# TESTIMONY REGARDING

16 CFR Parts 1304 and 1305

## RESPIRABLE FREE-FORM ASBESTOS

## Proposal to Ban Certain Patching Compounds and Artificial Emberizing Materials (Embers and Ash)

As Published in the FEDERAL REGISTER,
Vol. 42, No. 146 - Friday, July 29, 1977

Presented by Harrison B. Rhodes
Union Carbide Corporation
Metals Division
Niagara Falls, New York 14302
August 15, 1977



ASBESTOS INFORMATION ASSOCIATION/
North America
1835 K Street, N.W. Suite 402
Washington, D. C. 20006

My name is Harrison B. Rhodes and I am speaking on behalf of the Union Carbide Corporation where I hold the position of Technology Manager in the "Calif[redacted]estos Department. My education is in the field of Chemical Engineering where I hold the degree of Dr. of Science from Columbia University. For the past four years my assignment has been in the area of asbestos health and regulatory matters and has also included research on monitoring techniques. I am currently serving the Asbestos Information Association/North America as Chairman of the Standards and Technical Committee.

Union Carbide Corporation has been actively engaged, since 1963, in the mining and milling of asbestos ore at facilities in central California. The asbestos fiber produced is marketed throughout the United States and in many foreign countries. One of the principal applications for this asbestos in this country has been in tape-joint compounds. We do not ourselves manufacture such compounds, however, nor do we manufacture any other asbestos-containing finished products.

As the Commissioners are well aware, there has been a tremendous flood of "paper" generated in relation to the asbestos regulatory matters under consideration here. We believe that several crucial issues have been lost in the flood and would like to take the opportunity today to address these issues, as follows:

1. [redacted]look at <u>all</u> of the commercial and consumer exposure data [redacted]ilable today including some recent consumer tests and also some OSHA compliance inspection results.
2. An examination of the risk estimation model proposed by Dr. Bayard of the CPSC staff in terms of actual consumer exposure.

3. A discussion of the elimination or reduction of unreasonable risk of injury as required by the statute and the absolute [redacted] risk regulatory approach that is advocated by the petitioners.

4. The direction of your attention to the fact that "asbestos" of one type or another is present throughout the air, water and earth of this planet and the overwhelming consequences of a ban of ubiquitous material such as this without a precise definition of what is banned, a well specified analytical procedure, and some allowable levels other than zero.

5. The presentation of a suggested alternative approach to protect the consumer from unreasonable risk of injury which is more realistic, more workable and more enforceable than the proposed total ban.

It should be emphasized that this discussion will deal directly with, and be presented, in terms of tape-joint compounds. Spackling compounds are similar in composition and use, but are applied in so much smaller amounts that the potential for significant exposure is virtually non-existent. Emberizing kits are outside the field of our expertise and will not be considered.

[redacted] wallboard was developed around 1880-1900. It did not come into wide [redacted] until World War II when the need for houses and other buildings made this quicker, less complex construction method very popular. Usage has grown substantially since that time and drywall construction is now used in a majority of residential construction and in a wide variety of commercial and public buildings. Initially, ordinary plaster was used to embed and cover the tape to make the joint between the boards, but in the mid 40's specially formulated

dry mixtures with casein as the binder were introduced. These mixtures typically [redacted] 10-15% asbestos. We have been told that the plaster of that time [redacted] ined asbestos.

Ready-mix, i.e., wet compounds or mud were introduced in the mid 50's and were in broad general use by 1960. The asbestos content of muds in general dropped during the 70's to approximately the range of 2-7%. Tape-joint compounds containing asbestos have thus been in widespread use for 30-35 years. Over the first 15 years of this period the main material used was provided dry and contained relatively high levels of asbestos, i.e., 10-15%.

