PLAINTIFF'S EXHIBIT
WV-00275

611

PLAINTIFF'S EXHIBIT
DD64H.OD

Mr. L. W. Dickinson

Plant Manager

21 March 1962

Medical Department - Plant 512

Mr. G. H. Dunn
Mr. N. J. East
Mr. R. A. Hub
Mr. E. F. Kin
Mr. G. J. Ratcliffe
Mr. F. B. Snyder
Dr. E. M. Best, Jr.

Mr. P. E. Henry
Mr. S. H. Wilson
Mr. D. R. Matheny
Mr. N. H. Ketcham
Dr. C. U. Dernehl

Insulation Block Dust Survey
Construction Insulation Shop
Plant 512

Enclosed is a report by Mr. Peele on an Industrial Hygiene Department survey of an ...ation dust problem which existed in the Construction Insulation Shop in the Construction area of Plant 512. In this report, Mr. Peele points out that "Thermobestos" dust presents a very definite hazard to health and I would like to emphasize that the ultimate outcome, although it might take many years of exposure, would be silicosis in the employees, thus exposed. Free crystalline silica particles from three microns to one micron in size, or smaller, are capable of causing silicosis in uninformed and unprotected workers.

It should be pointed out that as soon as Mr. Peele made his calculations and discovered the potential hazardousness of "Thermobestos" dust, he notified immediately the Construction Department supervision of his findings, so that they would discontinue at once any further use of "Thermobestos" blocks. Mr. Henry has advised me that "Thermobestos" will no longer be processed, thus complying with Mr. Peele's recommendations.

The Plant 512 Medical Department has been informed that ten Construction insulators and one salaried supervisor have had exposure to "Thermobestos" dust. Up-to-date chest X-ray films will be ordered immediately on these men and the progress of the exposed men will be followed periodically.

Very truly yours,

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

RJS:gl
Enclosure

INDUSTRIAL HYGIENE SURVEY

CONSTRUCTION INSULATION SHOP - BUILDING 511-2018

REPORT 62-IH-1-G-1

SUMMARY: The industrial hygiene survey, evaluating the dust problem in existence at the Construction Insulation Shop (Building 511-2018) during the time of processing both "Thermobestos" and "Kaylo" insulation blocks, has been completed. The results of this investigation reveal the following conclusive facts:

First - The T.L.V. (Threshold Limit Value) for this material is 20 mppcf (million particles per cubic foot) of air.

Second - The fabrication of "Thermobestos" insulation blocks with band saws produces a definite atmospheric hazard to health.

Third - The fabrication of "Kaylo" insulation blocks with band saws does not constitute a hazard to health.

INTRODUCTION: On 15 November 1961, Mr. S. H. Wilson, Construction Safety Engineer at Plant 512, approached this department with a problem that had been brought to his attention by way of employee complaints. He stated that the "band saw" operators located in the Insulation Shop (Building 511-2018) were experiencing some rather uncomfortable working conditions as they performed their normal routine of ripping "Head Segments" from standard 18" x 36" x 4" insulation blocks. This concern was apparently initiated by virtue of the fact that two insulation materials, reputed to be identical in make-up although produced by different manufacturers, did not react in similar manners to the identical sawing techniques being utilized by the shop. According to statements obtained from the operators, heavy quantities of dust of such large concentrations as to seriously interfere with their normal breathing process, were immediately produced if and when "Thermobestos" blocks (a Johns Manville product) were supplied for sawing. Some dust also resulted whenever "Kaylo" blocks (an Owens Corning product) were handled in a similar manner; however, the quantity of particulate matter being produced from this latter material was hardly noticeable and never objectionable.

This interesting introduction to the problem stimulated a desire to visit the location in question and, while there, to obtain as many answers as possible to the numerous unanswered questions that came to mind upon the completion of Mr. Wilson's description. A visit was arranged and the following facts were noted: (1) Most of the fabrication equipment was connected to a well-known and apparently adequate dust collector by means of well constructed duct work. (2) This exhaust system had obviously been designed to cope with the normal dust problems encountered in most band saw operations. However, the band saw operations in evidence on this date were not what might be termed normal, as a result of the specific shape of the insulation material being fabricated and the particular manner in which each block was being cut. These conditions ruled out the possibility of the exhaust system operating in accordance with its pre-designed efficient manner. Figure 2 on page 15 has been included in an attempt to demonstrate the manner of processing these blocks and the position of the exhaust hoods in relation to the blocks during fabrication.

(3) The [illegible] Insulation Shop was completely open thro[illegible] and was vent[illegible] above by means of six small roof fans. (4) Atmospheric dust samples had to be taken in various areas of the shed before any evaluation could be made and these would, of necessity, have to be taken when both "Thermobestos" and "Kaylo" insulation materials were being processed separately.

