Asbestos and Its Environmental Impact

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By Jerome S. Horvitz*

INTRODUCTION

Asbestos, a name that embraces a number of fibrous mineral silicates, has been used for thousands of years because of its resistance to combustion. Yet, research has shown that even though asbestos has been credited with saving lives, its social utility may be outweighed by its deadly health effects.

Pausanias, the second century Greek topographer, when speaking about the golden lamps made around 430 B.C. by Callimaihus, mentioned the incombustible wicks of Carpasian flax. Strabo, Solinius and Plutarch referred to woven cloths that did not burn and the “everburning lamps” in the Grecian temples. Charlemagne had a tablecloth made from asbestos; he would impress enemy warriors by cleaning it by passing it through fire. Marco Polo wrote that he had seen Tartars using cloth that withstood fire.¹

The term asbestos is a generic term which is derived from a Greek adjective meaning inextinguishable. It refers to a group of hydrated silicate minerals that can separate readily into fibers when processed. These are further divided into two groups: serpentines (chrysotile) and amphiboles (Crocidite, amosite, tremolite, actinolite and anthophyllite).²

In 1879, the world’s first commercial asbestos mine was opened at Thetford, in the Province of Quebec, in Canada, and it produced three hundred tons of asbestos. Today, nearly four million tons are mined annually throughout the world.³ The United States, although it contributes little to the total production, is the world’s largest consumer of the mineral.⁴ Ninety-five percent of asbestos consumed in the U.S. is chrysotile asbestos from the open pit mines of Quebec.⁵

Of the one million tons of asbestos used currently in the United States, approximately three-fourths is used in the construction industry in such products as floor tiles, insulation materials, cement powders and acoustical products. Asbestos is also used in shipbuild-
ing, textiles, friction materials, brake linings, clutch facings, paper, paints, plastic, etc. As a result of these multiple and miscellaneous applications, asbestos has become practically ubiquitous in modern society.Ç

I. HEALTH HAZARD

It is almost impossible to estimate the number of workers presently exposed to asbestos since so many are exposed indirectly by airborne asbestos dust when not directly working with the product. As will be demonstrated below, manufacturing and construction workers who are exposed to asbestos suffer disproportionately from pulmonary cancer and mesothelioma. This medical problem was graphically demonstrated in the Senate Report submitted by the Labor and Public Welfare Committee:

Because nothing has been done about the hazards of asbestos, even after the association of asbestos and lung cancer was first reported in 1935, 20,000 out of the 50,000 workers who have since entered one asbestos trade alone—insulation work—are likely to die of asbestosis, lung cancer or mesothelioma. Nor is the potential hazard confined to these workers, since it is estimated that as many as 3.5 million workers are exposed to some extent to asbestos fibers. (emphasis added)7

These statistics do not take into account the low-level exposure of asbestos dust to the general public.

There are many well-documented medical studies which show a definite relationship between exposure to asbestos and asbestosis, lung cancer, gastrointestinal cancer and mesothelioma.8 Asbestosis, a form of pneumoconiosis, is caused by inhalation of asbestos fibers and creates scarring of the lungs. Asbestos fibers in the lungs also have been shown to cause growth of malignant neoplasms (cancer). Mesothelioma, for which there is no known cause other than inhalation of asbestos fibers, is a cancerous tumor of either the pleura (the membrane encasing the lungs) or the peritonium (lining of the abdominal cavity). All of these diseases are incurable. Asbestos related diseases usually do not develop until 20-30 years after the time of first exposure and can result from very brief exposure outside the workplace. For example, mesothelioma, which formerly was found almost exclusively among asbestos workers, but recently has begun to appear among the general population also, was the cause of death of a woman whose only contact with asbestos was when she routinely washed the dust covered overalls of her three daughters, who worked for an asbestos company.9

It is difficult to know how many American workers have died from
exposure to asbestos fibers. One recent estimate was offered by Dr. Marcus M. Key, Director of the National Institute for Occupational Safety and Health (hereinafter "NIOSH") who stated that:

there are 200,000 individuals currently employed in the asbestos manufacturing and construction trades and given further that there are 800,000 workers formerly exposed to asbestos but currently employed in some other trade or retired, the estimated average annual number of asbestos related deaths in the United States is 2,310. — My own intuitive feeling, however, is that 2,310 may be an underestimate.

