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**PLAINTIFF'S
EXHIBIT**

KM-365

PART II:

**DEPARTMENT OF
LABOR**

**Occupational Safety and
Health Administration**

■

**OCCUPATIONAL
EXPOSURE TO ASBESTOS**

Notice of Proposed Rulemaking

KMX 01286

**Asbestos Information Association
North America
1660 L Street, N. W.
Washington, D. C. 20036**

found in various parts of the world, but its low fiber strength makes it less desirable for industrial use.

Nearly one million tons of asbestos are consumed in the United States annually. According to the Bureau of Mines *Minerals Yearbook, 1973*, approximately 77 percent of asbestos products consumed in 1972 were used in the construction industries (186,000 short tons). Approximately 92 percent of the asbestos used in construction is firmly bonded, i.e., the asbestos is "locked in" in such products as floor tiles, asbestos cements, and roofing felts and shingles; while the remaining 8 percent is friable or in powder form present in insulation materials, asbestos cement powders, and acoustical products. These latter products generate more airborne fibers than the firmly bonded products. The 186,000 short tons of asbestos used in the non-construction industries in 1972 were utilized in such products as textiles, friction materials including brake linings and clutch facings, paper, paints, plastics, roof coatings, floor tiles, and miscellaneous other products.

An estimated 50,000 workers are involved in the manufacture of asbestos-containing products. However, this figure does not include secondary manufacture of products which contain asbestos, such as electrical or thermal insulation, or products which include previously manufactured components containing asbestos.

There are approximately 40,000 field insulation workers in the United States who are exposed to asbestos dust. The activities of these workers is estimated to cause secondary exposures to approximately three to five million other building construction and shipyard workers. However, since the dust exposure to the individual worker is extremely variable, and the number of asbestos workers at any one location is small, the primary and secondary asbestos dust exposures to all workers have never been satisfactorily estimated.

In the United States, the mining and milling of asbestos is a relatively small industry employing fewer than a thousand workers. The Occupational Safety and Health Administration does not have jurisdiction over mining and milling operations, as such operations are covered by the Mining Enforcement and Safety Administration of the Department of the Interior.

B. REGULATION OF OCCUPATIONAL EXPOSURE TO ASBESTOS

A standard for occupational exposure to asbestos was included in the initial promulgation of OSHA standards published on 29 May 1971 (36 FR 10466) pursuant to Section 6(a) of the Act, 29 U.S.C. 655(a). Derived from a 1969 federal standard issued under the Walsh-Healey Public Contracts Act (41 U.S.C. 35 et. seq.), the original OSHA standard established an exposure limit of 12 fibers (greater than 5 microns in length) per milliliter or 2 million particles per cubic foot of air.

Pursuant to Section 6(c) of the Act, 29 U.S.C. 655(c), a petition for an emergency standard to control concentrations of asbestos dust was submitted to the Secretary by the Industrial Union Department of the AFL-CIO on 4 November 1971. As a result of that petition, an emergency temporary standard for occupational exposure to asbestos dust was published on 7 December 1971 (36 FR 23207). The emergency standard stated that: "The 8-hour time-weighted average airborne concentration of asbestos dust to which employees are exposed shall not exceed 5 fibers per milliliter greater than 5 microns in length, as determined by the membrane filter method at 400-450 × magnification (4 millimeter objective) phase contrast illumination. Concentrations above 5 fibers per milliliter, but not to exceed 10 fibers per milliliter may be permitted up to a total of 15 minutes in an hour for up to 5 hours in an 8-hour day."

On 12 January 1972 a proposal for a new permanent asbestos standard was published (37 FR 466), pursuant to Section 6(b) of the Act, 29 U.S.C. 655(b). The proposal included the exposure limitations of the emergency temporary standard plus additional engineering and administrative controls, work practices, and procedures for medical surveillance and monitoring.

The present standard was promulgated on 7 June 1972 (37 FR 11318). This standard which appears as 29 CFR 1910.1001 [originally published as 29 CFR 1910.93a prior to recodification] established an 8-hour time weighted average (TWA) concentration exposure limit of five fibers longer than 5 micrometers per cubic centimeter of air, and a ceiling limitation against any exposure in excess of ten such fibers per cubic centimeter. The present standard further provided that, effective 1 July 1976, the 8-hour TWA is to be reduced to two fibers.

Pursuant to Section 6(f) of the Act, 29 U.S.C. 655(f), a petition for review of the Secretary's standard was filed with the United States Court of Appeals for the District of Columbia. The principal petitioners, the Industrial Union Department of the AFL-CIO, objecting to several substantive provisions of the standard, as well as to the grounds upon which such provisions were premised, requested that the Secretary's final decision be reversed. However, the Court affirmed the standard and the Secretary's judgement with two exceptions. *Industrial Union Department, AFL-CIO v. Hodgson*, 499 F.2d 467 (CA DC 1974).

The Court directed the Secretary to reconsider the effective date (1 July 1976) for the two-fiber standard and determine whether such date might be accelerated for all or some of the industries so affected. The Court also directed the Secretary to review the standard's recordkeeping provision requiring a three-year retention period for exposure monitoring records, and to reexamine whether such time period would be adequate to assure employee protection and prevention of asbestos related diseases.

Following the decision in *Industrial Union Department, AFL-CIO*, supra,

OSHA reviewed the record of the asbestos rulemaking proceeding in 1972, particularly with respect to the issues remanded by the Court to the Secretary. It is OSHA's belief that the record of the 1972 asbestos standard proceeding is inadequate to properly resolve the two issues raised by the Court's remand and that in the interest of achieving the best feasible occupational health protection a new rulemaking proceeding should be initiated so that fresh and more detailed evidence may be developed regarding changes in industrial usage, compliance capabilities, and employee health practices which have occurred since the standard's promulgation over three years ago. In addition, OSHA believes that new research developments regarding the harmful effects of asbestos exposure, as well as advances in monitoring and protective technology, make re-examination of the previous standard's premises and general structure desirable. The proposal accordingly goes beyond the issues OSHA has been directed to consider by the Court, in the interest of effecting the Administration's continuing mandate to "set the standard which most adequately assures on the basis of the best available evidence, that no employee will material impairment of health or functional capacity" from occupational exposure to this substance.