DISCUSSION: On the morning of 21 November 1961, the initial air samples were taken in what proved to be but the first part of a two-phase program of dust evaluation at this location. This first phase was responsible for disclosing the actual concentrations of dust (in millions of particles per cubic foot of air) to which the various men were being subjected as they fabricated first "Thermobestos" and then "Kaylo" with band saws. Atmospheric samples of the "Thermobestos" dust exposures were taken on this initial sampling date whereas similar samples of "Kaylo" dust exposures were, of necessity, taken on 11 December 1961, since these two products are not processed simultaneously.

Five general areas, capable of revealing the most comprehensive information relative to any overall dust exposure, were initially selected and sampling points then spotted in these areas in locations deemed important. The sampling locations are displayed in the Shop diagram revealed on page 7 The impingement* principle was utilized in the collection of these samples with the Midget-Impinger apparatus (as referred to on page 4) serving as the instrument of use. A total of thirteen samples were taken with the first seven being indicative of "Thermobestos" exposures and the latter six being representative of "Kaylo" exposures.

Each of these dust samples were evaluated through the use of light field microscopic counting techniques, referred to on page 4 , with the resultant disclosure that some of the locations were quite heavily contaminated with excessive concentrations of dust. This disclosure rendered it imperative that more descriptive information would have to be obtained before an accurate evaluation of the conditions could be formulated, and so the second phase of the program was initiated.

This second phase had the designed purpose of supplying two types of physical data relative to these exposures: (1) the percentage of crystalline free silica present in each material, and (2) the particle size distribution of the air borne portion of each material. This information was deemed essential as a result of the following well-known facts relative to human dust exposures.

It is an uncontested fact that prolonged exposures to excessive concentrations of certain types of atmospheric dust will result in the production of either one of two, or possibly even a combination of both, types of the following lung diseases; i.e., silicosis or asbestosis. It is also known that there are five specific factors that directly influence the production of these diseases. They are: (1) the composition of the dust;

*This means to strike or dash against, as (in this application) the striking or dashing of atmospheric dust particles against the bottom of a small impinger flask containing a specific volume of dust free water as a collecting medium.

i.e., percentage crystalline free silica or percentage asbestos, (2) the number of particles of inhaled dust, (3) the size of the particles of inhaled dust, (4) the length of time during which such dust is inhaled and, (5) the individual susceptibility of each human being.

Since the determinations revealed that some of the workers were being exposed to dust concentrations of such magnitudes as to exceed even the most lenient of all dust standards, i.e., a T.L.V. (Threshold Limit Value) of 50 mppcf of air (see table below - entry #3) and since it has been revealed (per a Johns Manville representative on 21 November 1961) that this material contained 12.0 - 13.0% asbestos with the remaining 88.0 - 89.0% being entitled, calcium silicate, then it became imperative that conclusive information be obtained which would identify exact physical values for two of the five specific factors listed above: i.e., the percentage crystalline free silica present in this material known as calcium silicate and the exact particle size distribution of the respirable portion of such material. The following criteria was used in the evaluation of this data.

First: The actual percentage crystalline free silica or percentage asbestos found to be present in a mineral or non-metallic inorganic dust furnishes the basic information needed in the establishment of a T.L.V. for the material in question. This selection is arrived at in accordance with criteria as follows:

T.L.V. in mppcf of Air	Substance	Limiting Conditions
5*	Silica as quartz	High percentage crystalline free silica, i.e., above 50%
20*	Silica as quartz	Medium percentage crystalline free silica, i.e., 5 to 50%
50*	Silica as quartz	Low percentage crystalline free silica, i.e., below 5%
+	Silicate as asbestos	High percentage asbestos, i.e., above 50%
20+	Silicate as asbestos	Medium percentage asbestos, i.e., 5 to 50%
50+	Silicate as asbestos	Low percentage asbestos, i.e., below 5%

* A.C.G.I.H. Threshold Limits Values for 1961, page 11 (April, 1961)
\+ Warren A. Cook, Personal correspondence, 21 February 1962.