The most thorough epidemiological studies to date were those conducted by Dr. Irving Selikoff and a team of doctors at the Mount Sinai School of Medicine in New York. These studies document the fate of over a thousand members of the Asbestos Workers Union in the New York metropolitan area since 1943. The conclusions of these studies, with which the Assistant Secretary of Labor concurs, include the following:

Among asbestos insulation workers in the New York metropolitan area at this time, one in every five deaths is due to lung cancer, approximately one in ten to asbestosis, one in ten to cancer of the stomach, colon and rectum, and one in ten to pleural or peritoneal mesothelioma. I have been following the six hundred thirty-two members of the Asbestos Workers Union in the New York area from January 1, 1943. By June 30, 1972, four hundred twenty-five had died. Eighty-five died of lung cancer whereas only eleven were expected to die of this cause. Twenty-seven died of mesothelioma. None had been expected to die of this tumor otherwise so very rare in the population at large. Thirty-two died of asbestosis, all tragically unnecessary, since death from this disease is limited to individuals with occupational exposure to asbestos dust.

The results of these studies as well as further results by Dr. Selikoff's colleagues remain basically undisputed.

The Assistant Secretary of Labor has noted that there is no scientific agreement, though, as to the "specific level, below which exposure (to asbestos dust) is safe."

II. THE OCCUPATIONAL SAFETY AND HEALTH ACT

The Occupational Safety and Health Act (OSHA) became law on December 29, 1970. The central thrust of OSHA is to assure safe and healthful working conditions for American workingmen and women. Special provisions and criteria were established by Congress to insure that, to the extent feasible, standards for toxic substances would be set so that no worker exposed to such dangers will have to suffer loss of life, health or functional capacity.
One of the toxic substances targeted by the legislators who passed this statute was asbestos dust.

Recent scientific knowledge points to hitherto unsuspected cause and effect relationships between occupational exposures to asbestos and many of the so-called chronic diseases — cancer, respiratory ailments, allergies, heart disease, and others. In some instances, the relation appears to be direct: asbestos... among others, are directly involved in the genesis of cancer. In other cases, occupational exposures are implicated as contributory factors. The distinction between occupational and non-occupational illness is growing increasingly difficult to define.¹³

On December 7, 1971, in response to (1) studies conducted by the National Institute of Occupational Safety and Health (NIOSH) and others and (2) recommendations by the American Conference of Governmental Industrial Hygienists (ACGIH), the Assistant Secretary of Labor, George Guenther, published an “emergency temporary standard” for occupational exposure to asbestos dust, pursuant to section 6(c) of OSHA.¹⁶ This emergency standard reduced the permissible airborne concentrations of asbestos dust from an eight-hour time weighted average (TWA) of 12 fibers greater than 5 micrometers long per cubic centimeter of air to 5 fibers per cubic centimeter; and it imposed a ceiling or “peak” concentration limit of 10 fibers per cubic centimeter to be permitted up to 15 minutes in an hour, but not for more than 5 hours in any one eight hour day.

Each asbestos dust particle is a bundle of extremely tiny fibers. In measuring airborne concentrations of asbestos, samples are collected on a membrane filter for a specified time period (e.g. 8 hours) and only fibers longer than 5 micrometers are counted with an optical microscope at 400-450x magnification. Although there may be thousands of fibers shorter than 5 micrometers, including submicroscopic particles, these are not included in the fiber counts.

A. Permanent Asbestos Standards under OSHA

On January 12, 1972, in accordance with section 6(c)(3) of OSHA, which requires the Secretary to replace an emergency standard with a permanent standard within six months, the Assistant Secretary issued a notice of proposed rulemaking for a permanent standard in the Federal Register.¹⁷

Shortly thereafter, on or about February 1, 1972, the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health, Education and Welfare, pursuant to section 20(a)(3) of OSHA, filed an asbestos criteria document with the Secretary of Labor entitled “Criteria for a Recommended Standard on
Occupational Exposure to Asbestos," for the purpose of providing expert assistance to the Secretary in the standard-setting process. The NIOSH criteria document recommended reducing the eight-hour TWA exposure limit of airborne asbestos dust from 5 fibers to 2 fibers per cubic centimeter within two years. The criteria document also recommended that a number of additional safeguards be incorporated into the final standard in accordance with section 6(b)(7) of OSHA. These included requirements for monitoring, warning signs and product labeling, medical examinations and recordkeeping, and mandatory work practices required wherever asbestos is used, without regard to compliance with the 5 or 2 fiber exposure limits. It further provided a comprehensive summary of the scientific literature on the health effects of asbestos dust and compilation of data indicating the current status of asbestos dust levels and employee exposure levels. These latter data were based upon a representative sampling of asbestos dust levels and dust control technology in a cross section of the U.S. asbestos industry. The NIOSH document did not venture any estimate of how much it would cost to bring asbestos operations in various plants into compliance with the recommended 2 fiber TWA standard (hereinafter referred to as the "2 fiber exposure limit").