II. TOXICOLOGICAL CONSIDERATIONS OF EXPOSURE TO ASBESTOS

A. EFFECTS OF ASBESTOS EXPOSURE

Asbestos, in its several commercial forms, has been shown in very recent time to be associated with the production of a variety of disease entities. These include:

1. Asbestosis: a diffuse, interstitial, nonmalignant, scarring of the lungs;
2. Bronchogenic carcinoma: a malignancy of the interior of the lung;
3. Mesothelioma: a diffuse malignancy of the lining of the chest cavity (pleural mesothelioma), or of the lining of the abdomen (peritoneal mesothelioma); and
4. Cancer of the stomach, colon, and rectum.

Asbestos may be evident, in its advanced stages, by characteristic manifestations on x-ray films, by restrictive pulmonary function, or by clinical signs, of finger clubbing or rales (dry, crackling sounds within the lung). Its most important symptom is dyspnea, or undue shortness of breath. The disease is progressive, even in the absence of further exposure, as those inhaled fibers which have been trapped within the lung continue their biological action. In its severe forms, death results from the inability of the body to obtain requisite oxygen or from the heart's failure to pump blood through the scarred lungs.

Mesotheliomas tumors are diffuse and spread rapidly throughout the cavity of origin. They have yet to be successfully cured by any types of treatment including chemotherapy, radiation, or surgery. Death usually results within a year of diagnosis. In the general population, mesothelioma is so rare that it has yet

These new observations should not diminish OSHA's prior focus on the prevention of asbestosis, since significant pulmonary and/or pleural scarring have not been an important feature of low-level, short-term, intermittent exposure. Rather, it should emphasize the incomplete perspectives of the current standard derived from considerations concerned with prevention of asbestos-related lung scarring rather than those needed for the prevention of asbestos-associated cancer, particularly mesothelioma.

C. THE NEW EVIDENCE

(1) *Asbestosis*. Subsequent to the hearings on the current standard, uncertainty has arisen as to whether the existing British asbestos standard and the mandated 2 fiber/ml U.S. standard provides effective protection even against asbestosis. The data from Great Britain obtained in 1966 indicated that little clinical disease, including x-ray evidence of asbestosis, had occurred among workers first employed in that factory at some time after 1933, when important improvements in work practices had been achieved. In 1972, results of evaluation of new x-rays that had been taken in 1970, of the work force then employed in the same factory, were reported as showing that many now had abnormal findings either in the lung or in the coverings of the lung pleurae (Lewinsohn, 1972). There was thus a difference between the prevalence of abnormal x-ray findings among workers x-rayed in 1966 as reported to the British Occupational Hygiene Society, and evaluation of other x-rays of workers in the same factory four years later.

Additionally, clinical data are becoming available concerning asbestos lung scarring in individuals exposed at levels much lower than those of occupational circumstances. Among 210 family contacts of former asbestos factory workers, 38% have been reported to have x-ray changes characteristic of asbestos exposure (Anderson, Selikoff, Lillis and Daum, 1975).

(2) *Cancer*. In December 1972, important new information on the spectrum of asbestos cancers was presented at the Conference on the Biological Effects of Asbestos, sponsored by the International Agency for Research on Cancer of the World Health Organization. At this conference, and subsequently, data on large groups of asbestos workers became available (Selikoff, Hammond and Seidman, 1973; Enterline, 1972). As expected, the high risk of bronchogenic carcinoma and mesothelioma persisted among factory employees and insulators. Moreover, these later studies confirmed the excess gastrointestinal cancer that had been suggested earlier, and extended the spectrum of asbestos related cancers.

(a) *Lung cancer*. The most important cancer afflicting asbestos workers is cancer of the lung, although mesothelioma has attracted considerable attention because of the high frequency among asbestos workers and infrequent occurrence in the population as a whole.

In many groups of asbestos workers, approximately 20% of all deaths are caused by lung neoplasms. This has been true both among asbestos product factory workers (Selikoff, Hammond and Churg, 1972; and Nicholson, 1975) and among users of these products (Selikoff, Hammond and Seidman, 1973). The exact percentage varies with circumstances of exposure, age of the workers, duration of the workers' exposure and, perhaps most of all, according to the duration from the onset of their asbestos work history. In addition, the last several years have seen the discovery of another critical variable affecting the incidence of lung cancer among asbestos workers. In 1968, Selikoff, Hammond and Churg reported that lung cancer was not significantly increased in incidence among asbestos workers with no history of cigarette smoking, although when such history was present, the incidence of lung cancer increased markedly over what would be expected among other cigarette smokers, in the absence of asbestos exposure. Thus, these scientists calculated that an asbestos worker who smoked cigarettes had 92 times the risk of dying of lung cancer, as compared with like individuals without cigarette smoking or asbestos work. This finding has been confirmed by larger studies (Hammond and Selikoff, 1973) where, again, it was found that non-smoking asbestos workers had few lung cancers while those who smoked had much more lung cancer than would have been expected had they not been asbestos workers. Calculations suggest that cigarette-smoking asbestos workers have approximately eight times the risk of developing lung cancer compared to other smokers.

(b) *Pleural and peritoneal mesothelioma*. In 1960, Wagner, Sleggs and Marchand demonstrated an important association between asbestos exposure and pleural mesothelioma. This cancer, which appears to be unrelated to smoking, had previously been considered to be a very rare tumor. Numerous reports have confirmed the finding of Wagner and his colleagues that mesothelioma can be commonly associated with asbestos exposure. A subsequent report by Enticnap and Smither, 1964, concerning workers in a British asbestos factory demonstrated that the same tumor could be commonly found in the abdomen (peritoneal mesothelioma), as well as in the chest.

