FILE NAME: Johns-Manville (JMA)

DATE: 1968 - 1970

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DOCUMENT DESCRIPTION: Asbestos Research: St. Luke's Hospital; Drs. Wright & Gross, Related Corr. Grant Application & Letter

5/27/70

A. B. Marchant
Attn: H. Jackson

Enclosed is a copy of the application for research grant from Dr. G. Wright which we are funding. Keep it for your files.

JJP

C O N F I D E N T I A L

[redacted]

June 19, 1968

Dr. George W. Wright
St. Lukes Hospital
11311 Shaker Blvd.
Cleveland, Ohio 44104

Dear Dr. Wright:

Jack Solon and I have discussed your interest in the potential health [redacted] related to manufacturing, handling, machining and fabricating asbestos-[redacted] products.

As you are probably aware, we have established an industry committee to [redacted] possible health problems in this area and prepare recommended health [redacted] practices. These would be in booklet form similar to the NIMA publications for asbestos and mineral fibers.

Some of the specific J-M products used in the Building and Construction Industry are: Asbestoboard, Asbestocite - flat and corrugated, Asbestone, Flexboard, Colorbestos, Thermostone, Transite - flat and corrugated, Asbestos Ebony, Chemstone, Colorchip, Transitop, Asbestos-Cement Bulkheads, Asbestos-Cement Extrusions - ACE Colorlith, Asbestos Shingles - Siding and Roofing, Asbestos-Cement Transite Water and Sewage Pipe, Transite Air Duct, Transite Cable Tray, Transite Core Plate, Transite Conduit, etc. Other manufacturers produce similar types of products.

The composition of some of our asbestos-cement products is approximately as foll[redacted]

1. [redacted]tos Fibre	-	45%
	-	55%
2. [redacted]		
Chrysotile Asbestos Fibre	-	30%
Portland Cement	-	70%
3. Corrugated Transite		
Chrysotile Asbestos Fibre	-	40%
Portland Cement	-	35%
Silica Flour	-	25%

4. Asbestos Roof Shingles

Chrysotile Asbestos Fibre	-	24%
Silica Flour	-	32%
Portland Cement	-	44%

5. Transite Pipe

Chrysotile Asbestos Fibre	-	[illegible]
Crocidolite Asbestos Fibre	-	8%
Portland Cement	-	49%
Silica	-	[illegible]

We are concerned with two sources of health problems related to this material. One is in the manufacturing plants where the product is made. The other is with fabrication and application contractors.

Most manufacturers are aware of the problem areas and have taken steps to control exposures. We are not, however, aware of either the extent of the health problems or measures taken to control exposures among the fabricators and applicators. Fabrication and application operations would include handling, sawing, drilling, filing, sanding, etc. Our program will therefore be simultaneously directed toward both manufacturers and fabricators-applicators.

In order to provide you with some idea of potential exposures encountered in machining asbestos-cement materials, I am enclosing several Industrial Hygiene reports from our plants. You will note that the particle counts are high even with mechanical dust collection equipment in use. Without exhaust equipment the concentrations would be substantially heavier.

If there is any additional information that you would like or if I can be of further assistance, please advise.

Sincerely yours,

C. L. Sheckler, Manager
Occupational Environmental Control

CLS/ems

bcc: F. J. Solon - GHQ
W. P. Raines - GHQ
H. M. Jackson - DHQ
File & C

SAINT LUKE'S HOSPITAL
11311 SHAKER BOULEVARD
CLEVELAND, OHIO 44104

DIVISION OF MEDICINE

APPLICATION FOR RESEARCH GRANT

March 30, 1970

TO: Johns-Manville Corporation
Twenty Two East Fortieth Street
New York, N. Y. 10016

Title of Investigation for Which Support is Requested:

"To Further Explore the Relationship Between the Dimension of Fibers and Their Ability to Produce Pulmonary Tissue Reaction."

Principal Investigator:

George W. Wright, M.D. Head, Dept. of Medical Research
Saint Luke's Hospital
11311 Shaker Blvd.
Cleveland, Ohio 44104

Associate Principal Investigator:

Marvin Kuschner, M. D. Professor of Pathology
New York University,
School of Medicine
New York City, N. Y.

