MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
~~HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION~~
Center for Disease Control
National Institute for Occupational Safety and Health

TO : See Below

DATE: August 8, 1973

FROM : Chief, Toxicology Branch, DLCD
Chairman, Committee on Threshold Limits, ACGIH

SUBJECT: Identification of a Threshold of Response and Estimations of Safety Factors in the Present Recommended Standards for the Industrial Carcinogen, ASBESTOS

Enterline et al. (Brit. J. Ind. Med. 30:162, 1973) reported that a study of the mortality from cancer and respiratory disease (asbestosis) of 1,348 retired asbestos workers, of whom approximately 1,000 were exposed to chrysotile, the remainder to crocidolite*, resulted in the conclusion that "there appeared to be no direct relationship between asbestos dust exposure and respiratory cancer below 125 mppcf-years."

This information is of the highest importance for two reasons:

1) It establishes a threshold of response for a chemical carcinogen.

2) It permits an estimate of the margin of safety incorporated in both the NIOSH and ACGIH recommended standard for asbestos.

The margin of safety (SF) in these recommended standards for all forms of asbestos disease and for chrysotile and crocidolite may be estimated as follows:

The NIOSH asbestos recommended standard of 2 fibers/ml > 5 mμ in length is equivalent to 0.3333+ mppcf, according to Lynch & Ayer (AIHAJ 27:431 (196

For 30 exposure-years @ 125 mppcf = 4.17 mppcf

For 40 exposure-years @ 125 mppcf = 3.13 mppcf

For 50 exposure-years @ 125 mppcf = 2.5 mppcf

Estimation of the Safety Factors** in the present NIOSH Standard:

For 30 years, $\frac{4.17 \text{ mppcf}}{0.333+} = \frac{SF}{12.5}$

For 40 years, $\frac{3.13}{0.333+} = 9.4$

For 50 years, $\frac{2.5}{0.333+} = 7.5$

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*According to private communication with Enterline August 7, 1973.
**For all types of asbestos disease, cancers and asbestosis.

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The ACGIH TLV of 5 fibers/ml > 5 μm in length is equivalent to 0.8 mppcf.

Estimation of the Safety Factors** in the present TLV:

For 30 years, $\frac{4.17}{0.8} = \frac{SF}{5.2}$

For 40 years, $\frac{3.13}{0.8} = 3.9$

For 50 years, $\frac{2.5}{0.8} = 3.1$

The above calculations permit for the first time validation of the asbestos recommended standards for chrysotile and crocidolite for all forms of asbestos disease and, moreover, permits an estimate of the margin of safety incorporated in these standards for 30, 40 and 50 years of exposure to asbestos.

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