Second: "The fraction of an inhaled dust which is retained in the respiratory system and the depth to which the dust penetrates are sensitively related to particle size. Thus, the size factor is a primary one in determining the magnitude of hazard associated

... the inhalation of particulate matter[1]. This relationship ... particle size, its area of deposit, and the resultant ... is revealed in the following table:

PARTICLE SIZE	AREA OF DEPOSIT	HAZARD POTENTIAL
Above 5.0 microns	Nasal	None
1.0 - 5.0 microns	Upper respiratory to alveoli	Great to extreme
1.0 micron	Alveoli (most optimum size for alveoli retention)	Extreme
0.25 - 1.0 microns	Alveoli	Extreme

The actual procedure was started on 8 December 1961, at which time two types of samples were obtained. First, a single atmospheric sample of "Kaylo" dust was taken in the area of band saws #1 and #2, through the use of a Millipore Filter apparatus referred to on page 4 , and particle sizing techniques, referred to on page 5 were then used to determine the particle size distribution of this sample. Second, a direct sample of the actual material was collected and later analyzed for crystalline free silica by two methods, i.e., X-ray diffraction and the latest wet chemical technique, both listed on page 5 . On 4 January 1962, two samples of "Thermobestos" dust were also obtained and evaluated for both percentage crystalline free silica and particle size distribution in a manner identical with that used on the "Kaylo" material.

PROCEDURES: Both sampling and analytical methods are as follows:

Sampling: (1) All samples used in determining the actual concentrations in air were collected with a midget impinger apparatus which is a hand-cranked, four cylinder suction pump drawing 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. These Cellulose Ester filters are recognized as being the most efficient and adaptable filter material available on the market today being capable of retaining particles down to and below 0.1 micron in size.

Analytical: (1) The actual counting technique, used in this analysis and referred to as the Light Field Microscopic Counting Technique, is accurately described on pages 152-153 of Industrial Dust by Drinker and Hatch.

1 J. H. Brown, K. M. Cook, F. G. Ney, and Theodore Hatch, American Journal of Public Health, Vol. 40, No. 4 (April, 1950).

(2) The sizing technique [illegible] from two separate sources. First, the sample was prepared for sizing in accordance with [illegible] permanent mounting method referred to on page [illegible] of the [illegible], [illegible], issue of the A.I.H.A. Quarterly. Second, the actual sizing was accomplished in accordance with the recommended technique described on pages 166-179 of Industrial Dust by Drinker & Hatch which depicts the use of a Filar micrometer, and a standard microscope while using both the 43X (high and dry) and 97X (oil immersion) [illegible].

(3) Free silica determinations were produced through the use of both of the two following techniques. First, a wet chemical procedure entitled, "Determination of Quartz in the Presence of [illegible] Using Phosphoric Acid" by N. A. Talvitie, Division of [illegible] Hygiene, U. S. Public Health Service, Cincinnati, Ohio, and second, X-ray diffraction techniques as described in the encyclopedia of "Instrumentation for Industrial Hygiene", pp. 436-439, and as performed by Mr. [illegible], Research and Development Department, Instrumental Methods Group, Union Carbide Chemicals Company.

RESULTS: The physical data listed in the appendix were evaluated and revealed the following facts:

(1) The composition of the dust (Table #5, page 12) is

(a) For "Thermobestos": Asbestos = 12.0 to 13.0%
Crystalline Free Silica = 2.5 $\pm$ 1 to 6.4%

(b) For "Kaylo": Asbestos = 12.0 to 13.0%
Crystalline Free Silica = 5.6 $\pm$ 1 to 7.4%

(2) The number of particles of atmospheric dust (Table #1, page 8) is revealed to be:

(a) In greatest concentration in and around the #1 and #2 band saws.
(b) In greatest concentration when "Thermobestos" is being fabricated.

(3) The particle size of the atmospheric dusts in question (Graphs 1 and 3, pages 13 and 14) is demonstrated to be:

Predominantly 1.0 micron in size for both "Thermobestos" and "Kaylo", but slightly smaller in size for "Kaylo" than for "Thermobestos".

(4) The length of time during which the particles are inhaled (as demonstrated in Table 2 page 9) reflects a weighted reduction in the overall dust exposures to both materials.

(5) The individual susceptibility is, in this case, one of those unmeasureable human factors which lends special emphasis to the need for the conscientious use of adequate protective measures deemed essential in the prevention of these incurable diseases.

CONCLUSIONS:

(1) The T.L.V. (Threshold Limit Values) for both of these materials is 20 mppcf (million particles per cubic foot) of air.

(2) The greatest hazard to health is experienced when processing only "Thermobestos" blocks.

(3) The existing ventilation control devices do not adequately control the dust problem being created when "Thermobestos" blocks are processed.

(4) The weighted exposure at the [illegible] band saw is slightly in excess of the T.L.V.

(5) The hazard to health, experienced when fabricating only "Kaylo" blocks is negligible.

(6) The environmental conditions in evidence, during the time of this survey of the fabrication of "Kaylo" blocks, were not hazardous to health.

(7) "Thermobestos" blocks should not be fabricated with any existing band saw unless a more effective ventilation system is designed and installed in such a manner as to render it capable of reducing the inherent atmospheric dust concentrations to within safe and acceptable limits.