Institution Where Investigation Will Be Carried Out:

Saint Luke's Hospital

Make Checks Payable To:

Saint Luke's Hospital

Name, Title and Address of Financial Officer to Whom Check is to be Mailed:

Frank A. Oblak, Controller
Saint Luke's Hospital
11311 Shaker Blvd.
Cleveland, Ohio 44104

For the Period:

July 1, 1970 to December 31, 1972.

Amount Requested:

7/1/70 - 6/30/71	$46,167	
7/1/71 - 6/30/72	34,900	
7/1/72 - 12/31/72	17,810	
		$98,877

Name and Title of Official Authorized to Sign For the Institution:

K A Shoos
Supt.

Mr. Kenneth Shoos
Supt. of St. Lukes Hospital
send letter and check to

Signature of Principal Investigator:

George W. Swift

Signature of Director of Division:

Ralph Wulvrd

BACKGROUND INFORMATION:

In contrast to the biological inertness of silicate particles*, fibrous* silicate in the form of asbestos, both pyroxene and amphibole causes cellular reaction and fibrosis when lodged in lung tissue. In contrast to the effect of size on the biological activity of free crystalline silica, fibrous silicate as represented by asbestos is believed by Gardner,(1) Vorwald,(2) Webster,(3) Klosterkotter(4) and King(5) to become less rather than more active as the fibers become progressively shorter in length. These investigators suggest that asbestos fibers shorter than 5 microns in length cause little or no tissue reaction. Holt(6) is in disagreement with this view and has reported data interpreted to indicate that asbestos fibers shorter than 5 microns in length are just as

* A particle has a length/diameter ratio less than 3.
* A fiber has a length/diameter ratio greater than 3.

active biologically as those of greater length.

The current, and admittedly provisional or incompletely established, view is that fibrous silicates produce their cellular and fibrogenic effects because of mechanical action rather than chemical or surface chemical activity. Vorwald[2] has reported that long fibers of brucite, a fibrous form of magnesium hydroxide, causes inflammation and fibrosis and cites this as evidence supporting the view that the injury is mechanical in nature. In contrast, however, is the fact that fibers of glass, an amorphous silicate, more than 1 micron in diameter and up to 200 microns long are biologically almost completely inert. ✓ ?

Electron microscope (EM) studies of airborne asbestos dust and of the lungs of men exposed to such dust, reveal that asbestos fibers smaller than can be visualized with the light microscope, co-exist with and actually are more abundant than the fibers large enough to see with a light microscope. This finding has raised the important question of what the role of these EM sized fibers might be in the overall biologic reaction to asbestos. Gross[7] has reported that synthetic chrysotile injected into guinea pig's lungs does not cause inflammation or fibrosis. He attributed this lack of a reaction to the fact that the synthetic fibers were free of those trace metals common to naturally occurring fiber. While this is a possibility, it is equally possible that the absence of a tissue reaction is explainable on the basis that all of the synthetic fibers used by Gross were of a submicroscopic size and visible only with the electron microscope.

On the basis of the information now available, the relationship between dimensions and shape of a substance and its biological effects remains moot. This is especially true in the case of asbestos. We believe this question deserves further study.

PROPOSED STUDY:

It is possible to grow synthetic chrysotile fibers (8) to a size that mimics the spectrum of light microscope-sized fibers found in the lungs of men exposed to naturally occurring asbestos fiber. Comparison of the biological effects of synthetic fibers of this length to those of the short or electron microscope-size would avoid the conflicting effect of trace metals and permit further clarification ?

of the possible role of fiber length in the biologic effects of asbestos. We propose introducing synthetic chrysotile fibers of three sizes into the lungs of guinea pigs by intratracheal injection and subsequent examination of these lungs to observe whether or not biological effects occur to an equal degree in all three groups. The animals will receive 50 mg. each of one of the following categories of fiber. Category 1 will consist of fibers all of which are submicroscopic in diameter and less than 5 microns in length. Category 2 will be composed predominantly of fibers of larger diameter and lengths up to 10 microns. Category 3 will contain predominantly fibers of still greater diameter and lengths greater than 10 microns. In Category 2 and 3 there will, of course, be some synthetic fibers of submicroscopic size. We propose also to study the effect of long and short natural chrysotile and crocidolite

all the synthetic fibers will be essentially same diameter (i.e., ~300Å), but they will differ in length and consequently in aspect ratio;

prepared in a fashion designed to retain the physical-chemical identity of asbestos.

