FILE NAME: Ford (FD)

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DOCUMENT DESCRIPTION: Memos RE Carcinogenic Effect of Asbestos - University Study with Attached Newspaper Article

The sticky note shown below was written by Barry Castleman and attached to the page immediately following this one along the right margin at the spot marked on the next page with an X

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Scientific Research Staff

Intra Company

September 6, 1972

Mr. J. V. Petrocelli

cc: A. E. Anderson, W. D. Compton, J. U. Damian, S. Gratch, D. A. Jensen, J. E. Mayer, J. S. Ninomiya, B. H. Simpson, P. E. Toth

Subject: Carcinogenic Effect of Asbestos -- Wayne State University Animal Experiments

On August 22, 1972, I telephoned Dr. Andrew L. Reeves, Associate Professor of Occupational and Environmental Health at Wayne State University School of Medicine, regarding his investigation of the effects of asbestos inhalation on laboratory animals. An article on Dr. Reeves' work appeared in the Detroit News on July 27, 1972 which indicated that he plans some animal experiments using heat-treated asbestos. By this means, he intends to simulate the form of asbestos or its decomposition products which may be emitted from automotive brakes when subjected to the high surface temperature generated during braking.

Dr. Reeves is working under grant from the U. S. Public Health Service. He has published work on experiments in which he exposed rodents to asbestos (chrysotile, crocidolite, or amosite) by inhalation, or by intratracheal, intrapleural, or intraperitoneal injection (Andrew L. Reeves et al, Environmental Research, Vol. 4, No. 6, Dec. 1971, pp. 496-511). In these experiments, no animals exposed by inhalation to chrysotile dust (the form of asbestos used in brake linings) developed any malignancies. He was able to induce malignant tumors in animals exposed to crocidolite by inhalation and to crocidolite or chrysotile by injection.

Dr. Reeves is currently conducting additional experiments with pulverized asbestos in which he expects to establish experimental conditions conducive to malignant tumor formation, after which he plans to contact the experiments with heat-treated asbestos. He expects to be able to report preliminary results of his current experiments by the end of December 1972. He hopes for a renewal of his PHS grant in January.

Dr. Reeves indicated that he might like to use actual airborne brake lining wear dust in some of his animal experiments, and we discussed

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the possiblity of our providing some assistance to him in setting up such experiments. Dr. Reeves is out of the country during September and suggested that we get in touch in the latter half of October to explore further the idea of including brake wear dust in his experiments.

Roy L. Gealer

R. L. Gealer
Chemical Engineering Department

RLG:ao

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Asbestos blamed

Brake lining dust linked to cancer

By JEAN PEARSON
News Science Writer

Asbestos in automobile brake linings may be a potential cause of cancer, a Wayne State University School of Medicine research team fears.

Dr. Andrew Reeves, chief of the research team, said yesterday that overexposure to asbestos particles is known to be the cause of a number of lung diseases, including cancer.

But what isn't known, he said, is whether use of the brakes releases harmful particles into the air.

ASBESTOS is used in brake linings, building materials and, to some extent, in the clothing industry.

In addition to lung cancer, overexposure to asbestos may lead to asbestosis, a degenerative type of lung disease, and possibly to mesothelioma, a tumor of the lining of the chest cavity, or pleura.

Dr. Reeves said the asbestos industry denies, on good evidence, that asbestos released into the air from automobile brakes poses a health hazard because the high temperatures incurred in braking mean the asbestos has taken another form.

"But the final word is not known," Dr. Reeves said, nothing that it is not known yet what that form is and whether it presents any hazard to humans.

Seeking "the final word," Dr. Reeves and his research team are planning an experimental system that will simulate the mechanical action of brakes, heat the asbestos to 1,500 degrees Fahrenheit and blow the dust into chambers for inhalation by guinea pigs.

The guinea pigs will then be checked to determine whether the heat-changed, inhaled asbestos particles are as toxic as the inhalation of regular asbestos particles.

The asbestos industry, Dr. Reeves said, is concerned about the potential hazards and is "cooperating in a very nice way and not trying to coverup."

One evidence of their cooperation, he said, is that Johns-Manville supplies him "asbestos by the ton" for his experiments.

Dr. Reeves, an associate professor of occupational and environmental health, is doing research on a number of potential and known health problems related to asbestos and beryllium which is used in a number of industrial processes. His studies are supported by a grant from the National Institutes of Health.

Though his research animals are guinea pigs, Dr. Reeves is especially concerned about the levels of both asbestos and beryllium which can be inhaled safely by humans.

Guinea pigs are like humans and unlike rats in their reaction to beryllium, he said.

"In our research here at Wayne," Dr. Reeves said, "we found that, after rats had been exposed to beryllium, they had a very high incidence of cancer.

"But beryllium does not seem to cause cancer in humans or in guinea pigs. It is a toxic substance that appears to be species specific."

Beryllium particles, however, are associated with a lung disease called beryllosis.

Dr. Reeves' team is trying to determine not only what levels of beryllium are dangerous but how to immunize persons exposed to the substance.

Working with guinea pigs, they are examining the possibility of immunizing against beryllosis.

"We have not reached the point where we can apply our findings to humans but that is our goal," he said.

The team's beryllium research has been oriented toward chronic studies, exposing guinea pigs for seven hours a day over a relatively long period.

EACH MONTH, a selected group of the exposed guinea pigs are dissected and microbiological and chemical studies are made to determine the effect of the beryllium dust.

Dr. Reeves said asbestos is much more difficult to study than beryllium because of the difficulty in breaking asbestos up into particles small enough to be blown into chambers for inhalation by guinea pigs.

The team had to design and build a special hammer to do the job. But the hammer itself introduced a problem because it erodes slightly as it is used.

Despite the researchers' attempts to remove trace metals, the "foreign particles" introduced may be inhaled along with the asbestos particles.

Then, the researchers have a difficult time trying to ascertain whether the effects upon the guinea pigs of the inhaled material should be attributed to asbestos or to the trace metals.

Dr. Reeves serves on the air pollution evaluation committee of the American Industrial Hygiene Association.

Inter Office Communication

SCIENTIFIC RESEARCH STAFF

December 5, 1972

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

cc: S. Gratch
M. Humenik, Jr.

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 our opinion, is that some species of laboratory animals developed carcinoma of the lung and pleural mesotheliomas after only a year 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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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/m^3) 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.

A. E. Anderson
Mechanical Research Department

R. L. Gealer
Chemical Engineering De

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Attachment

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