On January 24, 1972, pursuant to section 6(b)(1) of OSHA, the Secretary of Labor established an Advisory Committee on Asbestos Dust to consider, like its counterpart, NIOSH, the available evidence and come forward with recommendations regarding the proposed asbestos dust standard. This five-man Advisory Committee was composed of scientists and engineers and labor officials. On or about February 25, 1972, after a number of days of hearings that considered both the NIOSH criteria document's recommendations and the supporting evidence that accompanied the study, the Advisory Committee submitted its recommendations to the Assistant Secretary of Labor.

The Advisory Committee under its statutory authority affirmed the NIOSH recommendation that the exposure limit for airborne concentrations of asbestos dust should be reduced from 5 fibers to 2 fibers per cubic centimeter within two years after the promulgation of a permanent standard. The Committee also recommended the following additional safeguards such as engineering and housekeeping controls, and use of nontoxic substitute materials and processes as well as monitoring, warning signs and product labels, and medical examinations and recordkeeping. These safeguards were similar to the ones recommended by the NIOSH study mentioned above.
From March 14 to 17, 1972, a public hearing was convened to have introduced into the record evidence, comments and arguments in response to the proposed asbestos dust standard. The rulemaking hearing was described as being "informal and legislative in nature; and, although cross-examination was permitted, it was discouraged by the Hearing Examiner. Very little of the testimony submitted, therefore, was subjected to probative questioning." Thus, the hearing record together with exhibits of witness statements were certified to the Assistant Secretary of Labor without recommendation from the Hearing Examiner on March 31, 1972.

On June 7, 1972, which was the last day of the six-month statutory period in accordance with provision 6(b) of OSHA, the Assistant Secretary of Labor published a permanent standard for occupational exposure to asbestos dust. As required under section 6(e) of OSHA, the standard was accompanied by the Assistant Secretary's supporting statement of reasons to establish objectivity.

In reviewing the Secretary's position in regard to the specific provisions of the standard, the Assistant Secretary failed to adopt a number of the recommendations of either NIOSH or the Advisory Committee. The most significant example, subsection (b) of the new standard, reduced the permissible eight-hour averaged airborne concentrations of asbestos dust from five to two fibers per cubic centimeter, with a ceiling of ten fibers per cubic centimeter; however, and most importantly, it delayed the effective date for four years, i.e., until July 1, 1976, two years longer than recommended, in order to provide "all employers a reasonable time to comply." At the same time, so long as the ceiling limit is complied with, "no harm is reasonably expected to result from exposures during the transitional period." Thus, the Secretary disregarded the advice of two asbestos study committees and took the position of least resistance by postponing the 2 fiber exposure limit until 1976 in disregard of section five of OSHA which reads:

The Secretary, in promulgating standards dealing with toxic materials or harmful physical agents. . .shall set the standard which most adequately assures. . .that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life. (emphasis added)

A cubic centimeter is about the size of a small thimble of air, and an average workman who is exposed to ambient asbestos particles will inhale approximately six to eight million thimbles of air during his work day.
So the issue was whether to require the companies to maintain conditions which would prevent a worker from having to inhale more than 12 million to 16 million fibers of a certain length, or 30 million to 40 million fibers.\textsuperscript{27}

Consequently, by delaying the two fiber exposure limit until July 1, 1976, and allowing the five fiber exposure limit to stand until that date, the Assistant Secretary of Labor is permitting the average worker to inhale almost three times as much asbestos dust during that interim period (from July 7, 1972 to July 1, 1976), for the convenience of employers. This position is in direct conflict with the Secretary's own statement that lives of employees are at stake because "no one has disputed that exposure to asbestos \ldots is causally related to asbestosis and cancer."\textsuperscript{28}

Under subsection (f) of the standard, the Secretary established monitoring techniques to measure asbestos concentrations in every place of employment. Measuring and sampling techniques were established under subsection (f)(3) whereby employers are required to monitor such concentrations at least once every six months if "exposure to asbestos may reasonably be foreseen to exceed the limits \ldots." This monitoring requirement raises such questions as: (1) if an employer makes the determination that the exposure hazard does not or will not exceed the limits, is he excused from the self-monitoring requirement imposed every six months?; (2) should not employers be required to monitor those work areas found to be in excess of the standard? And, finally, (3) should employers be required to maintain direct control equipment?

The Insulation Hygiene Progress Reports\textsuperscript{29} released the results of an asbestos workers survey taken from over five thousand asbestos workers to find out the effectiveness of the new Asbestos Dust Standard in reducing their exposure to asbestos. The results of the survey indicate the ineffectiveness of the standards and the self-monitoring philosophy. From a total of 5,127 workers, 171 had observed an air sample being taken on the job. Even if one makes an allowance for all of the unobserved sampling surveys taken by employers, it must be concluded that there has been very little compliance with subsection (f) of the standard.