The exact risk of death of these invariably fatal neoplasms has not been as well defined as has lung cancer, although recording of cases from hospitals near one large asbestos factory has indicated that it must be very common indeed (Borow, Conston, Livornese and Schalet, 1973). Information available from the experience of asbestos insulation workers suggests that approximately five to seven percent of deaths may be due to this neoplasm (Hammond, Selikoff and Churg, 1965; Selikoff, Hammond and Seidman 1973). More recently, it has been suggested that this estimate is too low, on the basis of the experience

of workers in a British asbestos factory, where calculations predicted that between 10 and 11 percent of deaths would be due to mesothelioma (Newhouse and Berry, 1975).

(c) *Gastro-intestinal cancer* Gastro-intestinal cancers (cancer of the stomach, colon and rectum) are also increased in incidence among asbestos workers, but the increase is less pronounced than that of lung cancer or mesothelioma. A number of studies now indicate that the increase is on the order of two or three times the number of expected tumors (Selikoff, Hammond and Seidman, 1973; Elmes, 1968). Although this increased risk is relatively limited, especially when compared with lung cancer and mesothelioma, it is nevertheless of considerable importance since a two- or three-fold increase in such common tumors becomes an important cause of death for the workers involved.

It has been suggested that other tumors are also increased in incidence among asbestos workers, particularly cancers of the larynx (Stell and McGill, 1972; Newhouse, 1973) and neoplasms of the oropharynx (Selikoff, Hammond and Churg, 1970), and of the esophagus (Selikoff, Hammond, and Seidman, 1973). However, data concerning these neoplasms are less extensive than for lung cancer, mesothelioma and gastro-intestinal cancer and further experiences are awaited. In any case, they are not very common tumors in general and any increase does not weigh heavily on the overall cancer risk of asbestos workers.

Considering all neoplasms, among some groups of asbestos workers, employed either in asbestos factory work or in the use of asbestos products, as much as 40 to 45 percent of all deaths have been due to one or another type of cancer, an approximately three-fold or four-fold increase.

Of significant importance, new data have recently been made available concerning the cancer risk of workers at the textile mill reviewed for the British standard, including those workers first employed after 1933 (Howard, Kinlen, Lewinsohn, Peto and Doll, 1975). It was found that there was excess mortality from lung cancer among those workers who entered scheduled areas after 1 January 1933. There was "clear evidence of some excess of lung cancer and respiratory deaths among those first exposed between 1933 and 1950." Equally important was the finding that "there still appears to be an excess of deaths due to lung cancer after 15 or more years' exposure" even among those first exposed in 1951 and subsequently. Indeed, it is known that mesothelioma deaths have occurred among the specific group of 290 workers whose experience prior to 1966 had led to the development of the current standard, as detailed above (Brody, J. E., 1974).

There are further data indicating the necessity for reevaluation of the asbestos standard, albeit less directly derived from asbestos worker exposure. This information is derived from occurrence of asbestos cancer among individuals ex-

courts which have reviewed standards promulgated under the Act. For instance, in sustaining the standard for occupational exposure to vinyl chloride (29 CFR 1910.1017), the U.S. Court of Appeals for the Second Circuit stated that, "It remains the duty of the Secretary to act to protect the working man, and to act even in circumstances where existing methodology or research is deficient." *The Society of the Plastics Industry, Inc. v. United States Department of Labor*, 509 F. 2d 1301 (C.A. 2 1975), cert denied, sub nom *Firestone Plastics Co. v. United States Department of Labor*, — U.S. —, 43 U.S.L.W. 3525 (27 May 1975). A similar rationale was applied by the U.S. Court of Appeals for the District of Columbia in reviewing the standard for occupational exposure to asbestos (29 CFR 1910.1001, but appearing at the time of review as 29 CFR 1910.93a). The Court stated:

Some of the questions involved in the promulgation of these standards are on the frontiers of scientific knowledge, and consequently as to them insufficient data is presently available to make a fully informed factual determination. Decision-making must in that circumstance depend to a greater extent upon policy judgments and less upon purely factual judgments. *Industrial Union Department, AFL-CIO v. Hodgson*, supra, 499 F. 2d at 474.

In setting standards, the Secretary is expressly required to consider the feasibility of the proposed standards. S. Rpt. No. 91-1282, 91st Cong., 2d Sess., p. 58 (1970). Nevertheless, considerations of technological feasibility are not limited to devices already developed and in use. Standards may require improvements in existing technologies or require the development of new technology. *The Society of the Plastics Industry, Inc. v. United States*, supra, 509 F. 2d at 1309.

Where appropriate, the standards are required to include provisions for labels or other forms of warning to apprise employees of hazards, suitable protective equipment, control procedures, monitoring and measuring of employee exposure, employee access to the results of monitoring, and appropriate medical examinations. Where a standard prescribes medical examinations or other tests, they must be made available at no cost to the employee (Section 6(b)(7) of the Act). Standards may also prescribe recordkeeping requirements where necessary or appropriate for enforcement of the Act or for developing information regarding occupational accidents and illnesses (Section 8(c) of the Act).

V. THE PROPOSAL

The development of this proposal is premised upon: (1) recent medical and scientific evidence as to increased health hazards associated with occupational exposure to asbestos and (2) the experience gained by OSHA through three years of enforcement and administration of the current asbestos standard.

The following is a summary and analysis of the significant issues contained in the text of the proposed standard for occupational exposure to asbestos.

A. SCOPE AND APPLICATION

The standard, as revised, would continue to apply to all workplaces where occupational exposure to asbestos is present, but would exclude the construction industry.

It is OSHA's intention to develop and propose a separate revision to the existing asbestos standard for the construction industry. Approximately three-fourths of all asbestos products in 1972 were used in the construction industry. In addition, the uniqueness of the construction industry itself (viz., the multiplicity of non-fixed workplaces, and the utilization of highly transient workforces) strongly suggests separate treatment. These structural differences were reflected in the 17-18 September 1975 deliberations of the OSHA Advisory Committee on Construction Safety and Health.