RECOMMENDATIONS:

(1) Do NOT fabricate 18" x 36" x 4" "Thermobestos" insulation blocks with the existing equipment unless:

(a) The atmosphere dust problem can be reduced to below 20 mppcf of air through the use of ventilation, etc., or

(b) The producer of this product begins manufacturing an insulation block which will not release, upon fabrication with a band saw, dust concentrations in excess of 20 mppcf of air.

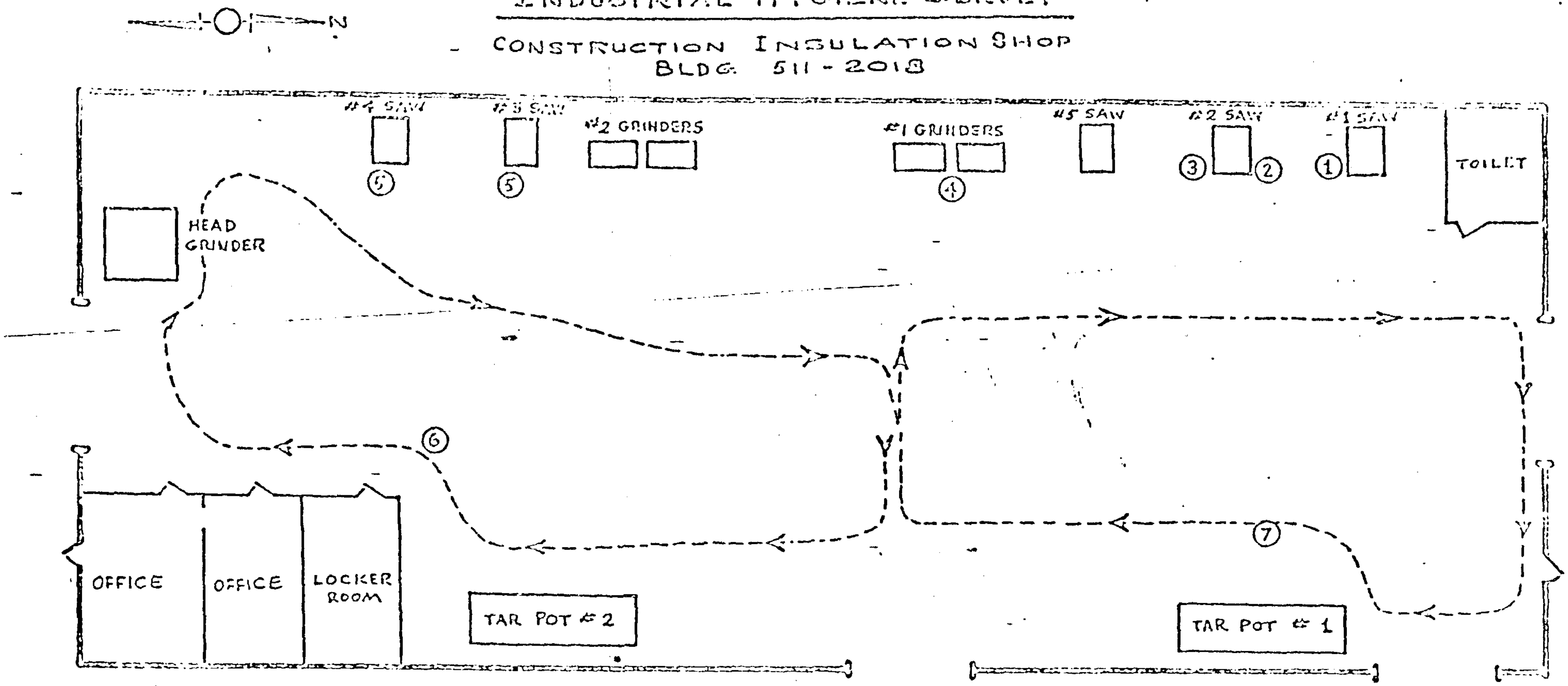
Submitted by: R E Poole
R. E. Poole
Industrial Hygienist

REP:gl

FIGURE 1

INDUSTRIAL HYGIENE SURVEY

CONSTRUCTION INSULATION SHOP
BLDG. 511 - 2018



1 SAMPLING POINT AS "MITCHELL" SAWED BLOCKS
2 SAMPLING POINT AS "BENNETT" WAS OFF BEARING ON #2 BAND SAW
3 SAMPLING POINT AS "RAINES" SAWED BLOCKS
4 SAMPLING POINT AS "DUNLOP" GROUND FIBER GLASS PIPE COVERS
5 SAMPLING POINT AS "SAMPLES" CUT RADIUS ON HEAD SEGMENTS
6 GENERAL ATMOSPHERIC SAMPLING AREA IN SOUTH END OF SHOP
7 GENERAL ATMOSPHERIC SAMPLING AREA IN NORTH END OF SHOP

