General Headquarters
December 3, 1941
(Dist. 11-29)

R. C. Smith [redacted]an

Hygienic Dust Control
Your Letter September 27th

You have raised some extremely pertinent questions, and to answer them fully would take much more than a letter in reply. Briefly, however:

1. (a) We are tentatively using an m.a.c. of 5 million particles for silite, all types.

Our animal experimental work to date indicates that the critical factor in diatomaceous earth pneumoconiosis is the cristobalite content of the calcined and flux calcined materials. The natural earth products appear to be more of the order of nuisance dusts. There is yet to be answered, though, a relation of any of the diatomaceous earth materials to tubercular infection. Additional animal work is being done, and an industry study by the United States Public Health Service is being conducted to evaluate the clinical experience. We anticipate that within the next several years we will have more complete answers.

1. (b) Amosite fiber. The A.C.G.I.H. list of threshold limits does not differentiate in the several types of asbestos fiber and shows the m.a.c. to be 5 million particles per cubic foot. On the basis of the Saranac Research our tentative m.a.c. is 1 million fibers (10 microns and longer) per cubic foot.

Our clinical experience suggests that there is considerable difference in the reaction to chrysotile or amosite fiber. Amosite appears to produce asbestosis within a much shorter time than does chrysotile. At present the Industrial Hygiene Foundation is conducting some animal experimental work for us which should clarify the fibrosis-producing potential of the several types.

2. At present the m.a.c. for a mixed product can best be interpreted by determining the percentage of materials found in air-borne dust and applying that ratio to the total dust count; comparing this result with the m.a.c. for the material in question.

The analysis of settled dust samples is used for this purpose. Settled dust samples are assumed to represent the air-borne portion of the dust produced. They are taken at or above the workmen's reading level. Where analytical methods do not provide a means of estimating percentage of material in question, the batch mix percentages are the next best yardstick.

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Since there was [illegible], to our knowledge, no research done on the effective mixed exposures, we are contemplating a project of this type. It has been suggested that the synergistic effect of two toxic materials may produce results beyond the mere summation of the toxic effects of each material individually. In general, however, our experience with mixed exposures shows minimal pulmonary disfunction even with advanced x-ray changes.

3. The "per cent fiber" findings of the Metropolitan survey reports cannot adequately be interpreted into our terminology of million fibers per cubic foot.

The standard dust counting procedure is based on noting those particles 10 microns and under in size. The Metropolitan dust count and per cent of fiber count related, therefore, only to the material 10 microns and less, which could be identified as particulate or fibrous in shape. As a result of the conclusions from the Saranac research, the fiber counts now made identify those fibers 10 microns and longer.

4. In general it may be considered that a "safe" area is one in which the hygienic dust level is consistently below the m.a.c. A move to a "safe" area must always be accompanied by a medical follow up of the individual involved.

It must be emphasized that neither the threshold limit nor the methods of sampling and counting are absolutes. The threshold limits are not established on the basis of providing an absolutely safe exposure level for for every individual, but rather a level within which most individuals will not be harmed. There is so much variation in the reaction of individuals to a particular type of material that no guarantee of full protection can be assured at any level of exposure. Medical follow up must always be a part of transfer for health reasons.

5. I have rechecked the original reports from Travelers and find that both surveys were properly reported at thousand fibers per cubic foot. Since there is considerable variation in the fiber count (and in the dust count too at sample station FT 2), it would be in order to check these stations on two or three successive days to establish the normal operating range.

The change to reporting to million fibers per cubic foot was made in April, 1954.

H. Jackson

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cc: T. K. Turnbull - Waukegan
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