Although OSHA believes that health hazards faced by employees in the construction industry with regard to occupational exposure to asbestos are similar to those faced by their counterparts in other covered employments, OSHA recognizes that alternative administrative and engineering controls may be more appropriate and feasible for the construction industry. Therefore, OSHA intends to consult with the Construction Advisory Committee in order to further explore such alternatives. Upon publication of the proposal to revise the existing asbestos standard for the construction industry, OSHA will consider the possibility of consolidated hearings on that proposal and the proposal contained herein for all other covered employments.

OSHA is aware that certain provisions of this proposal, such as medical surveillance and the extended retention period for medical and monitoring records, may pose special problems to some employers, especially those who have small numbers of employees, operate with non-fixed places of employment, or use workforces which are highly transient in nature. This awareness has been expressed by the Department of Labor in a statement submitted to the House Subcommittee on Environmental Problems Affecting Small Business on 26 June 1975, as follows:

It has become increasingly evident that the combined body of Federal regulations imposes a substantial, and to some extent, unnecessary burden upon employers, particularly those who run small businesses. While most of these requirements serve a necessary and useful purpose, a definite potential exists for duplication, conflicting standards, and inappropriate recordkeeping requirements. In an effort to eliminate problems where any exist in the Department of Labor, I have requested my agency heads to assess the small business impact of the laws they administer and determine what can be done to ease the burden on the small employer, while still assuring compliance with the law.

Although it is clear that OSHA's first and prime responsibility is to assure employees safe and healthful places of employment, the Act and its legislative history recognize that economic and technological feasibility are legitimate factors to

be considered in the setting of occupational safety and health standards.

In addition, the Act explicitly takes cognizance of its impact upon affected small business, specifically with respect to any recordkeeping requirements which are imposed. Pursuant to section 8(d) of the Act, OSHA is exploring methods of reducing, to the maximum extent possible, the administrative and economic burdens of the proposal's various information gathering requirements.

While the proposal does not address itself to specific alternatives, OSHA invites comments concerning options which would both provide full protection to affected employees and at the same time would minimize the administrative and economic burden on affected employers—especially those with small numbers of employees, non-fixed workplaces, or highly transient workforces.

B. DISCUSSION OF MAJOR PROVISIONS

OSHA recognizes that, since the promulgation of the current standard, several distinguished individuals and many agencies, both public and private, have made valuable contributions to the field of toxic substances generally, and asbestos specifically.

Exposure Levels. Recently, the National Institute for Occupational Safety and Health (NIOSH) has informed OSHA that it is currently reviewing data which may provide significant information with respect to the margin of safety afforded by the existing asbestos exposure limits. In a memorandum dated 29 September 1975 to the Deputy Assistant Secretary of Labor for OSHA, the Director of NIOSH stated:

Multiple and consistent epidemiological studies leave virtually no doubt that asbestos is carcinogenic to man.

OSHA also believes sufficient medical and scientific evidence has now been accumulated to warrant the designation of asbestos as a human carcinogen. Therefore, it is incumbent upon OSHA to propose the establishment of safeguards to protect the lives of affected workers.

OSHA deems it appropriate to propose that the 8-hour exposure limit (TWA) be lowered to 500,000 fibers per cubic meter (0.5 asbestos fibers per cubic centimeter), and that the ceiling exposure limit be 5,000,000 asbestos fibers per cubic meter (5 asbestos fibers per cubic centimeter) for any period up to 15 minutes. OSHA recognizes that there is no assurance of a safe exposure for a substance with known carcinogenic property, in this case asbestos, and thus there should be no detectable concentrations. However, the Act requires that the Secretary establish standards to the extent feasible, and therefore the Secretary must take into consideration technological and economic factors.

OSHA believes that it may be appropriate to postpone the effective date of the proposed exposure level because of the existence of problems of feasibility of a technological and economic nature. OSHA expressly invites comments on this issue, including comment on the ap-

employer would be required to inform each employee assigned to a regulated area about the nature of asbestos-related health problems, the necessity for exposure control, the work practices and engineering controls associated with the employee's job assignment, and the medical surveillance programs.

Signs and labels. Due to the hazardous nature of asbestos, OSHA believes that emphasis should be placed on warning employees and other persons about the dangers of exposure. For this reason, the proposed standard includes a section on signs for regulated areas and labels for products containing asbestos or their containers.

The signs to be posted at regulated areas inform employees of the carcinogenic hazard of asbestos and alert them to the fact that only persons authorized by the employer should enter the area.

Hygiene facilities and practices. The proposal provides that all employees working in regulated areas must be required to wash hands, face, and forearms before eating, drinking, or smoking. Finally, smoking, nonfood chewing products, drinking, and eating are prohibited in regulated areas. In addition employees working in regulated areas are required to shower before leaving at the end of the work shift. This section of the proposed standard also requires that the employer provide for the hygiene facilities such as change rooms and showers in accordance with 29 CFR 1910.141.

Appendices. In addition, the proposal introduces appendices to be published with the standards as information and guidance.

Appendix A (Substance Safety Data Sheet) provides information on the general nature of asbestos, exposure limits and general precautions regarding its usage. **Appendix B** (Substance Technical Guidelines) provides technical information on asbestos minerals, recommendations for monitoring, and general work practices for clean-up operations. Two guides for work practices for certain operations are included as enclosures. The first deals with loading, unloading, and storing asbestos cargo. The second provides guidance to employers who introduce asbestos into manufacturing operations. **Appendix C** (Medical Surveillance Guidelines) provides information considered to be useful and appropriate to the examining physician.

VI. ENVIRONMENTAL IMPACT ASSESSMENT

The National Environmental Policy Act of 1969 (NEPA), (42, U.S.C. 4321-4343), requires, among other things, that Federal agencies assess their proposed major actions, including rulemaking, to determine whether a significant impact on the quality of the human environment may result. Furthermore, 29 CFR 1999.3 (d) requires that where OSHA determines that an environmental impact statement should be prepared, the determination to do so must be published in the FEDERAL REGISTER. Accordingly, it is hereby noticed that OSHA intends to prepare an environmental impact statement on the proposed revision to the

standard for occupational exposure to asbestos.