The Commission's consultant, A. T. Kearney, Inc., estimates that today's annual value of shipments of patching compounds is 80 million dollars. At an average price of $4.50 per can. This is equivalent to about 18 million cans. The formulations we have seen cost about 20-30¢ more per can in raw material costs to replace asbestos so that the added burden, just to cover raw materials cost is about 4.5 million dollars annually. This cost, plus any percentage markups used, would be added to the cost of the structure and would carry the normal financing charges over the life of the indebtedness. It should also be noted that about 10,000 tons per year of asbestos with a product value of about one million dollars were used in this application prior to the decline that has resulted from actions of a variety of governmental agencies. We believe [redacted] tal of 5.5 million dollars annually presents a reasonably reliable [redacted] stimate of the direct economic effects of the replacement of asbestos in tape-joint compounds. The added effect of the poor performance of many of the asbestos-free muds has not been considered.

In the assessment of the risk that needs to be related to this cost burden, it is important to have a reliable estimate of the level of consumer exposure. All of the available information on exposure has been assembled and

is documented and discussed in detail in an Appendix to this presentation which will be submitted prior to the August 29, 1977, deadline for written comments. Only the [redacted] will be summarized here.

The data presented are contained in five reports:

1. The tests conducted by Rohl et al[1] at one location in New York, NY. This is the data cited by the petitioners.
2. A survey of a variety of sanding conditions made by Rhodes and Ingalls[2] and cited extensively by the Asbestos Information Association/North America in their response to the petition.
3. Data from State and Federal OSHA compliance inspections compiled by Equitable Environmental Health Incorporated as part of a study of asbestos exposure in the construction industry.
4. A report submitted to the CPSC by Union Carbide Corporation on July 14, 1977, covering consumer exposure during a typical spackling and a moderate size drywall installation operation.
5. A study by Union Carbide Corporation which has just been finished on another consumer installation of drywall in a large room including the ceiling.

The results of this survey are summarized in the two figures you are now receiving. Figure 1 shows along the vertical axis, the airborne asbestos [redacted]tion, in fibers per cubic centimeter longer than 5 micrometers, that occu[redacted] breathing zone of the operator during the sanding operation. Usually a number of samples were collected at each location, The dark bar shows the range of concentrations found with the arithmetic average of all samples indicated by the arrow.

---

1. Rohl et al, Science, Volume 189, August 15, 1975, p. 552.
2. S.O.C.I. Drywall, January/February 1976.

The data on the left are those of Rohl et al that were cited in support of [redacted]. These were obtained in one test in New York City. Note that an exposure of 20 fibers/cc for four days was used by Dr. Bayard in his projection of risk to be discussed later.

The next group of results were obtained by the Union Carbide Corporation in a survey of commercial operations in eight different cities. Results range from about 0.2 to 3 fibers/cc. These fiber counts have been spot checked "blind" by two other laboratories. The EEH and OSHA compliance data shown next fall in the same range as those of Union Carbide.

The consumer-use data are shown on the far right. The first case is for extensive spackling and the installation of three panels of drywall. The second is for three walls and the ceiling of a large basement recreation room. This latter mud contained 2.6% asbestos by weight on a dry basis. Exposures in these tests were only 0.2 to 1.0 fibers/cc >5u, which correspond roughly to the lower end of the range found for commercial use.

Two other operations in tape-joint installation present the possibility of exposure to free-form asbestos fiber; the addition of dry powder product to water and the cleanup after sanding. Data for these operations are shown in Figure 2. Here, in order to get the Rohl et al data on the graph it was necessary to run the scale from zero to sixty instead of zero to twenty as in the previous [redacted]. Otherwise the graph follows the same format and shows a very similar [redacted]. The Rohl et al data are far higher than the OSHA results and the consumer values are below or in the lower end of the range found for commercial use.

It is very important to understand that all of the concentrations shown occurred during the active pursuit of the particular operation, i.e., sanding, wet-out, or cleanup. These operations generally take place for a moderate portion of the day with concentrations at much lower values for the rest of the 8 hour

period. Eight-hour time-weighted average exposures were calculated for the two consumer [redacted] and the highest exposure found was 0.2 fiber/cc >5μ for two days [redacted] asbestos-containing dust was being generated.

