000
6 Mar 63	#2	"	" " " " "	
25 Feb 63	#1	Downdraft	Only Downdraft System in Operation	2100
6 Mar 63	#1	"	" " " " "	1500
25 Feb 63	#1	"	Downdraft & Overhead System in Operation	1500
6 Mar 63	#1	"	" " " " "	1150
25 Feb 63	#1	"	Every Hood in the System Open	1100
6 Mar 63	#1	"	" " " " "	
25 Feb 63	#1	Overhead	Downdraft & Overhead System in Operation	5500
6 Mar 63	#1	"	" " " " "	4500
25 Feb 63	#1	"	Every Hood in the System Open	4200
6 Mar 63	#1	"	" " " " "	

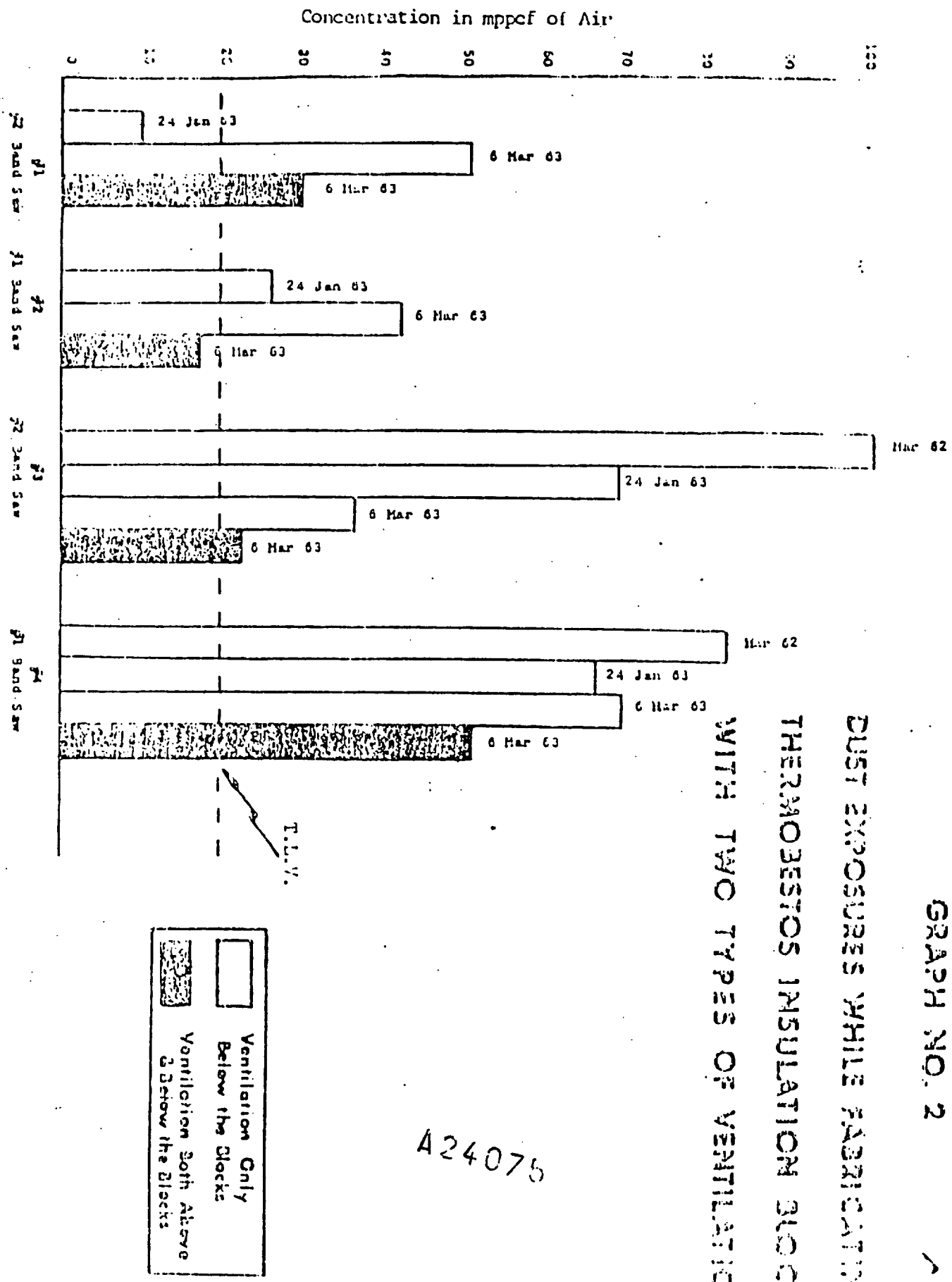
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GRAPH NO. 1

DUST EXPOSURES WHILE FABRICATING KAYLO & THERMOBESTOS INSULATION BLOCKS WITH ONLY DOWNDRAFT VENTILATION

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DUST EXPOSURES WHILE FABRICATING THERMOBESTOS INSULATION BLOCKS WITH TWO TYPES OF VENTILATION

GRAPH NO. 2

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Concentration in mppcf of Air

0 10 20 30 40 50 60 70 80 90 100

1a #2 Band Saw
2a #1 Band Saw
3a #2 Band Saw
4a #1 Band Saw
5a #1 Band Saw

T.L.V.

Thermobestos
Carey Temp

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GRAPH NO. 3

DUST EXPOSURES WHILE FABRICATING THERMOBESTOS & CAREY-TEMP INSULATING BLOCKS WITH BOTH BOARDRAIT AND OVERHEAD VENTILATION