Under subsection (c) the standard sets down specific methods of compliance whereby engineering controls such as isolation, enclosure, exhaust ventilation, and dust collection have to be used to meet the 5 fiber exposure limit established. If one examines the results of the survey taken by the Asbestos Workers Union, it appears that there has not been any widespread adoption of work practices recommended or mandated in the standard.\textsuperscript{30}
Under subsection (g) of the new standard, which requires sign specifications and caution labels to be placed in work areas of potential asbestos contact, the Secretary gave no reasons why he eliminated the warning that was to be placed on signs that:

Asbestos dust may cause asbestosis, a severe lung disease, and is implicated in the development of certain cancers. Control of exposure to asbestos dust helps protect against these hazards. This suggested warning was toned down to read: “Breathing Asbestos Dust May Be Hazardous to Your Health.”32

Thus, it appears that the Secretary may have been influenced by industry, who considered such words as “danger,” “asbestosis” and “cancer” unwarrantedly alarming.

B. Court Action to Review Promulgated Standards

On July 27, 1972, the Industrial Union Department (IUD) and several labor unions filed a petition for review of the asbestos standards pursuant to section 6(f) of OSHA in the U.S. Court of Appeals for the District of Columbia. On August 28, 1972, the Environmental Defense Fund and four asbestos insulation workers (E.D.F., et al.) moved to intervene in the proceedings. Intervention was granted September 13, 1972. As of the end of October, 1973, the suit is still pending. The issues presented for review included the following:

(1) Did the Secretary violate section 6(b)(5) of OSHA by failing to promulgate a standard for exposure to asbestos dust that will minimize, to the fullest extent feasible, the risk of cancer and other asbestos-related diseases?
(2) Did the Secretary’s decision to delay for four years, until July 1, 1976, implementation of the two fiber exposure limit violate section 6(b)(5) of OSHA?
(3) Did the Secretary fail to provide such monitoring as is necessary for the protection of employees in violation of section 6(b)(7) of OSHA?
(4) Do the wording and applicability of the warning and labeling requirements of the contested standard violate section 6(b)(7) of OSHA by failing to provide that persons exposed to asbestos dust are apprised of all hazards to which they are exposed?33

III. THE CLEAN AIR ACT

A. Promulgated Ambient Asbestos Particles in the Air

On March 31, 1971, pursuant to section 112 of the Clean Air Act, as amended, the Administrator of the Environmental Protection Agency published an initial list of three hazardous air pollu-
tants which, in his judgment, may cause, or contribute to, an increase in mortality or serious illness. The pollutants were asbestos, beryllium, and mercury. On December 7, 1971, the Administrator proposed standards for these pollutants, and hearings were held during 1972.

The proposed and promulgated standard for asbestos is not given in terms of numerical values. Instead, the standard is expressed in terms of required control practices that will limit asbestos emissions to an acceptable level. The standard includes the following safeguards:

(a) No visible emissions to the outside air from any asbestos mill. Outside storage of asbestos materials will not be considered part of an asbestos mill.
(b) The surfacing of roadways with asbestos tailings is prohibited while the depositing of asbestos tailings on roadways covered with snow or ice is considered “surfacing.”
(c) No visible emissions will be allowed to the outside air from any building in which particular operations are conducted outside the building. These operations include: manufacture of cement products, fireproofing insulating materials, friction products, paper, millboard, felt, floor tile, paints, coatings, chalks, adhesives, sealants, plastics and rubber materials, chlorine.
(d) The demolition of institutional, commercial or industrial buildings which contain any boiler, pipe or load-supporting structure that is insulated or fireproofed with friable asbestos materials has to comply with the requirements set out in the standard.
(e) There shall be no visible emissions to the outside air from the spray or application of materials containing more than one percent asbestos, on a dry weight basis, used to insulate or fireproof equipment and machinery.34

B. Petition for Reconsideration of Standards

On April 11, 1973, the Environmental Defense Fund (E.D.F.) petitioned the E.P.A. to reconsider and amend the emission standard for asbestos. The following represents the basis of the petition.37

E.P.A.’s proposed regulations in December, 1971 would have prohibited visual emissions from asbestos mines and mine roads, from dumps and storage areas near asbestos mills, from all asbestos fabrication operations, and from disposal of asbestos collected during demolition. The final regulations omit all such restrictions on the assumption that measures to be taken to comply with the regulations of other federal agencies, and particularly those of the Occupa-
tional Safety and Health Administration (OSHA), will prevent these sources of asbestos dust from contaminating the air of the surrounding environment.\textsuperscript{38}

As was emphasized above, the five fiber threshold limit established by the Secretary of Labor under OSHA has not been accepted by the medical community as an effective means of reducing the risk of contracting asbestos-related diseases. Even the Administrator admits that there is no safe risk factor between asbestos emissions and the public health: "... there are levels of asbestos that will not be associated with any risk detectable, although these levels are not known."\textsuperscript{39} Thus, compliance with asbestos standards established by other agencies will not necessarily result in compliance with section 112(b)(1)(B) of the Clean Air Act which states that the "Administrator shall establish any such standard . . . which . . . provides an ample margin of safety to protect the public health from such hazardous air pollutants."