[redacted] staff members, Dr. Stephen Bayard, has developed a model[1] to estimate the risk of respiratory cancer from low level exposure to asbestos from taping compounds. This model is patterned on that described in a paper by Enterline and Henderson[2] except that Dr. Bayard has made an assumption that the effect of dose is cumulative. This builds a geometric increase in risk into the model. We question whether there is any basis for this assumption, but do not feel that this is an appropriate place to debate the issue. It is of more interest to use this model, which is heavily biased toward predicting a high risk, with the highest exposure just noted for consumer use, i.e., 0.2 fiber/cc TWA for two days of operation.

Following Dr. Bayard's directions on page 3, Part C, of the reference cited for the highest time-weighted average of 0.2 fibers/cc for two days found for the consumer applications we obtain an annual exposure of 0.004 fibers/cc per day for one year, a mean latent period to tumor of 621 years, and zero deaths of asbestos induced cancer in the 40-year period considered. If the period examined is extended to 100 years, the number of deaths predicted would be 0.000003 which is still far less than a single death. These estimates are probably on the high side due to assumptions used in the model but since an exposure of 0.004 fibers/cc [redacted] stinguishable from background, the values found not unreasonable.

[redacted] lso instructive to point out that if we assume an exposure of 5 fibers/cc for two full 8-hour days, which is well above that found in commercial use, the yearly rate becomes 0.1 fiber/cc. This yields a median time to tumor of 212.5 years and an asbestos induced cancer estimate of 0.02 deaths. We question whether these are the unreasonable risks referred to in the statute.

---

1. Memorandum to Dan Clay dated June 3, 1977.

2. Presented at Pinehurst, NC, March 12, 1976.

Let us now relate this risk to the proposed ban of consumer patching compounds containing respirable, free-form asbestos under Sections 8 and 9 of the Consumer Product Safety Act. To quote Section 8:

"Sec. 8. Whenever the Commission finds that--

(1) a consumer product is being, or will be, distributed in commerce and such consumer product presents an unreasonable risk of injury; and

(2) no feasible consumer product safety standard under this Act would adequately protect the public from the unreasonable risk of injury associated with such product,

the Commission may propose and, in accordance with section 9, promulgate a rule declaring such product a banned hazardous product." (Emphasis added.)

And from Section 9, Paragraph 2 (c):

(2) The Commission shall not promulgate a consumer product safety rule unless it finds (and includes such finding in the rule)--

(A) that the rule (including its effective date) is reasonably necessary to eliminate or reduce an unreasonable risk of injury associated with such product;

(B) that the promulgation of the rule is in the public interest; and

(C) in the case of a rule declaring the product a banned hazardous product, that no feasible consumer product safety standard under this Act would acequately protect the public from the unreasonable risk of injury associated with such product." (Emphasis added.)

Note particularly the repeated use of the words "unreasonable risk" and the [redacted] to eliminate or reduce unreasonable risk, not to make this risk [redacted] fact makes it quite clear that the intent is not the total elimination of all risk but of "unreasonable risk" and it delegates to the Commission the complex and soul-searching problem of deciding what is "reasonable".

The comments of your own staff on the strength of the evidence used to support the ban is well summarized by three short quotations from the record:.

> "The petitioners believe that high quantities of asbestos fibers remain in the air after these products are sanded and the fibers substantially increase the risk of mesothelioma and lung cancer." (1)

> "The petitioners have addressed problems which arise from being exposed to asbestos fibers occupationally and environmentally. However, they have not cited any concrete evidence of the hazard which is tied directly to the products for which they seek a ban. It merely cited the fact that these products do contain asbestos fibers and they have cited the fact that asbestos fibers in other situations have been linked to lung disease. No question whether the evidence presented in the [redacted] is sufficient to show that these substances may cause [redacted]ial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use." (Emphasis added.) (2)

---

(1) CFR, Vol. 42, No. 146 - Friday, July 29, 1977 p. 38790.

(2) Letter of July 11, 1976, from Charles M. Jacobson, BCMI to Francine Shacter, TAD, OSCA.