INDUSTRIAL HYGIENE SURVEY

EVALUATION OF ATMOSPHERIC DUST CONDITIONS AT THE CONSTRUCTION INSULATION SHOP

TABLE 1

Atmospheric Dust Concentration Data

As Collected with the Midget Impinger Pump & Apparatus

Type of Dust Material	SAMPLE								
	No.	Location	Rate in cfm	Time in Min.	Vol. in C.F.	Blank # Particles	Dilution Factor	Count # Particles	Conc. in mppcf of Air
Thermobestos	1	#1 Band Saw "Mitchell" while sawing	0.1	10.0	1.0	8.0	250	89.6	83.3
"	2	#2 Band Saw "Bennett" off bearing	0.1	10.0	1.0	8.0	250	105.4	84.5
"	3	#2 Band Saw "Raines" while sawing	0.1	10.0	1.0	8.0	625	51.4	101.4
"	4	#1 South Grinder "Dunlop" grinding fiber glass pipe covers	0.1	8.5	0.85	8.0	50	73.8	15.1
"	5	#4 Band Saw "Samples" sawing "Kaylo" head segments	0.1	10.0	1.0	8.0	50	71.4	13.1
"	6	G. A. (General Atmospheric) south end of Shop	0.1	10.0	1.0	8.0	20	37.8	2.4
"	7	G. A. North end of Shop	0.1	10.0	1.0	8.0	50	95.5	20.1

Type of Dust Material	No.	Location	Rate in cfm	Time in Min.	Vol. in C.F.	Blank # Particles	Dilution Factor	Count # Particles	Conc. in mppcf of Air
Kaylo	1	#1 Band Saw "Mitchell" while sawing	0.1	10.0	1.0	5.2	20	37.2	3.05
"	2	#2 Band Saw "Bennett" off bearing	0.1	10.0	1.0	5.2	20	52.8	4.48
"	3	#2 Band Saw "Raines" while sawing	0.1	10.0	1.0	5.2	50	79.6	17.1
"	5	#3 Band Saw "Samples" cutting radius on head segments	0.1	10.0	1.0	5.2	20	99.6	7.69
"	6	G. A. South end of Shop	0.1	10.0	1.0	5.2	20	23.4	1.5
"	7	G. A. North end of Shop	0.1	10.0	1.0	5.2	20	45.0	3.0[illegible]

TABLE 2

SUMMARY OF 40-HOUR WEEKLY WEIGHED EXPOSURES AS

EXHIBITED BY FIVE WORKERS EMPLOYED AT BLDG. 511-2018

Worker*	Length of Exposure in Hours Per Week+			Concentrations in mppcf of Air		Weighed Exposures in mppcf
	To Both "Thermobestos" & "Kaylo"	To Only "Thermobestos"	To Only "Kaylo"	"Thermobestos"	"Kaylo"	
"Mitchell" (#1 Band Saw Ripping Blocks)	16.0	6.4	9.6	83.3	3.1	14.1
"Raines" (#2 Band Saw Ripping Blocks)	16.0	6.4	9.6	101.4	17.1	20.4
"Samples" (#3 & #4 Band Saws - Cutting [illegible]ius on [illegible]ad Segments)	16.0	6.4	9.6	13.1	7.7	3.9
"Bennett" (#2 Band Saw Off Bearing)	16.0	6.4	9.6	84.5	4.5	14.6
"Jordan" (#3 & #4 Band Saws Same as "Samples"		SAME	AS SAMPLES			

* These workers were selected for identification upon the suggestion of the Shop Insulation Fabrication Foreman, Mr. D. R. Matheny, who stated that these particular men prove to be the ones most exposed to high concentrations of this air borne material known to the trade as "calcium silicate".

\+ These hourly exposure values were derived on the basis of the following estimates also submitted by Mr. D. R. Matheny: 16 hours a week are probably spent working with both products (i.e., "Kaylo" and "Thermobestos") with about 40% of this being "Thermobestos" exposure and 60% "Kaylo" exposure.

The following general formula was used in deriving the values referred to above as weighed exposures:

$$\text{Weighed Exposure in mppcf of Air} = \frac{\left(\begin{array}{c}\text{Concentration of}\\ \text{"Thermobestos" in mppcf of Air}\end{array}\right)\left(\begin{array}{c}\text{Number Hours of}\\ \text{Daily Exposure}\end{array}\right) + \left(\begin{array}{c}\text{Concentration}\\ \text{of "Kaylo" in}\\ \text{mppcf of Air}\end{array}\right)\left(\begin{array}{c}\text{Number Hours}\\ \text{of Daily}\\ \text{Exposure}\end{array}\right)}{\text{40 Hours Per Week}}$$

TABLE 3

"THERMOBESTOS" PARTICLE SIZE DISTRIBUTION USING BOTH THE 43X & 97X OIL IMMERSION OBJECTIVES IN COMBINATION WITH A 12X FILAR EYEPIECE.