By relinquishing his regulatory authority to other agencies, the Administrator may be creating wholesale risks to the health of persons in the vicinity of asbestos operations since it is quite apparent (as was illustrated above) that the standards established by sister agencies are not being complied with to any significant extent.

In the three specific areas in which the Administrator has relinquished his authority under the Emission Standard — (1) as applied to mines and emissions from drilling operations; (2) as applied to asbestos mills and their ore dumps, open storage areas of asbestos ores; (3) as applied to manufacture or fabricating operations in the use of asbestos — the Environmental Defense Fund has petitioned that the standard be amended to include regulations covering these sources of asbestos emissions.

The proposed standard would have prohibited the spraying of any material containing asbestos on any portion of a building or structure. It also would have prohibited the spraying of any material containing asbestos in an area directly open to the atmosphere, with emissions from all other spraying of any material containing asbestos limited to the amount which would be emitted if specified air cleaning equipment were used, such as fabric filters with an air to cloth ratio of 20:1.

The promulgated Emission standard limits the asbestos content to no more than one percent. The reason given by the Administrator for the relaxed standard was "to ban the use of materials which contain significant quantities of asbestos,"\textsuperscript{40} (emphasis added), while allowing the use of materials which would contain trace
amounts or very small amounts of asbestos. The E.D.F. stated in its petition that the Administrator's relaxation of the proposed standard was "specifically to meet the needs and desires" of "only one company, W.R. Grace, the largest manufacturer of spray insulation products in this country, which has consistently resisted the no-asbestos standard." If this assertion is correct, such favoritism in the promulgation of administrative standards cannot be tolerated, especially in the face of the Administrator's own words: "There is evidence which indicates that mesotheliomas occurs after much less exposure to asbestos dust than the exposure associated with asbestos." (emphasis added) Further, the tolerance of one percent asbestos spray would be unjustified since "all manufacturers of spray insulation materials (except W.R. Grace), have agreed that a 'no-asbestos' standard is feasible, and they have taken responsible steps to comply with such a standard by substituting materials or using other control technology (which) has resulted in asbestos-free spray products being currently available on the market.

IV. Asbestos in Food, Drinks and Drugs

Although asbestos is not directly added to human foods, a number of commercial uses have been established that may result in the contamination of food and drugs through preparation practices. Talc occurs naturally as a hydrous magnesium silicate which may reasonably be expected to be contaminated with asbestos particles. Talc has been generally recognized as safe (abbreviated GRAS) by the Food and Drug Administration for use in (1) paper and paperboard employed in dry food packaging; (2) cotton and cotton fabrics employed in dry food packaging; (3) chewing gum base; and (4) for use as an anti-sticking agent in forms employed in molding various food shapes. Talc has also been used as a polishing agent to coat rice. Much of the polished rice is eventually exported to Japan, and this may be one reason why there exists a very high incidence of stomach cancer in that country. Another process that incorporates asbestos that may be injurious to human health is the use of asbestos filters for beer, wine, and hard liquors. The asbestos fibers are ingested into the stomach and they are carried into the blood stream. Today about 10 percent of the soft drink industry uses asbestos filters and about 50 percent of the edible oil industry. Representatives of the Center for Science in the Public Interest spoke with the chief engineer at a Carling brewery and informed him of the hazardous potential of asbestos to workers
and the public.\textsuperscript{17} The company immediately procured a cellulose substitute from Grefco, Incorporated, which had also furnished the asbestos-containing filter material. Asbestos filter media (i.e. asbestos filters, pads and sheets made partially or entirely from asbestos) are widely used in United States breweries, and at this time a number of companies are switching to substitutes voluntarily in order to avoid government regulation and adverse publicity.

The above experience supports the claim that the resistant properties and low cost of asbestos lead to widespread, nonessential uses which can be readily substituted and eliminated. Some of the present uses of asbestos filters include antibiotics, blood plasma, cider, condiments, dextrous solutions, drinking water, fruit juices, mouthwashes, salt solutions, serums, syrups, tonics and vinegar.\textsuperscript{18}

At present, the FDA’s position on asbestos particles as an additive that may adulterate foods and/or drugs is demonstrated by the following response:

We are developing the necessary analytical methods, . . . to measure small amounts of asbestos fibers in beverages and foods, and are attempting to obtain all possible toxicological information on the oral ingestion of asbestos.\textsuperscript{19}

Further, there has been no final action on the proposed regulation on the establishment of a zero tolerance for “asbestos-form particles” in talc intended for use as a food additive.