"The instances of single or short-term exposure to asbestos [redacted] the petition can be taken as evidence of a possible [redacted] necessarily probable) cause-effect relationship. How-[redacted] themselves, they would not stand up to statistical scrutiny in predicting a correlation between brief exposure to asbestos and the later development of cancer caused by such exposure." (3) (Emphasis added.)

Substantial evidence has been presented here that the commercial use data upon which the petitioner's based their allegations is substantially higher than that of all other investigators (including OSHA compliance inspections). It has also been shown that consumer exposures are low, of short duration, and when averaged over a year or more are not distinguishable from ambient background. We know of no evidence that such casual, low exposure represents any hazard so that the question becomes one of a banning action based on the existence of a possible, but not proven [redacted] risk, which if it exists at all differs only slightly from zero.

You are probably aware, that this question of the regulation of carcinogens is a major issue today before virtually all of the governmental regulatory agencies. The FDA saccharin ban has received wide publicity and OSHA is deeply involved with a proposal for a generic regulation approach to carcino[redacted] hearings on benzene are now in progress. All of this activity does not [redacted] find answers to our immediate problem, but we are at least in good company.

The problem we face originates in the so-called "one-hit" theory of carcinogenisis. In simplest outline, this theory holds that:

---

(3) Briefing Package, February 2, 1977, presented to the Commission by Fracine Shacter.

1. [redacted] molecule of a carcinogen is capable of causing [redacted] particularly susceptible person.

[redacted] people are exposed, the susceptible person (or small number of such persons) will contract cancer.

3. It follows, therefore, that there is no absolutely safe or zero risk level for a carcinogen and such a material should, depending on the statutory authority of the agency involved, be banned, severely restricted, replaced, controlled to the limits of detection, etc.

It is useful to examine this theory in the light of where there is general agreement and where responsible opinions diverge. We believe that virtually all medical authorities would agree:

1. That there is a wide range of dosages for a carcinogen where a dose-response relationship exists. The larger the dose, the greater percentage of these exposed contract cancer and vice versa.

2. In exposed populations, even at substantial exposure levels, large proportions of those exposed do not contract cancer.

3. As the dosage goes down the average time to the appearance of [redacted] tumors increases. This principle was illustrated by the [redacted] calation formula of Enterline and the Bayard modification [redacted] ed previously.

The medical disagreement occurs over what happens as the dosage is decreased to very low levels. There is one school of thought, and this is embraced by most of the regulatory agencies, that no completely safe level exists. There are other responsible authorities who contend that a dosage level is

reached where the body's defense mechanisms can effectively combat the altered cells and [redacted]rous growth does not occur. Supporters of this position cite the low level presence of certain metals and hormones that are essential to the human body in trace amounts but at higher levels are carcinogens.

Unfortunately, there is no way to demonstrate the correctness of either view since there is a background level of cancer in both man and experimental animal. As the dosage and the corresponding number of cancers decreases one point of view is that the occasional cancer from the specific agent still occurs but cannot be distinguished from the background while the other is that the added cases do not occur. These views can be partially resolved with the model of Enterline discussed previously, i.e., a very low exposure may cause a cancer but the time to tumor is 150 years for example. With an expected life span of 70 years this, for all practical purposes is a safe threshold exposure, at least until life expectancy approaches 150 years. Since there is no provable scientific answer to this risk question, we are really left with a socio-political rather than a scientific decision to consider.

The fundamental question, then, is whether a total absence of risk approach to regulation is appropriate or more particularly will be acceptable to society. In our lives we undergo a succession of risks, some knowingly and some unknowingly. The American people have always indicated a willingness to take risks [redacted]idenced by such things as the widespread use of the automobile, smoking, [redacted] improper diet, and even the home as it is today. We believe that the zero risk concept, when it begins to impact on jobs and the way of life of a substantial number of people will not be acceptable and will have to be modified to balance risks against benefits in a realistic fashion. This sort of balance rather than regulation by cliche, "its a carcinogen so ban it", should be applied here. The benefits from the continued use of asbestos in

type joint compounds is substantial and the risk is either zero or so small it cannot be distinguished from zero.