43X OR 516 MAG. WHERE 1 FILAR DIV. ≅ 0.2 MICRONS

Micron (WHOLE) ↓ / FRACTIONS →	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	TOTAL
0.0											
0.1											
0.2											
0.3											
0.4											
0.5											
0.6											
0.7											
0.8	10										10
0.9											
1.0	15		19		14		16		8		72
2.0	10		9		10		12		6		47
3.0	10		6		3		2		2		23
4.0	2		3		1		6		3		15
5.0	3		1		1		2		2		9
6.0	2				2						4
7.0	2		1						2		5
8.0					1		2		1		4
9.0	2		1				2		1		6
10.0											
11.0			1				1				2
12.0											
13.0	1										1
14.0											
15.0											
16.0											
17.0											
18.0											
19.0											
20.0											
21.0											
22.0											
23.0											
24.0											
25.0											
26.0											
27.0					1						1
Total											200

97X OR 1164 MAG. WHERE 1 FILAR DIV. ≅ [illegible]

Micron (WHOLE) ↓ / FRACTIONS →	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	TOTAL
0.0											
0.1											
0.2											
0.3											
0.4	2										2
0.5	7										7
0.6	6										[illegible]
0.7	13										[illegible]
0.8	10										[illegible]
0.9	9										[illegible]
1.0	14	14	7	8	11	9	7	5	3	[illegible]	[illegible]
2.0	3	4	5	4	3	1	2	1	1	4	[illegible]
3.0	1	2	1	1		3	3				11
4.0	4		3	1	1	2		2	3		17
5.0	2			1	1						[illegible]
6.0			1		1	1					[illegible]
7.0				1			1				2
8.0		1				1					[illegible]
9.0	1										1
10.0				1						1	2
11.0											
12.0											
13.0	1										[illegible]
14.0											
15.0			1								1
16.0		1									1
17.0											
18.0											
19.0											
20.0											
21.0											
22.0											
23.0											
24.0											
25.0											
26.0											
27.0									1		1
Total											20[illegible]

TABLE 4

"KAYLO" PARTICLE SIZE DISTRIBUTION USING BOTH

THE 43X & 97X OIL IMMERSION OBJECTIVES IN COMBINATION WITH A 12X FILAR EYEPIECE

43X OR 516 MAG. WHERE 1 FILAR DIV. ≅ 0.2 MICRONS

Micron → FRACTIONS; ↓ WHOLE

WHOLE	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	TOTAL
0.0											
0.1											
0.2											
0.3											
0.4	8										8
0.5											
0.6	23										23
0.7											
0.8	24										24
0.9											
1.0	29		19		13		13		10		84
2.0	8		5		2		6		3		24
3.0	3		1		4		1		4		13
4.0	2		1		3				1		7
5.0	3						1				4
6.0							1		1		2
7.0	2										2
8.0											
9.0					1						1
10.0			2		1						3
11.0											
12.0											
13.0							1				1
14.0									1		1
15.0							1				1
16.0			1								1
17.0	1										1
18.0											
19.0											
20.0											
21.0											
22.0											
23.0											
24.0											
25.0											
26.0											
27.0											
Total											200

97X OR 1164 MAG. WHERE 1 FILAR DIV. ≅ 0.0[illegible] MICRONS

FRACTIONS

WHOLE	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	TOTAL
0.0											
0.1											
0.2					2						[illegible]
0.3	3										[illegible]
0.4	7										7
0.5	31										[illegible]
0.6	18		1	1							[illegible]
0.7	23										[illegible]
0.8	16										[illegible]
0.9	19										[illegible]
1.0	8	3	6	11	9	4	[illegible]	[illegible]	1	1	[illegible]
2.0	1	1	1		1				1	[illegible]	[illegible]
3.0				2							[illegible]
4.0		1	1		1			1			[illegible]
5.0		1							1		[illegible]
6.0		1									[illegible]
7.0	3		1								[illegible]
8.0					1						[illegible]
9.0							1				[illegible]
10.0						1					[illegible]
11.0				1					1		[illegible]
12.0								1			1
13.0						1					[illegible]
14.0											
15.0											
16.0											
17.0						1					1
18.0											
19.0	1										1
20.0											
21.0											
22.0											
23.0											
24.0											
25.0											
26.0											
27.0									1		1
Total											200