As a consequence of FDA’s passive role in the promulgation of regulations under the Federal Food, Drug and Cosmetic Act to prohibit the adulteration of foods and drugs with asbestos, the Center for Science in the Public Interest, and the Environmental Defense Fund, Inc. have petitioned the FDA to ban asbestos filters in all foods and drugs within thirty days.\textsuperscript{20}

Foods, drugs and cosmetics that may be deleterious to human health are regulated by the Food and Drug Administration under authority granted by the Food, Drug and Cosmetic Act of 1938.\textsuperscript{51} Chapter III of the Act prohibits “the introduction . . . into interstate commerce of any food, drug, device, or cosmetic that is adulterated. . . .”\textsuperscript{52} and the “adulteration of any food, drug, or cosmetic in interstate commerce.”\textsuperscript{53} Under section 402(a) of the Act, as amended, a food shall be deemed to be “adulterated”:

If it bears or contains any poisonous or deleterious substances which may render it injurious to health. . . ; or If it bears or contains any added poisonous or added deleterious substance . . . which is unsafe within the meaning of section 406; or if it is, or bears or contains, any food additive which is unsafe within the meaning of section 409 . . . or
if it consists in whole or in part of any filthy, putrid, or decomposed substance, or it is otherwise unfit for food; or if it has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health . . . .51 (emphasis added)

Section 402(a) refers to foods with added toxic substances which are “unsafe within the meaning of section 406.” Section 406 states that “any poisonous or deleterious substance added to any food except where such substance is required in the production thereof . . . shall be deemed to be unsafe for purposes of the application of clause (2)(A) of section 402(a) . . . .”55 (emphasis added)

The courts have emphasized that the application of section 402(a)(2) is not restricted to situations where the final product is dangerous. United States v. Commonwealth Brewing Corp. involved a charge that beer was adulterated because of added fluorine. The court instructed the jury that the only question of fact was whether any fluorine had been added, not whether such large amounts had been added that the beer was injurious to health.56

In applying section 402(a) to the finding that asbestos is a carcinogen, there should be little doubt that the manufacturing processes mentioned above lead to the contamination of foods and have rendered them adulterated. Thus, the Administrator under section 701(a) of the Act has the authority to enjoin the use of such processes which “have been rendered injurious to health.”

In 1958, the Food, Drug and Cosmetic Act was amended to embrace food additives that induce cancer when ingested by man or animal.57 This Amendment is better known as the Delaney Anticancer Clause, named after New York Congressman James J. Delaney who introduced the measure. It reads as follows: “No additive shall be deemed to be safe if it is found to induce cancer when ingested by man . . . .,” and the term “food additive” means “any substance . . . which results . . . directly or indirectly, in its becoming a component . . . of any food (including any substance intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding foods) . . . .”58 Consequently, asbestos particles which enter food indirectly, via talc or from contact with asbestos filters is a “food additive.” Further, since it has been demonstrated that the carcinogenicity of asbestos has resulted in high risks to humans, there is the conclusive assertion that the Delaney Clause is applicable and, thus, the Administrator should prohibit the further additions of asbestos particles to food.
Since talc has been generally recognized as safe (GRAS) by the FDA and has had a prior sanction from the FDA, it is currently enjoying the status of being exempted from any food additive regulation. However, as the Environmental Defense Fund has shown in its petition to the FDA, the GRAS listing and prior sanctioning "apply only to talc, they do not apply to the asbestos in talc." Even the Administrator, in his proposed regulation that would have created a zero toleration for "asbestos-form particles" in talc intended to be used as a food additive, recognized that talc contaminated with asbestos "may be injurious to health." Thus, by the continued listing of asbestos infected talc on the GRAS list, the Administrator may be contravening the intent of Congress as expressed in the Delaney Amendment:

Congress, guided by the state of scientific knowledge, must place limits on the risks to be measured by Society; the appropriate regulatory agency, again guided by scientific research must not allow that established risk to be exceeded.

Section 501(a) of the Act states, in relevant part, that:

A drug or device shall be deemed to be adulterated. . .if it has been prepared, packed or held under insanitary conditions whereby it may have been contaminated with filth, or whereby it may have been rendered injurious to health. (emphasis added)

Consequently, one can make the assertion that a drug that has been contaminated with asbestos fibers as a direct or indirect result of either the use of asbestos filters or asbestos-containing talc falls within the definition of adulteration quoted above. Therefore, any drug, like any food, which has been processed with asbestos filters or to which asbestos-containing talc has been added should be deemed, by the Administrator, to be adulterated.

On September 28, 1973, the FDA responded to the above mentioned petition filed by the Environmental Defense Fund (E.D.F.) and the Center for Science in the Public Interest (CSPI). Therein, petitioners had recommended that subpart F of part 121 and part 133 of the Code of Federal Regulations (CFR) be amended to include (1) foods and drugs that have been contaminated by coming into contact with filters containing asbestos and (2) talc contaminated with asbestos particles, because asbestos particles may be injurious when injected or ingested.