[redacted] the risk-benefit discussion and I would like to conclude this [redacted] by pointing out certain practical aspects of enforcement of the ban as presently proposed in the Federal Register. These questions were discussed at great length, and generally were not solved, at the recent meeting in Gaithersburg, MD, conducted by the National Bureau of Standards. Since several members of your staff were present at this meeting, they will only be indicated briefly.

Since the promulgation of the OSHA asbestos regulations in 1972 there has been a continuing debate on what is asbestos and what is an asbestos fiber. Asbestos, when narrowly defined, in a way that will satisfy the most precise minerologists is ubiquitous in the atmosphere although generally it occurs at very low, but not zero, concentrations. When the definition is broadened to include all amphibole chips which are longer than 5 microns and have a length to diameter ratio greater than 3, you approach a condition aptly described by Dr. Malcom Ross of the U.S. Geological Survey at the NBS meeting just mentioned, of "shutting down the face of the earth". Particles of this type are everywhere and would contaminate any product containing a mineral.

The EPA faced this problem in 1973 in writing emission standards for the spraying of asbestos-containing products and decided to treat it by setting a 1% by [redacted] limit. Their reasoning was as follows:

> [redacted] intent of the 1-percent limit is to ban the use of materials which contain significant quantities of asbestos, but to allow the use of materials which would: (1) Contain trace amounts of asbestos which occur in numerous natural substances, and (2) include very small quantities of asbestos (less than 1 percent) added to enhance the material's effectiveness.[1]

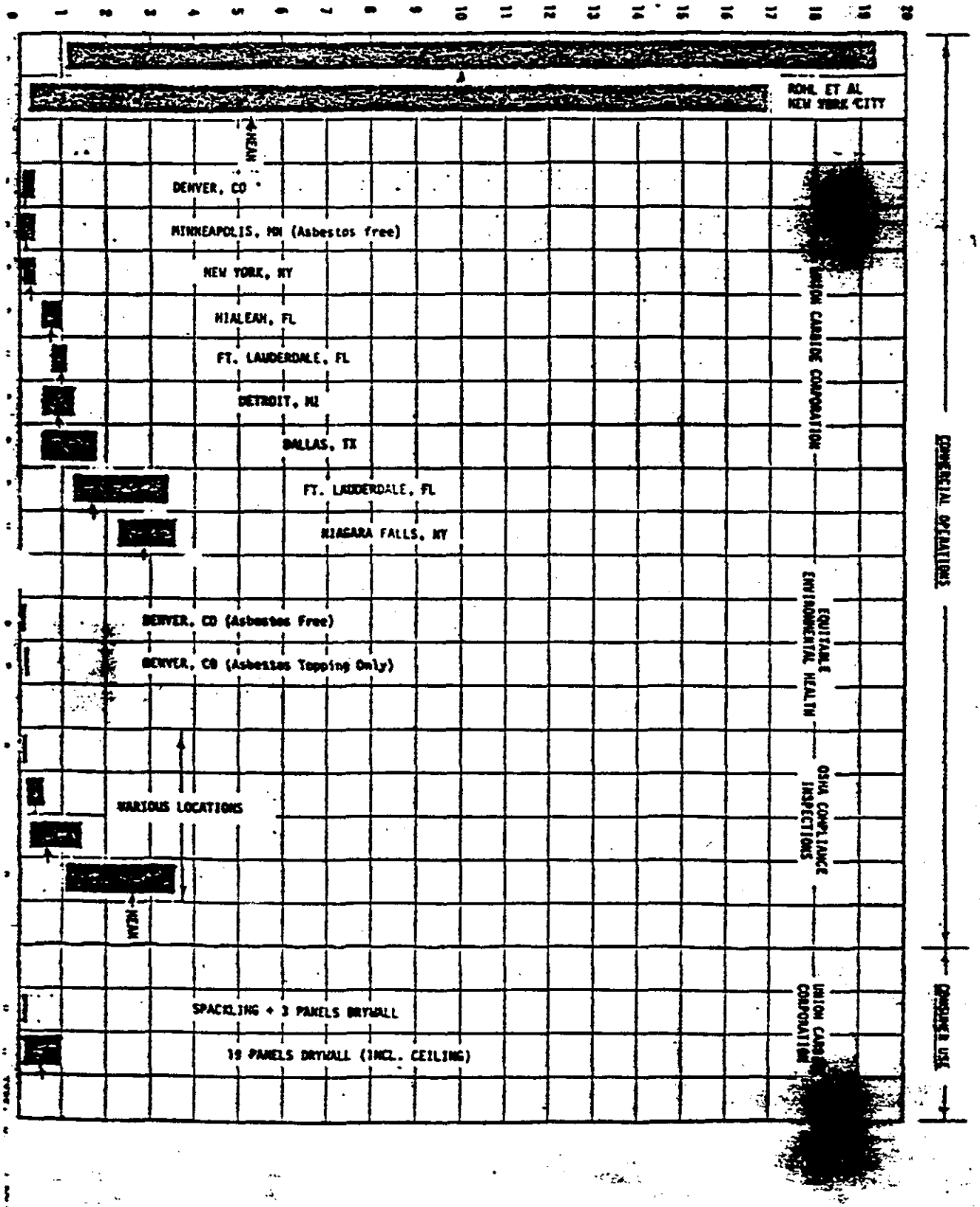
[1] FR, Volume 38, No. 66 - Friday, April 6, 1977, p. 8821.