Because of tracheal regurgitation and the spotty distribution of the injected material during intratracheal installation, the dose of material relative to a volume of lung varies greatly. For this reason, no attempt will be made to use comparable total surface or mass of the different sized fibers. Because of the technical difficulty of being certain that areas of lung tissue will be examined that are identical to those where submicroscopic particles have come to rest, a marker of some inert, light microscope-sized material will be injected along with the submicroscopic sized fibers. √ ?

Davis[9] has recently referred to his unpublished data suggesting that when glass microfibrils, having a diameter of less than 0.1 micron, are introduced into the pleura of experimental animals a severe inflammatory and fibrotic reaction developes. This is particularly true of the long glass fibers in contrast to the short ones. This finding is in striking contrast to the relative inertness of glass fibers of varying length but having a diameter greater than 1 micron. We propose to study the effect of long and short <u>microfibers</u> when placed in lung tissue by intratracheal installation. We propose to inject 50 mg. of microfibrils having a length less than 5 microns in one group of animals, in contrast to another group that will receive 50 mg. of microfibrils longer than 5 microns.

?

Is 50 mg. dose so heavy that it might mask differences? Would 25 mg. be better?

Suitable control animals for these experiments will be established. All of the animals in the experiment will be held isolated from other known noxious agents, and appropriate numbers sacrificed at six months, twelve months and twenty-four months for examination. Whole lung sections will be examined by light microscope using suitable staining techniques and, where appropriate, electron microscope studies will also be made.

VALUE AND APPLICABILITY OF INFORMATION OBTAINED FROM THIS STUDY:

In addition to what might be considered the strictly scientific dividends relating to such things as chemical vs. surface vs. mechanical factors in the production of biological effects, there are two values of a more applied nature that might come from this study. The first of these is that fiber technology is rapidly expanding and a better understanding of the role of shapes and dimensions of fibers as they may be related to the presence or absence of biological effects might well influence the total field of fiber technology. A second and, perhaps, more immediately important value of this study relates to the matter of electron microscope-sized particles. At this time the threshold limit value for airborne asbestos fiber is in terms of light microscope-sized fibers greater than 5 microns in length. With the recognition that submicroscopic-sized fibers are even more prevalent both in the occupational and public environment than are light microscope-sized fibers, it is only a matter of time before the relative importance of the submicroscopic-sized fiber will have to be established. There exists at this time some epidemiological data which can be interpreted as indicating that the submicroscopic-sized fibers are not as important from a biological point of view as are the larger fibers, but more direct ?✓

experimental information would be helpful in arriving at a considered view of the problem as a whole.

In these studies it must be recognized that we are speaking in terms of that biological effect of fibers which is characterized by the development of a cellular reaction plus fibrosis and we are not considering the matter of carcinogenesis.

DURATION OF STUDY:

It is proposed that this study be initiated July 1, 1970. A preliminary report of the results of the studies at the end of six months, twelve months and twenty-four months of intrapulmonary fiber residence will be made as soon as practicable following each of the sacrifice periods. A formal, finished report, will be made by December of 1972.

While the investigators reserve the right to publish the results of their study in an acceptable scientific journal, they will submit a full report of their studies to the sponsor of these studies prior to submitting a scientific report to one of the scientific journals.

Addendum (5/1/70):

Further discussion of this proposal with Mr. Burnett and Dr. Pundsack led to the suggestion that additional asbestos and glass fiber dimensions could be prepared which would broaden the scope of the information to be gleaned from this study. With the addition of these, the study becomes not only an examination of the effect of fibre length but also of diameter on the biological reaction of lining tissue to fibres of asbestos and glass. Contrasting the effect of similar length natural to synthetic asbestos fibres will provide additional information on the role of trace metals in the cellular response to these agents.

