MINNEAPOLIS
DIVISION OF PUBLIC HEALTH
PUBLIC HEALTH CENTER — 250 SOUTH FOURTH ST.
KARL R. LUNDBERG, M.D.

March 9, 1961

Occupational Health Field Headquarters
U. S. Public Health Service
1014 Broadway
Cincinnati 2, Ohio

Dear Sirs:

ATTENTION: MR. DOHRMAN H. BYERS

COPY

I am writing you at this time for further information on vermiculite. I have on my files a letter dated May the 27th, 1955, which was addressed to me and signed by Melvin M. Udel, Assistant Surgeon, Clinical Services. This was in reply to my letter inquiring about the clinical effects of vermiculite.

At that time we had a case of pneumoconiosis which was thought to be related to a heavy exposure to vermiculite dust. We have recently had another case of similar pneumoconiosis reported to us. This workman has also been exposed to vermiculite dust of a long period of time. The vermiculite is being produced for use as insulation.

Although the workmen involved are in two separate companies, they use the same source of raw product which is the zonolite brand.

I wonder if you can supply me with more recent information in regard to the effects of vermiculite dust, and was outlined in Dr. Udel's letter of May the 27th, 1955.

Through his letter and further articles which I have at hand I have the following references relating to this subject.

1) Dreessen, W. C.; Dalla Valle, J. M.; Edwards, T. I.; Sayers, R. R.; Eason, H. F.; and Trice, M. F.; "Pneumoconiosis Among Mica and Pegmatite Workers", Public Health Bulletin, No. 250, D.S.P.H.S. 1940.

2) Vestal, T. F.; Winstead, J. A.; and Joliet, Paul V.; "Pneumoconiosis Among Mica and Pegmatite Workers", Industrial Medicine, Vol. 12, No. 1, page 11, January 1943.

3) Harihara, C. R.; Gupta, M. N.; and Maniker, N. S.; "Notes on Mica Dust Inhalation", A. M. A. Archives of Industrial Hygiene and Occupational Medicine, Vol. 8, No. 6, December 1953, page 531.

4) Parada, A.; "Silicatosis Caused by Sepiolite", Med. Segur. Trab., 2: 11-14. January - March 1954, (abstracted in Industrial Hygiene Digest, Vol. 19, No. 4, page 30, April 1955.)

5) Patty, Vol. 1 (Second Revised Edition) 1958, page 361, item 3 bottom of page.

6) Vorwald, Arthur J.; "Diffuse Fibrogenic Pneumoconiosis", Industrial Med. & Surg., Vol. 29, August 1960, pp. 353 - 358.

We are proceeding to make a much more detailed investigation of both of these cases of pneumoconiosis and hope to have additional information which we will be glad to share with you.

Very truly yours,

W. E. Park, M. D., Chief
Occupational Health Service

WEP/gjk

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

PUBLIC HEALTH SERVICE

Occupational Health Research and Training Facility
Research and Technical Services Branch
1014 Broadway
Cincinnati 2, Ohio

March 27, 1961

Dr. W. E. Park, Chief
Occupational Health Service
Division of Public Health
250 South Fourth Street
Minneapolis, Minnesota

Dear Dr. Park:

Your letter of March 9, 1961, a request for recent literature on the biologic effects of vermiculite, has been referred to me for reply.

I am sorry to say that new information on this subject published during the past five years is quite limited. A need for further study of the relationships between the silicates and pulmonary disease certainly exists.

Enclosed are three abstracts copied from the Industrial Hygiene Digest that were not included in your list of references. Another article that is old but relative to the subject is also mentioned.