After discussing the scientific data on the contamination of food and drugs, the Administrator concluded that, even though asbestos inhalation has been known to be an occupational hazard, the evi-
dence concerning the possible hazard from ingestion of asbestos particles is "contradictory and inconclusive." The Administrator stated that it is nearly impossible to eliminate all sources of asbestos contact in food and drugs; therefore it is sufficient to require that only certain precautions be taken in the manufacture of food and drugs.

In response to this statement, the Administrator proposed to amend Title 21 of the Code of Federal Regulations and, in particular, section 121.101 of the GRAS list, by revising the entry for "talc" to read, under section 121.2006(b):

Accordingly, any food or food packaging material containing talc that is not free from asbestos fibers — shall be deemed to be adulterated in violation of section 402(a)(1) of the act. Under section 121.2006(c) the Administrator proposed a method for determining asbestos fiber levels in food grade talc.

He also proposed to amend sections 133.6 and 133.8 of the CFR by stating:

Accordingly, any drug, drug ingredient, or drug packaging material containing talc that fails to meet the specifications of paragraph (c) of section 121.2006—shall be deemed to be adulterated in violation of section 501(a) of the Act. [and] No asbestos containing or fibers releasing filter may be used in the manufacture of a parenteral drug or parenteral drug ingredient unless it is not possible to manufacture that drug or drug ingredient without the use of such filter. It appears that the Administrator, while recognizing that asbestos-infected talc and the preparation of food and drugs with asbestos filters may be injurious to health, did not propose a strict prohibition of asbestos fibers for such practices, as petitioned by the E.D.F. and C.S.P.I. nor did he mention a restriction on one use of asbestos—releasing filters in the preparation of food — except to say that precautions should be taken "as part of good manufacturing processes." In this context, the Administrator did not recommend an amendment to the good manufacturing practices for foods as he did for drugs. Finally, he refused to establish what the final GRAS listing for asbestos in talc would be "until a reproducible and accurate method (for determining asbestos fibers) can be specified for compliance purposes." Such a method may take years to develop, resulting in a delay, even though the Administrator concedes that "asbestos fibers perform no functional purpose in talc and are an unnecessary contaminant." (emphasis added)
Lake Superior is the largest fresh water lake in the world. It is 350 miles long and 160 miles wide, with 31,820 square miles in surface area. Much of its 3,000 mile shoreline is unsettled wilderness, and it was not until the 1950’s that industry became interested in its natural resources for the commercial processing of iron, paper and chemicals.

By the early 1960’s the inevitable clash between commercial development and environmental interests began. Senator Gaylord Nelson of Wisconsin first petitioned for Federal action in 1963. In 1967 he called for a Federal enforcement conference to prohibit the “provable interstate pollution” originating in both Ashland and Superior, Wisconsin and Duluth, Minnesota.

Senator Nelson’s petition focused upon the Reserve Mining Company, herein Reserve, of Silver Bay, Minnesota, which is located about sixty miles north of Duluth on Lake Superior’s northern shore. Presently, the company is jointly owned by Republic Steel Corporation and Armco Steel Corporation. Reserve processes and mines low grade ore into taconite and uses approximately 350,000 gallons of the Lake’s water for every minute of processing. In 1948 Reserve negotiated with the Army Corps of Engineers for a permit to dump the unusable waste called “tailings” from the taconite into the Lake. Since the company has gone into full time operation in 1955, it has deposited more than 190 million long tons of tailings, and every day it adds another 60,000 tons to the total. It has only recently been alleged that the taconite tailings contain asbestos fibers which have found their way into the drinking water of Duluth and other cities surrounding Lake Superior.

The Minnesota Council on Environmental Control has issued a report on asbestos concentrations in drinking water in selected Minnesota and Wisconsin communities which draw their water from Lake Superior. The highest concentrations were discovered, respectively, in the Minnesota communities of Two Harbors, Beaver Bay, Duluth, and Silver Bay where the counts were 2.6 million, 1.9 million, 948,000, and 296,000 asbestos fibers per liter at 5 microns in length.