In order for any action by the Commission to be workable and enforceable, it is absolutely essential that you provide a definition of "asbestos" that states exactly what mineral species and what form of these species are included and specify what particle dimensions constitute an asbestos "fiber". The present definition in the proposal could be applied to the rock that covers much of the surface of the earth. In addition, an analytical procedure and the levels of "impurities" that are acceptable, as measured by this procedure, must be specified. Without the practical definitions the ban is virtually universal and completely unworkable.

To conclude this discussion, I would like to summarize the Union Carbide position and expand on the approach presented in my letter of July 14, 1977, which we believe is a reasonable alternative to the ban proposed by the Commission.

1. The products under consideration have been in widespread use for about 35 years and we know of no evidence that any consumer has ever been harmed by them. No "unreasonable risk" to the consumer has been demonstrated by the petitioners or by the staff.
2. Consumer exposure data have been presented which show that the exposures are both low and brief and when averaged over a year are not distinguishable from the general background. The risk from such exposure, if indeed any risk does exist, is extremely small and is based on the extrapolation of an unproven and unproveable theory.
3. We question whether it is appropriate and whether the Act gives the Commission the authority to ban a product on the basis of a hypothetical or theoretical risk or on the basis of an absolute zero risk requirement.

AIRBORNE ASBESTOS FIBER CONCENTRATION DURING SANDING (Fibers/cc longer than 5 micrometers)




AIRBORNE ASBESTOS [illegible] TRATIONS
IN OPERATION BREA[illegible]G ZONE
DURING SANDING OF TAPE-JOINT COMPOUND

4. [redacted] a reasonable [redacted]

[redacted] to protect the [redacted] consumer risk and recommend the following approach:

[redacted] amount of asbestos that can be used in sprayable and troweled compounds to two percent by weight in the dry formulation. This is sufficient to gain the benefits of the use of asbestos and serves to limit the potential for exposure. It differs from the 1% of total formulation including water suggested previously in that it more closely defines the content in the final product in the form that [redacted] handed. It is also at a level where analysis is more reasonable.

b. Require a warning label including proper work procedures on all compounds under the jurisdiction of the commission whether packaged for direct consumer or commercial use in consumer contact. This turns to good advantage the widespread public awareness of the possible potential hazards of asbestos to encourage that the product be treated according to directions and not abused. It also gives the user a choice.

[redacted] this opportunity to speak to the Commission. I will [redacted] any questions you may have or to provide any additional information [redacted] available.