Once the draft environmental impact statement has been prepared, a copy of it will be made available by OSHA to any member of the public who requests an opportunity to comment on it. Any person or agency submitting comments on it to OSHA must at the same time forward five copies of the comments to the Council on Environmental Quality (CEQ), 772 Jackson Place, N.W., Washington, D.C. A 45-day period will be allowed for the submission of comments after the publication of the notice of availability of the draft environmental impact statement. The draft statement will be available where practicable, at least 15 days prior to a public hearing on the proposed standard. The environmental impact of the proposal would be an appropriate issue at such hearing.

In addition, comments that may be helpful in preparing the draft environmental impact statement on the proposed revision are solicited. Any person having relevant information or data is invited to submit it to David R. Bell, Office of Standards Development, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Avenue, N.W., Room N-3669, Washington, D.C. 20210, by November 10, 1975. Comments submitted in regard to the proposed standard need not be resubmitted. All material received on environmental impact will be available for public inspection and copying at the above address.

VII. PUBLIC PARTICIPATION

Interested persons are invited to comment on the proposed standard on or before December 8, 1975. Written data, views and arguments concerning the proposal must be submitted in quadruplicate to the Docket Officer, Docket H-033, U.S. Department of Labor, Room N-3620, 200 Constitution Avenue, N.W., Washington, D.C. 20210 Telephone 202/523-8076. Written submissions must clearly identify the provisions of the proposal addressed and the position taken with respect to each such provision. The data, views, and arguments will be available for public inspection and copying at the above address. All written submissions received will be made part of the record.

Pursuant to 20 CFR 1911.11 (b) and (c), interested persons may, in addition to filing written comments as provided above, file objections to the proposal and request an informal hearing with respect thereto, in accordance with the following conditions:

1. The objections must include the name and address of the objector;
2. The objections must be postmarked on or before December 8, 1975;
3. The objections must specify with particularity the provision of the proposed rule to which objection is taken, and must state the grounds therefor;
4. Each objection must be separately stated and numbered; and
5. The objections must be accompanied by a detailed summary of the

evidence proposed to be adduced at the requested hearing.

In addition to the comments invited above concerning the proposal and its environmental impact, OSHA hereby solicits comments from interested parties regarding the potential inflationary impact of the proposed revision. Comments must be submitted in accordance with the above requirements for comments on the proposal and may be directed toward any or all of the following subjects:

1. Cost impact on consumers, businesses, markets, or Federal, State, or local government;
2. Effect on the productivity of wage earners, businesses, or government;
3. Effect on competition;
4. Effect on supplies of important materials, producers, or services;
5. Effect on employment; and
6. Effect on energy supply or demand.

It is OSHA's intention to prepare an inflationary impact statement and analysis, if appropriate, or a certification that the revision has no substantial inflationary impact, and to make such statement or certification available at least 30 days prior to any public hearings on the proposed revision. The potential inflationary impact of the proposed revision would be an appropriate issue at such hearing.

This procedure has been concurred with by the Council on Wage and Price Stability in accordance with the Office of Management and Budget Circular A-107 (28 January 1975), issued pursuant to Executive Order 11821.

Accordingly, pursuant to sections 6(b) and 8(c) of the Occupational Safety and Health Act (84 Stat. 1593, 1599, 29 U.S.C. 655, 657) and 29 CFR Part 1911, it is hereby proposed to amend Part 1910 of Title 29 of the CFR as set forth below.

Signed in Washington, D.C., this 30th day of September 1975.

JOHN T. DUNLOP,
Secretary of Labor.

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7. Cooke, W. E.: Fibrosis of the Lungs Due to the Inhalation of Asbestos Dust. Brit. J. Med. II p. 147, (1924).
8. Nureweather, E. R. A., and C. W. Price: Report on the Effects of Asbestos Dust on the Lungs and Dust Suppression in The Asbestos Industry. H.M. Stationery Office, London, (1930).
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PROPOSED RULES

TABLE 1

RESPIRATORY PROTECTION AGAINST ASBESTOS FIBERS

Concentration of asbestos	Required respirator
Over 2,000 times the applicable exposure limit prescribed in paragraph (c) of this section.	(A) Self-contained breathing apparatus with a full facepiece in pressure-demand (positive pressure) mode.
Up to 2,000 times the applicable exposure limit prescribed in paragraph (c) of this section.	(A) A type C supplied air respirator with a full facepiece operated in pressure-demand or other positive pressure-mode, or with a full facepiece, hood, or helmet operated in continuous flow mode.
Up to 1,000 times the applicable exposure limit prescribed in paragraph (c) of this section.	(A) A type C supplied air respirators operated in pressure-demand or other positive pressure or continuous flow mode; or (B) A powered air purifying respirator with a high efficiency particulate filter; ¹ (C) self contained breathing apparatus in pressure demand (positive pressure) mode.
Up to 50 times the applicable exposure limit prescribed in paragraph (c) of this section.	(A) A high efficiency particulate filter respirator with a full facepiece; or (B) Any supplied air respirator with a full facepiece; or (C) Any self-contained breathing apparatus with a full facepiece.
Up to 10 times the applicable exposure limit prescribed in paragraph (c) of this section.	(A) Any air purifying respirator with replaceable particulate filter; or (B) Any single use respirator with or without valve; or (C) Any supplied air respirator; or (D) Any self-contained breathing apparatus.

¹ High efficiency filter—99.97 percent efficient against 0.3 micron size dioctylphthalate (DOP).

(3) *Respirator program.* (i) Respirators shall be used and maintained in accordance with § 1910.134 (e) and (f) of this part.

(ii) The employer shall institute a respiratory protection program in accordance with § 1910.134(b) of this part.

(iii) Employees who wear respirators shall be allowed to leave work areas to wash their face and respirator facepiece to prevent skin irritation due to respirator use.