BUDGET

PERSONNEL	7/1/70-6/31/71 12 mo. Time	$'s	7/1/71-6/31/72 12 mo. Time	$'s	6/31/72-12/31/72 6 mo. Time	$'s	
G. Wright	15%	-	15%	-	15%	-	
M. Kuschner	10%	-	10%	-	10%	-	
Animal Caretaker	100%	9,250	100%	9,500	70%	3,500	
Ass't. Animal Caretaker	40%	3,000	40%	3,200			
L. Grinnell (Research Ass't)	80%	10,700	50%	6,750	60%	4,200	
S. Wise (Res. & Histology Tech.)	75%	7,100	65%	6,200	75%	3,650	
SUPPLIES	No.		No.		No.		
Guinea Pigs	500	3,000	50	300	-	-	
Feed		3,500		3,000		1,000	
Histology		400		400		400	
Drugs-Syringes Etc.		300		-		-	
EQUIPMENT							
Cages		2,350		-		-	
Services of Electron Microscope		4,000		3,000		3,000	
Employee Benefits	10%	3,005		2,565		1,135	
Indirect Cost	35%	10,517		8,977		3,970	GRAND TOTAL
TOTAL		57,122		43,892		20,855	121,869

PROTOCOL

No.	MATERIAL	LENGTH (μ)	DIAMETER (μ)
1	Synthetic Chrysotile	0.5	0.03
2	Natural Chrysotile (Coalinga)	<1	0.03
3	Synthetic Chrysotile	5	0.03
4	Natural Chrysotile (Jeffrey)	<10	0.03
5	Synthetic Chrysotile	>10	0.03
6	Natural Chrysotile (Jeffrey)	>10	0.03
7	Saline & Marker (Control)	-	-
8	Crocidolite (Webster)	<10	0.5
9	Crocidolite (UICC)	>10	0.5 - 5.0
10	Chrysotile (Jeffrey)	<10	0.5
11	Chrysotile (Jeffrey)	>10	0.5-5.0
12	Glass (Microfibril)	<5	0.05
13	Glass (Microfibril)	>10	0.05
14	Glass	<5	1.0
15	Glass	>10	1.0
16	Glass	<5	3.0
17	Glass	>10	3.0
18	Thermobestos	?	<5

In this study, 25 similar aged adult guinea pigs will be injected intratracheally with 50 mgms. of each material. Five will be sacrificed and prepared for histological examination at 6 months and 10 at each period of 1 and 2 years. The suspension of those materials having a diameter less than 1 micron will also contain a biologically inert marker visible by the light microscope.

REFERENCES:

1) Gardner, L. U. (1938) Silicosis and Asbestosis by Lanza, A.J., Oxford University Press p. 257.

2) Vorwald, A.J., et al, (1951) Experimental Studies of Asbestosis, A.M.A. Archives of Industrial Hygiene and Occupational Medicine, Vol. 3, p.

3) Webster, I., (1970) Personal Communication.

4) Klosterkötter, W. (1969) Personal Communication

5) King, E.J. (1951) Thorax, Vol. 6, p. 127.

6) Holt, O.F. (1965) Ann. N.Y. Acad. Sc. Vol. 152, p. 87.

7) Gross, Paul (1967) Fibrous Dust Studies Progress Report No. 2, Industrial Hygiene Foundation.

8) Pundsack, F. and Speil, S., Personal Communication.

9) Davis, J., Personal Communication to F. Pundsack.

m
CLS

FILE

July 8, 1970

George W. Wright, M. D.
St. Luke's Hospital
11311 Shaker Blvd.
Cleveland, Ohio 44104

Re: Fiber Glass Heat and Frost Insulators and Asbestos Workers

Dear George:

Attached is a copy of the letter which Paul Gross wrote in response to an inquiry from the Alexandria, Ky. Local Asbestos Workers, which I referred to the other day.

Since we are desirous of keeping abreast of all activities of the International, I would appreciate it if you would forward copy of your reply to the inquiry you received.

Sincerely,

Hugh M. Jackson
Director of Industrial Relations

HMJ/md
Attachment

Return to Shuckler

4
6144

COPY JUN 30 1970 (412) 687-2100

ESTABLISHED 1935

INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, INC.

5231 CENTRE AVENUE PITTSBURGH, PA. 15232

June 16, 1970

Mr. Richard R. Wuertz, Jr.
International Association of Heat and
Frost Insulators and Asbestos Workers
31 Wright Court
Alexandria, Kentucky 41001

Dear Mr. Wuertz:

Your letter of June 6 is at hand and I am writing to provide the information requested.

