ENGINEERING AND
MANUFACTURING STAFF

November 19, 1971

Intra Company

To: Mr. J. U. Damian
Mr. B. H. Simpson

cc: Mr. W. M. Brehob
Mr. D. A. Jensen
Mr. H. L. Misch
Mr. R. C. Ronzi
Mr. C. W. Schwartz

Subject: Fibrous Asbestos Emissions

On October 19, 1971, the State of Illinois held a public hearing concerning the banning of asbestos in brake-linings beginning with the 1975 model year. At this hearing, the State of Illinois requested a statement from Ford Motor Company regarding the banning of asbestos. Mr. Damian is in the process of preparing a statement for filing on November 22, 1971. The purpose of this letter is to provide a summary of available information concerning asbestos, for background or reference use, covering the following topics:

1. The effects of asbestos on health
2. Sources of ambient fibrous asbestos
3. Automotive uses versus total asbestos consumption
4. Ford studies to determine asbestos emission rates
5. Alternatives for asbestos in brake-linings

1. Health Effects

Inhalation of fibrous asbestos has been considered the source of asbestosis and mesothelioma (rare form of cancer frequently observed in asbestos workers). Non-fibrous asbestos, on the other hand, is believed to be harmless to human health. The mechanism by which fibrous asbestos promotes cancer formation has not been determined, however, it is conjectured that synergistic effect of asbestos with various pollutant (such as cigarette smoke) is the major cause. Asbestos induced cancer is limited to those who work in asbestos mines or industries which produces asbestos products or those who live in the vicinity of asbestos mines and asbestos processing industries (e.g. industrial processes in which workers actually come in contact with fibrous asbestos). A high prevalence of asbestosis has also been observed among consturction workers who specialize in spray insulation of buildings. The contraction of this type of cancer usually results from a 15-30 year of exposure and the frequency of cancer occurrence is related to the dosage of fibrous asbestos which is many orders of magnitude higher than that observed in ambient background air.

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2. Sources

The fibrous asbestos content of Detroit's ambient air is estimated to be about 1×10^{-8} grams/m^3. A recent literature review by the Public Health Service states that the bulk of airborne asbestos originates from natural sources such as soil dust and locally from asbestos mines and processing plants. Limited amounts of fibrous asbestos are also emitted from the use of asbestos cement used often as spray building insulation. According to another review by the National Research Council, automotive contribution from brake-linings is believed to be negligible because asbestos fibers are destroyed by the intense heat created by the braking process (about 1400°F) to a non-fibrous state.

3. Uses

The total U. S. asbestos production in 1965 was 8×10^5 tons. Cement, floor tile, paper, and other building construction materials accounted for about 90% of asbestos consumption. Friction materials - - primarily brake linings - - accounted for 2.8×10^4 tons or 3.5% of the total asbestos production.

4. Brake Lining Emission Rates

Attempts have been made at Ford to determine the fibrous asbestos emission rates from a laboratory brake-lining test stand. An elaborate electron microscope technique is used to identify the tiny fibers (about 1×10^{-6} inches diameter). Our preliminary experiments indicate that there is very little fibrous asbestos present in brake dust. The fibers are less than 0.5 u in length and most of them are converted to a non-fibrous state by the process of braking. Our emission rate estimate is very close to the background ambient concentration levels.

5. Brake Lining Alternate Materials

Alternatives for asbestos based linings are few and all have some disadvantages in terms of either performance, cost, or both. Ford has been using cermet linings (sintered metal) for heavy duty trucks and semi-met (metal strand and carbon mixture) for police cars, both containing no asbestos. Beginning with the 1971 model year , Ford has been supplying optional semi-met front-end brakes for police car fleets. Semi-met linings are superior in performance to conventional brake-linings (about equivalent in terms of cold-wear and noise), but the cost penalty is severe ($1.25/car just for front-end brakes). Ford is experimenting with semi-met linings for rear wheels. However, there are some cold-stopping and wear difficulties associated with rear wheel semi-met linings in their present form and may necessitate major redesigning of the rear wheel brake systems.