(iv) No employee shall be assigned to tasks requiring the use of a respirator if, based upon his most recent examination, an examining physician has determined that the employee would be unable to function normally while wearing a respirator, or that the safety or health of the employee or other employee would be impaired by his use of a respirator. To the maximum extent possible, such employee shall be rotated to another job, or given the opportunity to transfer to a different position, whose duties he is able to perform, with the same employer, in the same geographical area and with the same seniority, status, and rate of pay he had just prior to such transfer.

(h) *Personal protective clothing.* (1) The employer shall provide, and require the use of, personal protective clothing, such as coveralls or similar whole body clothing, head coverings, gloves, and foot coverings, for any employee exposed to airborne concentrations of asbestos fibers which exceed either of the limits prescribed in paragraph (c) of this section.

(2) Clean and dry protective clothing and equipment shall be provided to each affected employee at least daily.

(3) The employer shall clean, launder, maintain, or dispose of protective clothing and equipment required by this section.

(4) The employer shall assure that all protective clothing and equipment is removed only in change rooms required by paragraph (i) (1) of this section.

(5) The employer shall assure that no employee removes contaminated protective clothing and equipment from the change room, except for the purpose of cleaning, laundering, maintenance, or disposal.

(6) Contaminated protective clothing and equipment shall be placed in impermeable closed containers.

(7) The employer shall inform any person who launders or cleans protective clothing and equipment contaminated with asbestos of the potentially harmful effects of exposure to asbestos fibers.

(i) *Hygiene facilities and practices.*

(1) *Change rooms.* Where employees wear protective clothing and equipment, clean change rooms equipped with storage facilities for street clothes and separate storage facilities for protective clothing and equipment shall be provided.

(2) *Showers.* Employees working in regulated areas shall be required to shower before leaving at the end of the work shift. The employer shall provide shower facilities in accordance with § 1910.141(d) (3) of this part.

(3) *Lavatories.* Employees working in regulated areas shall be required to wash hands, face, and forearms prior to drinking, eating, or smoking. The employer shall provide an adequate number of lavatories for this purpose which shall meet the requirements of § 1910.141 (d) (1) and (2) of this part.

(4) *Arrangement of shower facilities.* Clothes lockers and shower facilities shall be arranged so as to separate regulated areas and uncontaminated areas.

(5) *Arrangement of lavatory facilities.* Lavatory and toilet facilities which are located in regulated areas shall be arranged so that no access is available from them to uncontaminated areas.

(6) *Prohibition of activities in regulated areas.* The presence or consumption of food or beverages, the presence or use of smoking or nonfood chewing prohibit shall be prohibited in regulated areas.

(j) *Medical surveillance.* (1) *General.* Every employer shall provide or make available at his cost medical examinations relative to exposure to asbestos, as required by this paragraph. If an employee refuses a medical examination provided in accordance with this paragraph, the employer shall inform the employee of the possible health consequences of such refusal, and shall obtain a signed statement from the employee stating that such employee has been informed of the consequences and refuses to be examined.

(2) *Preplacement.* The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an area exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination. Such examinations shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptoms of respiratory disease, pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_{1.0}), and for employees with 10 or more years of exposure to airborne concentrations of asbestos fibers or who are 45 years of age or older, a sputum cytology examination.

(3) *Annual.* Every employer shall provide or make available comprehensive medical examinations to each of his employees exposed to airborne concentrations of asbestos fibers at least annually. Such examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptoms of respiratory disease, pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_{1.0}) and, for employees with 10 or more years of exposure¹ to airborne concentrations of asbestos fibers or who are 45 years of age or older, a sputum cytology examination.

(4) *Termination of employment.* The employer shall provide or make available, within 30 calendar days before or after termination of employment of any employee exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination. Such examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptoms of respiratory disease, pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_{1.0}) and, for employees with 10 or more years of exposure to airborne concentrations of asbestos fibers or who are 45 years of age or older, a sputum cytology examination.

(ii) Employee exposure measurements records required by this paragraph shall be made available for examination and copying to employees, former employees, and their designated representatives.

(iii) Employee medical records required by this paragraph shall be made available upon request for examination and copying to a physician designated by the employee or former employee.

(7) *Transfer of records.* (i) In the event the employer ceases to do business, the successor shall receive and retain all records required to be maintained by this paragraph.

(ii) In the event the employer ceases to do business and there is no successor to receive and retain his records for the prescribed period, these records shall be transmitted by mail to the Director, and each employee and former employee shall be individually notified in writing of this transfer.

(c) *Observation of monitoring.* (1) *Employee observation.* The employer shall give employees or their representatives an opportunity to observe any measuring or monitoring of their exposure to asbestos fibers conducted pursuant to this section.

(2) *Observation Procedures.* (i) When observation of the measuring or monitoring of employee exposure to asbestos fibers requires entry into an area where the use of personal protective equipment is required, the observer shall be provided with and required to use such equipment and shall comply with all other applicable safety and health procedures.

(ii) Without interfering with the measurement, observers shall be entitled to receive an explanation of the monitoring or measurement procedures, observe all steps related to the measurements and record the results obtained.

(p) *Appendices.* The information contained in the appendices to this section is not intended, by itself, to create any additional obligations not otherwise imposed, or to detract from any existing obligation.

APPENDIX A—SUBSTANCE SAFETY DATA SHEET

Asbestos

1. SUBSTANCE IDENTIFICATION

A. Substance: Asbestos

For purposes of the asbestos standard asbestos is identified as including the following hydrated silicates: chrysotile, amosite, crocidolite, tremolite, anthophyllite and actinolite.

B. Permissible airborne exposures

1. 0.5 fibers (longer than 5 micrometers, with a length-to-diameter ratio of at least 3 to 1 and with a maximum diameter of 5 micrometers) per cubic centimeter of air as an 8-hour time-weighted average.

2. 5 fibers (longer than 5 micrometers with a length-to-diameter ratio of at least 3 to 1, and with a maximum diameter of 5 micrometers) per cubic centimeter of air as determined using a sample collected over a period up to 15 minutes.