Responding to the Council’s findings, Russell E. Train, Administrator of the Environmental Protection Agency (E.P.A.), sought to enhance the E.P.A.’s analytical ability by eliciting the aid of Dr. Irving J. Selikoff from Mount Sinai Hospital in New York City and Dr. E. Cuyler Hammand, a biostatistician for the American Cancer
Society. They tested the Duluth drinking water and obtained tissue samples of deceased Duluth residents, taken during autopsies, for the purpose of tracing the presence of asbestos fibers.\textsuperscript{74}

In 1967 the Corps of Army Engineers (Corps) and the Department of the Interior reviewed all dumping permits with environmental considerations in mind. When the Corps reviewed the permit granted to Reserve Mining Company, then Secretary of the Interior Udall assigned a task force of five Interior agencies to investigate and make recommendations. Charles Stoddard, Regional Director of the Interior, issued the report on Reserve's permit. He concluded that:

Each day's refuse from Reserve contains over a ton of nickel, more than two tons of copper, a ton of zinc, 3 tons each of lead, and chromium, 25 tons of phosphorous, and 310 tons of manganese, in addition to silica, arsenic, and substantial quantities of iron.\textsuperscript{75}

The report recommended that Reserve be given up to three years to move its operations. These recommendations were not acted upon for political reasons.\textsuperscript{76}

After reviewing the results of the Stoddard report, the Minnesota Pollution Control Agency, the state's environmental arm, attributed the asbestos fiber residues of Lake Superior to the discharges of taconite tailings by Reserve. The tailings are grains of ore from which magnetic particles of iron ore have been extracted.

The controversy has led to a law suit instituted by the E.P.A. in February, 1972 involving the states of Wisconsin, Michigan and Minnesota, the Environmental Defense Fund, a number of Chambers of Commerce and small towns whose economies are dependent on the mining operations of Reserve. The trial is currently in progress.\textsuperscript{77}

The Government is advocating that Reserve dispose its taconite waste on land at Babbit, Minnesota. The company insists that on-land disposal is economically prohibitive because it would cost more than $200 million. The court has indicated that it might order the defendant to shut down "if it is definitely established that Reserve's taconite waste is a hazard."\textsuperscript{78}

In addition to the asbestos pollution of the water supply, the court wishes to pursue allegations made by E.D.F. that Reserve is polluting the air by the discharge of potentially injurious asbestos fibers.\textsuperscript{79}

Reserve will attempt to "establish that Reserve's method of discharge of taconite tailings has no significant adverse effects on Lake Superior" and that it was "the best available method for minimizing any potential adverse ecological effects," and will introduce evi-
dence that the asbestos fibers have been released into Lake Superior from Canadian streams owing to a mineral named cummingtonite. 80

CONCLUSION

The legal and regulatory response to the environmentally deleterious effects of asbestos contamination has been, at best, a concession to the status quo. Because of the inherent incompleteness of medical studies and the difficulty of compiling accurate information on response relationships for mesothelioma and lung cancer, there appears to be no sense of urgency coming forth from Washington or from industry responding to the problem.

While more scientific research is being developed, there is a current necessity to promulgate strict laws and regulations to curb the ubiquitous use of asbestos. Since the loss of human life is the issue at hand, the burden falls on the manufacturer to prove that his product or working condition is environmentally safe.

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FOOTNOTES

*Assistant Professor, Department of Business Administration, University of Connecticut.
3N.Y. TIMES, Jan. 21, 1973, (Magazine at 8).
4Id. at 60. Canada and Russia are the major producers of asbestos, accounting for 34 and 44 percent, respectively. Id.
5Id.
6Brodeur, supra n. 2, at 7.
9Brodeur, supra n. 2, at 25.
1329 U.S.C. §§ 653 et seq.
1429 U.S.C. §§ 653 et seq.
ASBESTOS


21Id.

22N.Y. TIMES, Jan. 21, 1973 (Magazine at 63).


24Jd.

25N.Y. TIMES Jan. 21, 1973 (Magazine at 63).


27Results of Asbestos Workers Survey In, INSULATION HYGIENE PROGRESS REPORTS, 5:2, (1973). (Hereinafter referred to as Workers Survey). To appreciate the dire consequences of continuing the five fiber standard until July, 1976, Dr. Selikoff has stated that the Secretary of Labor has "doomed 20,000 to unnecessary lung cancer deaths, 7,000 to unnecessary mesothelioma deaths, 7,000 to unnecessary asbestosis deaths" as well as deaths from other cancers. N.Y. TIMES, Jan. 21, 1973 (Magazine at 64).

28Workers Survey, supra n. 28.


30Id. at 8820.


32E.D.F. Petition, supra n. 37, at 6.


34E.D.F. Petition, supra n. 37, at 5.


Edible oils refer, of course, to cooking and salad oils.

Castleman, supra n. 1, at 35.


Id.


21 U.S.C. §§ 301 et seq.


C.F.R. 121.101(h) and (i) (1964).

F.D.A. Petition, supra n. 50, at 15.


Id. at 27077.


Id.


Id. at 141-2.

Id. at 142.


Zwick, supra n. 68, at 142-3.

Id.


Id.

E.P.A. attorneys objected to the introduction of this issue by
E.D.F. Inc. because they felt that the question of air pollution should be considered in a separate court action.