TABLE 5

DETERMINATIONS OF THE PERCENTAGE CRYSTALLINE FREE SILICA PRESENT IN BOTH "THERMOBESTOS" & "KAYLO", AS QUARTZ, BY THE "TALVITIE" METHOD

"THERMOBESTOS"

TRIALS	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	6.28
Average % Crystalline Free SiO_2 = 6.4				

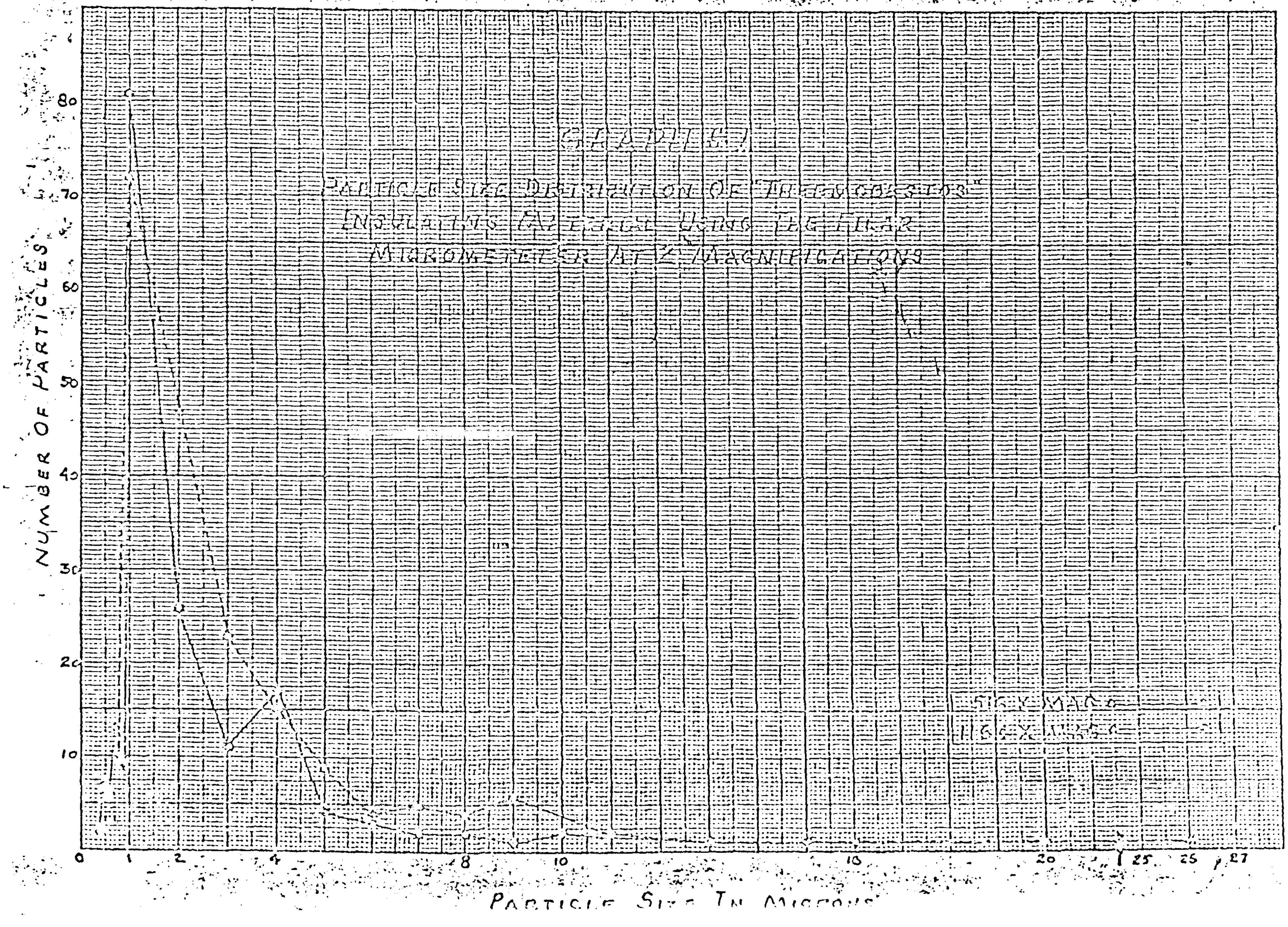
"KAYLO"

TRIALS	W_1 in GRAMS	W_2 in GRAMS	W_3 in GRAMS	% FREE SiO_2
1	0.5	0.0807	0.0433	7.48
2	0.5	0.0730	0.0364	7.32
3	0.5	0.0563	0.0190	7.46
Average % Crystalline Free SiO_2 = 7.4				

Determinations of the Percentage Crystalline Free Silica Present in Both "Thermobestos" & "Kaylo" by the X-ray Diffraction Method*

"Thermobestos"	"Kaylo"
2.5% ± 1%	5.6% ± 1%

*This information obtained and reported by Mr. K. J. Garska, Research and Development Department, Instrumental Methods Group, Union Carbide Chemicals Company.