C. Description

Mineral fibers of high tensile strength and flexibility. Color may be white, off white, blue or brown. Fibers vary from harsh coarse varieties to fine silky ones.

II. HEALTH HAZARD DATA

A. General

Asbestos poses a hazard as an air contaminant. Tissue pathology may be seen at the site of retained fine asbestos fibers which have been inhaled.

B. Asbestosis

A lung disorder characterized by a diffuse interstitial fibrosis at times including pleural changes of fibrosis and calcification. Accompanying clinical changes may include fine rales, and dyspnea, finger clubbing, and cyanosis. Many of the people exposed to asbestos fibers develop asbestosis if the fibers concentration is high or the duration of their exposure is long. In general, there is a considerable time lapse between inhalation of the fibers and the appearance of changes as determined by x-ray.

C. Neoplasms

Neoplasms, such as mesothelioma, may occur without radiological evidence of asbestosis at exposure levels lower than those required for prevention of radiologically evident asbestosis.

III. RESPIRATORS AND PROTECTIVE CLOTHING

A. Respirators

You must wear a respirator whenever you are in an atmosphere where asbestos fiber concentrations exceed the permissible limits. However, respirators can only be required for routine use if your employer is in the process of installing controls, or in situations where these controls cannot feasibly reduce exposure levels to within permissible limits. If respirators are worn, they must be selected in accordance with Table 1 of the asbestos standard and have a National Institute for Occupational Safety and Health (NIOSH) seal of approval. If you experience difficulty breathing while wearing a respirator, tell your employer.

B. Clothing

The purpose of wearing protective clothing is to prevent additional exposure which could result from asbestos dust from personal clothing and/or the body, becoming airborne. It is essential that contaminated clothing be removed and handled in such a way that the dust will not become airborne and inhaled.

IV. PRECAUTIONS FOR SAFE USE AND HANDLING

Perform all operations in a manner which will keep the amount of dust which becomes airborne and potentially inhaled to an absolute minimum. Follow the requirements of the asbestos standard regarding engineering controls, regulated areas, work practices, respiratory protection and protective clothing. Special work practices may be developed for your particular operations. Find out what they are and follow them. If you notice operations which may be exposing you or others to asbestos dust, tell your supervisor.

APPENDIX B—SUBSTANCE TECHNICAL GUIDELINES

Asbestos

1. PHYSICAL AND CHEMICAL DATA

A. Identification

Asbestos includes several different hydrated silicates, all fibrous minerals.

B. Minerals named in the asbestos standard

Chrysotile, amosite, crocidolite, tremolite, anthophyllite and actinolite.

C. Physical characteristics

Asbestos fibers generally have high tensile strength, flexibility, heat and chemical resistance and good frictional properties.

Characteristics vary with the mineral:

(1) Chrysotile, the fibrous form of serpentine, is the most common variety of asbestos. It can be crushed into fine, white, silky fibers. It has high heat resistance but is destroyed by acids.

(2) Crocidolite, the fibrous form of riebeckite, has fine resilient blue fibers. The fibers are strong and resist acids.

(3) Amosite, the fibrous variety of grunerite, can be broken down into long somewhat harsh fibers, brownish-yellow to white in color. It is characterized by good resistance to acids and other chemicals.

(4) Anthophyllite has rather fragile, brownish or off-white fibers with good heat and chemical resistance.

(5) Tremolite (a calcium magnesium silicate) fibers have low tensile strength, making them undesirable for many industrial applications. It is often a major component of industrial and commercial talc.

(6) Actinolite (a calcium magnesium iron silicate) fibers, like tremolite fibers, have low tensile strength so that industrial use is limited.

II. CLEAN-UP OF SPILLS AND CONTAMINATED AREAS

A. Clean-up of asbestos and asbestos-containing materials must be done in a manner which will not result in employee exposure to asbestos dust. Do not dry sweep, blow or otherwise move the material so that it will become airborne. Wet the material before handling when possible. If loose material must be cleaned up dry, use vacuum cleaning or other methods which will keep dust under control.

B. Employees involved in clean up operations should be restricted from the area until clean up has been completed.

C. Employees involved in clean up operations should wear respiratory equipment specified in Table 1 of the asbestos standard when air concentrations are unknown. When air concentrations are known select appropriate respirators from Table 1 of the asbestos standard.

D. Enclose waste asbestos materials in containers which are impermeable to asbestos fibers and dispose of in a manner which will not result in subsequent exposures.

IV. MONITORING AND MEASUREMENT PROCEDURES

A. General

Measurements taken for the purpose of determining employee exposure are best taken in a fashion such that the average 8-hour exposure may be determined from a single sample or two (2) 4-hour samples. Short time interval samples (up to 30 minutes) may also be used to determine the average exposure level if a minimum of five (5) measurements are taken in random manner over the 8-hour work shift. Random sampling means that any portion of the work shift has the same chance of being sampled as any other. The arithmetic average of all such random samples taken on one (1) work-shift is an estimate of an employee's average level of exposure for that workshift. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

The concentration of dust in the air to which a worker is exposed will vary, depending upon the nature of the operation and upon the type of work performed by the operator and the position of the operator relative to the source of the dust. The amount of dust inhaled by a worker can vary daily, seasonally, and with the weather. In order to obtain representative samples of workers' exposures, it is necessary to collect samples under varying conditions of

weather, on different days, and at different times during a shift.

The percentage of working time spent on different tasks will affect the concentration of dust the worker inhales since the different tasks usually result in exposure to different concentrations. The percentage can be determined from work schedules and by observation of work routines.

The concentration of any air contaminant resulting from an industrial operation also varies with time. Therefore, a longer sampling time will better approximate the actual average.

With the following recommended sampling procedure, it is possible to collect samples at the workers' breathing zones for periods from 4 to 8 hours, thus permitting the evaluation of average exposures for a half or full 8-hour shift—a desirable and recommended procedure. Furthermore, dust exposures of a more normal work pattern result from the use of personal samplers.