In answering your question regarding health hazards presented by fibrous glass and asbestos lined ducts, first let me point out that the bio-effects of these two materials have been carefully studied and that they are quite different in nature. Asbestos can produce lung fibrosis (asbestosis) and cancer in workers if exposure is sufficiently heavy and prolonged, as in asbestos textile manufacturing and also in the tearing out of old asbestos-containing insulation, for example. For this reason the safe limits of dustiness for asbestos dust exposure have been set at a very low level: an average of 5 fibers per ml longer than 5 μ with a ceiling limit of 10 fibers per ml. From experience in the asbestos textile industry in Britain and the United States it appears that these standards will successfully prevent not only fibrosis of the lungs but cancer as well in workers.

In the case of fibrous glass dust, despite extensive experimental and human observations of animals and individuals exposed the equivalent of a ~~working lifetime (i.e., greater than 30 years) to the heaviest concentra-~~ tions of [illegible] dust producible in the laboratory or in the largest, oldest [illegible] manufacturing plant, there have been no signs of such patholo[illegible] lung fibrosis or cancer. After reviewing all existing factual [illegible] on fibrous glass, the American Conference of Governmental Industri[illegible] Threshold Limits Committee, of which I am a member, recommen[illegible] that the intended threshold limit value (TLV) for "inert" or nuisance dusts be applied to fibrous glass dust. This value remains tentative for a period of time to allow those in possession of data suggesting need for a change in the standard to present such facts for consideration. To the best of my knowledge, no such data have been forthcoming and, therefore, the TLV for fibrous glass as a nuisance dust may be considered technically sound and valid. Obviously, therefore, one should not speak in the same way of hazards of asbestos and fibrous glass dusts lest there be confusion and the recognized pathogenic capabilities of asbestos dust be applied, in error, to fibrous glass dust.

To proceed in answering your question, we are aware of good data from the Kettering Laboratory at the University of Cincinnati which document that fibrous glass duct liner does not erode either under conditions of use or when subjected experimentally to air flows considerably higher than those encountered in use.

Because of the biological inertness of the glass fibers used, and their incorporation into duct liner in such a way that erosion does not occur, there can be no hazard to health whatsoever involved under conditions of proper use.

Regarding asbestos, we are not aware of its use in duct liner. It has been suggested by researchers who have studied asbestos-containing mineral fiber spraying for fireproofing or decorative purposes that it is unsafe to allow air to pass through plenum chambers in which dust containing asbestos fibers may be added to the air intake of central building air conditioners. A control procedure which has been suggested and is being tested involves over-spraying of such plenums with a polyethylene coating. We are not aware whether quantitative measurements before and after have been made, but if so, we have not yet seen these reported in the literature. As the degree of control of asbestos fibers for community air purposes must be as nearly absolute as possible, it will be necessary in the public interest to document that the air system is not adding significantly to the background level of asbestos contaimination in urban air. Because of this, thought is being given to substitution of non-asbestos mineral fiber spray materials which meet technical performance specifications. Another solution proposed has been the application of formed asbestos panels or pre-coating of steel structural parts to eliminate completely need for the fiber spraying operation.

In conclusion, let me say that I hope the above information will be sufficient to answer your question, which was quite general in nature. I shall be happy to attempt to provide further assistance if you will be as specific as possible concerning the area in which your interest lies.

Sincerely yours,

Paul Gross, M.D.
Director, Research Laboratory

PG/sk
bcc: Dr. Lee B. Grant
Dr. Jon L. Konzen
Mr. Hugh M. Jackson
Mr. R. L. Strickland

H/
8/3

SAINT LUKE'S HOSPITAL

11311 SHAKER BOULEVARD
CLEVELAND, OHIO 44104

DIVISION OF MEDICINE

August 11, 1970

Mr. Clint B. Burnett
President
Johns-Manville Corporation
Twenty-Two East Fortieth Street
New York, New York 10016

Dear Clint:

Being required to make a statement and recommendation with respect to the potential hazard of asbestos fiber in the public air and the need for controlling the same, the National Air Pollution Control Administration asked the National Academy of Sciences of the U.S.A. to designate a committee, to study this matter and bring in a report. This committee has been formed and ultimately will report to a larger committee under the Chairmanship of Dr. Arthur DuBois and this committee in turn will make its recommendation to NAPCA. The second meeting of this committee was held in New York last Thursday. By 1972, we are expected to have a fully developed and documented recommendation but, prior to that time and it is hoped before the end of this year, we are expected to make a recommendation as to whether or not an interim control procedure is needed and is feasible. In the light of lack of knowledge and a wish to avoid prematurity, we have been asked to not set any kind of standard in terms of a number. It is possible, however, that something in the way of a number may actually come out in spite of this.