Johnstone and Miller in their new book "Occupational Diseases and Industrial Medicine," W. B. Saunders Company, Philadelphia, 1960, classify various pulmonary responses to industrial dusts. Mica is broken down in this manner:

Mica	Physical Characteristics	Chemical Formula	Tissue Response	Possible Entity
Muscovite (sericite)	Crystalline	$K_2O.3Al_2O_3$ $6SiO_2 2H_2O$	Foreign Body Reaction	Minor silicate pneumoconiosis
Biotite	Crystalline	$H_2K(Mg, Fe)_3$ $3Al(SiO_4)_3$	Foreign Body Reaction	Minor silicate pneumoconiosis
Vermiculite	Plates	Varied hydrated silicates	Foreign Body Reaction	Minor silicate pneumoconiosis

Under their section on Minor Pneumoconioses they discuss the usual pulmonary response to these silicates as consisting of an elaboration of a fine reticulum of fibers forming a loose mesh throughout the packed masses of dust cells. These changes are apparently responsible for an accentuation of linear markings and reticulation that is evident on a chest x-ray examination.

Dr. W. E. Park, Chief -- March 27, 1961

We are very much interested in the results of your pending investigation of the two men exposed to vermiculite dust.

Please do not hesitate to write us again if we can be of further help to you.

Sincerely yours,

Roy L. Gibson

Roy L. Gibson, Surgeon (R)
Occupational Medicine Section

1. Polican, A.: The action of mica dust on pulmonary tissue. J. Ind. Hyg. 16:160, 1934.

2. Ramaswamy, A. S., Venkatish, D. S., and Rama Rao, R.: The nature of lesions caused by asbestos and mica in experimental pneumoconiosis in guinea pigs. J. Indian Inst. Sc. 35, Sect. A., 319, Oct., 1953. (Ind. Hyg. Dig. 18. No. 550, 1954).

Guinea pigs were subjected to intratracheal injections of mica and asbestos dusts. Stress is laid on the development, after long periods, of lesions in other organs besides the lungs, especially in the adrenal glands. Mica dust was found to lead to some degree of nodular formation in the lungs, but the asbestos dust set up diffuse fibrosis only. These differences are portrayed in a series of photomicrographs. Mica induced hypertrophy of the adrenal cortex with extensive foamy disintegration of the cortical cells; asbestos induced lesser changes, but small areas of necrosis were occasionally found in the zona fasciculata and zona reticulata. In a theoretical discussion the authors attempt to draw a relation between the atomic structure of mica and asbestos and the pathological lesions in the lungs and other organs. Their theory, however, leaves many points unexplained. - Cond. from Bull. Hyg.

3. Gupta, M. N.: Silicosis amongst supervisory staff in mica mining in Bihar. Report No. 8 Govern. of India, Ministry of Labor, Office of the Chief Advisor Factories, New Delhi, India. 6pp,. 1955. Ind. Hyg. Digest 21: No. 1437, 1957.

The silicosis hazard among the supervisory staff in mica mining was studied. Nodular and conglomerate silicosis was found in 45.2% of the supervisory staff and was fairly well correlated to the number of years spent in underground work. Pulmonary tuberculosis was found in 19% of the supervisory staff.

4. Health Hazards in Mica Processing, India, Government of: Ministry of Labour. Report No. 4. Office of the Chief Advisor Factories, Ministry of Labour and Employment. New Delhi. 11pp, 1954. (Ind. Hyg. Dig. 23: No. 186, 1959).

The production of mica in India increased from 6,000 tons in 1939 to nearly 10,000 tons in 1951 and the industry now employs about 27,000 workers, 16,500 of whom work underground. A recent investigation revealed a high prevalence of silicosis in mica miners. The hazard in mica mining is mainly from free silica and the investigation described in this report was carried out to determine the importance of inhalation of mica dust. Dust measurements taken during the different processing operations were found to exceed the maximum allowable concentration (MAC) for mica of 20 million particles per cubic foot in screening and grinding mica. Chest x-rays of 61 workers, 53 men and eight women were taken; 58 of those studied worked in processing factories and three in mica grinding. Twenty (32.7%) of the x-rays were recorded as showing "linear exaggeration" and 41 (67.3%) "ground glass" appearances. No x-rays showed nodular silicosis and none were recorded as normal. The self-evident conclusion is drawn that it is desirable to keep "the dust concentration of mica within safe limits". As no nodular case was

noted in the 61 workers whose average time intensity factor was 360, equivalent to 18 years exposure to 20 million particles per cubic foot, the suggested MAC is considered reasonable.- Cond. from Bull. Hyg.