NUMBER OF PARTICLES
80
70
60
50
40
30
20
10
0
1
2
4
8
10
20
25
27

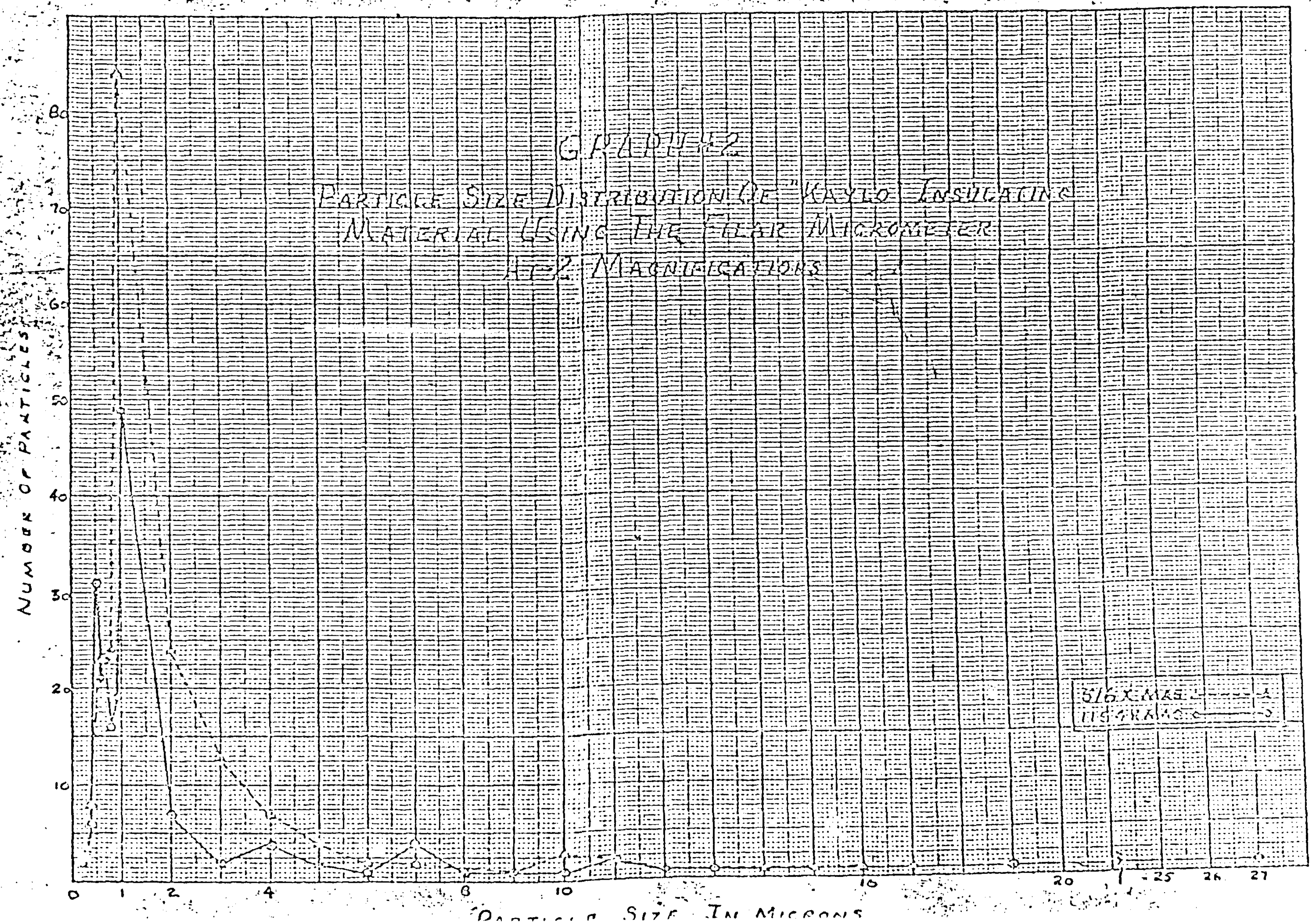

GRAPH #2
PARTICLE SIZE DISTRIBUTION OF "KAYLO" INSULATING
MATERIAL USING THE FILAR MICROMETER
AT 2 MAGNIFICATIONS
516X MAG
NUMBER OF PARTICLES
PARTICLE SIZE IN MICRONS

FIGURE 2

Cut-away Side View of a Band Saw With Ventilation Provided.