From our two sessions thus far, I gather that they want to pinpoint the sources of public air contamination by asbestos fiber and to obtain a consensus on whether or not some controls are needed at these sources and whether such controls are feasible at this time. Based upon what I know now, I would think that all manufacturing sources, and in this I would include milling, will be asked to reduce any output of fiber from the factory involved to the lowest level feasible taking into consideration the kind of ventilation and filtering devices currently available. Sources such as the actual mining operation, disposal of solid waste, road surfacing and similar uses of asbestos will be far more difficult to control and I have the impression that they will permit this to continue until further recommendations are brought in in 1972. They may wish to make some specific recommendations about solid waste disposal and mining if technologies now exist that are of a conventional nature and might be introduced without undue hardship. The group seems to be well aware of the fact that specific information on which to base severe limitations or permit continuance of the status quo simply do not exist and will have to be obtained in the very near future. In this regard, I indicated that Johns-Manville had some scant data on these matters and that I would ask whether or not this information could be made available. I think that it would be well for us to try to get a little additional information in the next two or three weeks, especially data in the neighborhood of the factories with and without control measures in effect.

On Friday of last week, I attended a meeting in Corning, New York, having to do with the question of whether or not the public is being exposed in a hazardous way to fibrous glass. This meeting was called by a Subcommittee of the Committee on Occupational Health of the American College of Chest Physicians. Dr. Lewis Cralley and Clark Cooper serve on that Subcommittee. Dr. Cralley indicated to us that he would like to have available to him a statement about the likelihood of a public hazard from fibrous glass from an authoritative agency since he is being plagued by requests for that kind of information from a number of sources. A good many of us would agree with the desirability of this but all of us fear a poor statement or an inflammatory one that might be biased. It had been my understanding and that of a number of others who were at the meeting that Dr. Scheppers was going to present some data on the fibrogenecity in animals secondary to contact with fibrous glass. He did not come to the meeting however.

The upshot of the meeting was that it would have been nice if no one had raised the issues but since it has been raised, perhaps, the committee that raised it might do something about it, especially if it could be arranged to have individuals who actually know something about the problem as members of the Subcommittee. This should not be interpreted that any of us wanted an unwarranted playing down of the question.

I am sure that you recognize that this whole matter is in a large measure trumped up and supported by the jurisdictional problem of the Heat and Frost Insulators vs. the Sheet Metal Workers. If they would drop the issue, I am sure that we would not be involved in the matter of some kind of authoritative statement from the medical profession being needed.

With best wishes,

Sincerely yours,

George W. Wright, M.D.

GWW:vk

cc: Dr. Tom Davison
Mr. A. B. Marchant
Mr. Hugh Jackson

December 17, 1968 [redacted]

Dr. Klosterkotter
Ruhn University
Essen, West Germany

Dear Dr. Klosterkotter:

Dr. George Wright recently informed me of your desire for a bar made of chrysotile which you could use to supply fiber for inhalation exposures. Under separate cover I am sending you a sample of chrysotile asbestos designated by our Identification No. 3778-83-1. This was made by slurrying relatively clean chrysotile fiber (Johns-Manville Plastibest 20), casting the resultant slurry in a mold, and then pressing it approximately 400 lb/sq in. The resultant sheet was then dried at 175C.

[redacted] hope that this material will be satisfactory for your application, and [redacted] be very interested in learning any results that you obtain in your [redacted]

Very truly yours,

Dr. Sidney Speil, Director
Corporate Research & Development

SS/rs

cc: Dr. George Wright
St. Luke's Hospital
11311 Shaker Boulevard
Cleveland, Ohio 44104

bcc: H. M. Jackson - DH
F. L. Pundsack
S. Speil
Att: J. P. Leineweber

[redacted]