J. S. Ninomiya

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Intra Company

ENGINEERING AND
MANUFACTURING STAFF
January 18, 1972

To: Mr. J. U. Damian
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Subject: Control of Asbestos Emissions -- Progress Report.

The proposed standards for asbestos, beryllium, and mercury appeared on a Federal Register (December 7, 1971, volume 36, No. 234). In December, 1971, the EPA also published "Background Information -- Proposed National Emission Standards for Hazardous Air Pollutants: Asbestos, Beryllium, Mercury", to supplement the Federal Register. This letter is intended to bring you up to date on the subject of asbestos control and the possible effects that such a standard may have on the automotive industry. A discussion dealing with the sources of asbestos, effects on health, alternates to asbestos brake-lining, etc. were discussed in an earlier letter (copy attached).

Although the proposed asbestos standard is not defined in terms of numerical values, it does require that all asbestos emission sources provide adequate asbestos emission controls. A numerical standard may be adopted in future when:

1. A dose-response relationship between levels of airborne asbestos and resulting human diseases is established.

2. Reliable and rapid analytical technique are available to determine the level of asbestos emissions from different sources.

In reviewing the EPA publication, it is apparent that the control of asbestos emissions from brake-lining is not a "dead-issue" as many would like to believe. The report states that "The asbestos emissions from use of these materials (brake-lining is one of them)

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can be significant" and that "A program for determining the extent and nature of asbestos emissions from automotive brake-lining is now in progress in the Office of Air Programs". Specifically, the above mentioned program is being conducted by the Bendix Corporation.

The EPA publication also states that the regulation of asbestos emissions from brake-lining lies outside the authority of Section 112 of the Clean Air Act. This implies that each State has the authority to regulate asbestos emissions from brake-lining in the event such control is deemed necessary. Such action was considered recently in the State of Illinois which planned to prohibit the use of asbestos in brake-linings beginning with the 1975 model year. Although no action was taken, the matter may be brought up again.

J. S. Ninomiya
Automotive Emissions Office

Attachment

SPECIAL LEGISLATIVE REPORT

NO. 976-B

DATE: August 10, 1971

WASHINGTON STAFF

SUBJECT: August 4 Senate Commerce Committee Toxic Substance Control Hearing

COPIES TO: W. D. Innes
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R. W. Fri, Deputy Administrator, Environmental Protection Agency (EPA) was the principal witness at the Senate Commerce (Hart, D-Mich.) Subcommittee on the Environment hearing August 4 on S. 1478, the Administration's proposed Toxic Substances Control Act.

Fri's prepared statement stressed that EPA had no current authority to regulate such substances, that EPA would like authority to ask the Justice Department to seek temporary restraining orders preventing use or distribution of such substances and that the bill, if enacted, would create a Board to advise EPA on its test procedures and controls on use of toxic substances.

Acting Chairman Spong (D-Va.) was told that asbestos is one substance which EPA is concerned about, although EPA's role in restriction in the use of asbestos would largely be limited to uses of asbestos in industrial processes.

Fri told Spong that 35,000-50,000 products containing approximately 900 chemical ingredients may ultimately require manufacturing controls to be employed by EPA. Fri agreed with Spong that situations currently exist where it is easier for the agency to monitor manufacturing processes than to monitor the discharge of all toxic materials into air or water.

Dr. Robert Risebrough of the University of California also testified concerning the use of polychlorinated biphenyls (PCB)., Risebrough warned of the dangers of PCB, which is currently used as an additive to sealants, rubber, paints, plastics, adhesives, etc.

Hearings continue August 6 when a Mt. Sinai Hospital staff member may appear.

Copies of statements presented at the hearing are attached to Mr. Misch's copy of this report.

R. W. Markley, Jr.
Vice President - Washington Staff

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