



Inter Office Communication

SCIENTIFIC RESEARCH STAFF

December 5, 1972

TO: J. E. Mayer, Jr.
J. V. Petrocelli

cc: S. G. R. R. R.
M. J. M. M. M.

SUBJECT: Carcinogenic Effects of Asbestos-WSU Animal Experiments

As a follow-up to our previous contact (see attachment) we met with Dr. Andrew Reeves and his associates at the Wayne State School of Medicine on November 17.

Dr. Reeves is now completing work on a contract with the Public Health Service in which several species of laboratory animals were exposed to airborne asbestos for extended time periods. The significant finding, in my opinion, is that some species of laboratory animals developed carcinoma of the lung and pleural mesothelioma after only a few years of exposure to high concentrations of airborne asbestos fibers. Dr. Reeves stated that cancer development might well occur at some fraction of the animal's normal life-span, rather than at a fixed absolute time. Thus, with suitable laboratory animals, the dose-time-cancer occurrence relationships for airborne asbestos exposure might be established within a few years.

A logical extension of his work is being proposed by Dr. Reeves for a new PHS contract, to be submitted in January 1973 and initiated the following summer. In this study, he plans to subject his laboratory animals to simulated brake lining wear debris. His planned approach was to heat chrysotile asbestos to 1500°F, subject this material to mechanical action, and blow the ensuing airborne material into his test chambers.

We suggested that this approach probably would not approximate brake asbestos effluents. After describing what we know of brake lining interfacial phenomena and of the magnitude of asbestos fiber content from brakes in normal service, we suggested three possible alternative approaches.

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J. E. Mayer, Jr.
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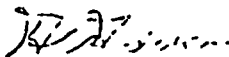
The first is to collect brake drum debris and use this material to simulate the air in an automotive brake relining shop. The second is to collect the grinder dust in a brake lining finishing shop to simulate the air in a brake lining manufacturing area. While these samples may be appropriate to simulate the environmental air for a small group of workers, they would not be expected to simulate the debris from automotive brake usage. Our third suggestion was to generate brake lining wear debris at the WSU Laboratory for direct introduction into the animal chambers.

The last approach would appear to be preferred, since we all are exposed to brake lining wear debris, yet little is known of its carcinogenic properties. We do know, from our own studies, that much less than 1% of the asbestos content of the lining is emitted to the atmosphere. Dr. Irving Selikoff, the noted expert on asbestos epidemiology from Mt. Sinai School of Medicine, has stated that he doubts that brake usage contributes significantly to asbestos air pollution. However, a good laboratory test to establish the dose-time-occurrence relationship for brake lining wear debris would appear to be of importance to us all, and particularly to Ford Motor Company as a major purchaser of resin/asbestos friction materials.

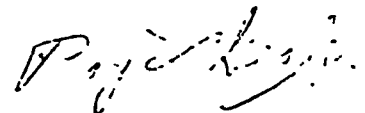
A preliminary calculation indicates that airborne asbestos concentrations more than a thousand times the typical level (1-10 ng/m³) found in U.S. cities could be generated with a 3 horsepower device which uses standard brake parts. This power level would confine bulk brake temperatures, and thus lining friction and wear behavior, to the normal usage range.

It appears prudent that we volunteer our services to aid Dr. Reeves and his associates in recommending this approach of brake lining wear debris generation for his new PHS contract proposal. Our involvement need be as little as a man-week's work, with assistance on test fixture design and brake parts procurement to assure that representative brake debris is generated. Our involvement could logically extend to the design of the brake device and even its construction.

We would appreciate your advice in this matter. As of now, we have made no commitments with Dr. Reeves, but have expressed an interest in his program.



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Mechanical Research Department



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Attachment

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