B. Recommended method

The recommended sampling and evaluation method is described in a paper "USPHS/NIOSH Membrane Filter Method for Evaluating Airborne Asbestos Fibers" by Nelson A. Leidel, Stephen G. Bayer and Ralph D. Zummaulde, U.S. Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, Cincinnati, Ohio 45202 (in press). A brief summary is given below.

Samples are collected by drawing air through a cellulose ester membrane filter by means of a battery powered personal sampling pump. The filter, after collection of the sample, is transformed from an opaque solid to a transparent, optically homogenous gel. The fibers are sized and counted by phase-contrast microscopy at 400-450X magnification.

V. WORK PRACTICES FOR CERTAIN OPERATIONS

Work practices for certain work involving asbestos follow as enclosures to this appendix.

They are advisory in nature and are not intended to create any additional obligations not otherwise imposed by the standard, or to detract from any existing obligation.

ENCLOSURE I

LOADING, UNLOADING AND STORAGE ASBESTOS CARGO

(a) Prior to unloading bags or other container of asbestos fiber from a railcar, truck, ship, or other carrier, make a visual inspection of the cargo and cargo space to determine if leakage or spillage of asbestos cargo has occurred and the extent of loose asbestos and dust present, if any.

(b) If the cargo has not been damaged, and there is no visible loose asbestos fiber or dust on the cargo or in the cargo space, unloading and transport to storage or another carrier may proceed normally. Handle and store asbestos fiber which is in sealed bags or other closed containers impermeable to asbestos fiber in a manner that will minimize any damage that could create an exposure problem.

(c) If visual inspection of cargo and cargo space reveals bag or other container damage or loose asbestos fiber or dust at any time, do not proceed with unloading of cargo until precautions have been taken to minimize employee exposure.

(d) Collect any loose asbestos fiber and dust found in the process of unloading, or in the storage area, by vacuum cleaning or other suitable methods that do not in themselves produce air concentrations exceeding those prescribed in paragraph (b) of the asbestos standard, and dispose of it in sealed bags or other closed containers impermeable to asbestos fiber. Do not clean up asbestos by blowing or dry sweeping. Repair damaged bags or other containers by taping or by inserting into bags or other containers impermeable to asbestos fibers. Make these remedies before transporting the bag or the container to storage or use point.

(e) If it is known that railcars, trucks, ships or other carriers have contained asbestos as their last cargo, inspect the carrier and clean up any visible asbestos fiber and dust, prior to loading the next asbestos cargo, to ensure that no residue of asbestos fiber and dust will contaminate the asbestos cargo.

(f) If the airborne concentrations of asbestos fibers to which employees are exposed during asbestos cargo loading, unloading and storage are unknown select any respirator from Table 1 of the asbestos for employee use. During clean-up operations in carrier or storage areas where airborne concentrations of asbestos fibers are unknown have employees wear respirators selected from Table 1 of the Asbestos standard which protect for up to 50 times or more of the limits in paragraph (b) of the asbestos standard. Where the concentrations are known have employees wear appropriate respirators as specified in Table 1 of the asbestos standard.

(g) Special clothing is to be worn by all employees engaged in loading, unloading, and storage of asbestos cargo when the wearing of such clothing is required by paragraph (d)(3) of the asbestos standard.

ENCLOSURE II

INTRODUCTION OF ASBESTOS FIBER INTO MANUFACTURING PROCESSES

(a) Conduct production operations involving introduction of asbestos fiber into a process under dust controlled conditions such that employees are not exposed to concentrations of asbestos fiber above the exposure limits prescribed in paragraph (b) of the asbestos standard.

(b) In those operations where bagged asbestos fiber is being used, ensure that the fiber bags arrive at the work station in clean condition, free of loose fiber on the bag surface. If the bags are stacked on pallets, the pallets must be clean and free of loose fiber.

(c) Place empty bags or other containers which have contained asbestos fibers in closed or sealed containers impermeable to asbestos fibers until disposed of by methods that do not create airborne concentrations in excess of the exposure limits prescribed in paragraph (b) of the asbestos standard.

APPENDIX C—MEDICAL SURVEILLANCE GUIDELINES

I. ROUTE OF ENTRY

Inhalation.

II. TOXICOLOGY

A. Exposure to asbestos dust may result in asbestosis if the dust concentration is high or the duration of exposure is long. In general, there is a considerable time lapse between inhalation of the dust and the appearance of changes as determined by X-ray Asbestosis is characterized by:

1. A pattern of roentgenographic changes consistent with diffuse interstitial fibrosis of variable degree and, at times, pleural changes of fibrosis and calcification.

2. Clinical changes including fine rales and finger clubbing. These may be present or absent in any individual case.

3. Physiological changes consistent with a lung disorder.

B. Neoplasms

Neoplasms, such as mesothelioma, may occur without radiological evidence of asbestosis at exposure levels lower than those required for prevention of radiologically evident asbestosis.

III. SPECIAL TESTS

A. Chest roentgenographs.

B. Lung function tests.

1. Forced vital capacity.
2. Forced respiratory volume at 1 second.
3. Sputum cytology.

VI. SURVEILLANCE AND PREVENTIVE CONSIDERATIONS

A. Preplacement

A routine medical examination and a complete medical and work history are required to be made available. The examination includes a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) forced expiratory volume at 1 second (FEV_{1.0}), and, for employees with 10 or more years of exposure to airborne concentrations of asbestos fibers or who are 45 years of age or older, a sputum cytology examination. Those employees with respiratory disorders generally should not be placed where there is increased risk to inhalation of asbestos fibers.

C. Annual and termination examination

Annual and termination examinations are required to be made available. They are to include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_{1.0}) and, for employees with 10 or more years of exposure to airborne concentrations of asbestos fibers or who are 45 years of age or older, a sputum cytology examination.

(Secs. 4, 6, 8, 84 Stat. 1592, 1593, 1599 (29 U.S.C. 653, 655, 657) and 29 CFR Part 1911)

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