ORGANIZATION RESOURCES COUNSELORS, INC.
OCCUPATIONAL SAFETY & HEALTH STANDARDS GROUP
Split-Sheet Analysis

OCCUPATIONAL EXPOSURE TO ASBESTOS
October, 1975

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DEPARTMENT OF LABOR

Occupational Safety and Health Administration

[29 CFR Part 1910]

[Docket No. H-033]

OCCUPATIONAL EXPOSURE TO ASBESTOS

Notice of Proposed Rulemaking

Pursuant to sections 6(b) and 8(c) of the Occupational Safety and Health Act of 1970 (the Act) (84 Stat. 1593, 1599; 29 U.S.C. 655, 657) and Title 29 Code of Federal Regulations (CFR) Part 1911, it is proposed to revise 29 CFR 1910-1001, the standard for occupational exposure to asbestos.

This standard, as revised, would continue to apply to all employments covered by the Act but would exclude the construction industry. It is OSHA's intention to develop and propose a separate revision to the existing asbestos standard which would be applicable only to the construction industry.

The accompanying document is a proposal issued pursuant to sections 6(b) and 8(c) of the Act. The Occupational Safety and Health Administration (OSHA) requests the submission of written comments, data, and arguments from interested persons on the issues addressed or implicit in the proposal. In addition, the proposal states that an informal hearing may be requested to provide further opportunity for discussion of the issues. After the hearing, if one is held, OSHA will issue a final standard based on the full record of the evidence.

The proposed standard would, among other things, lower the permissible exposure to 500,000 fibers per cubic meter (0.5 asbestos fibers per cubic centimeter) for an 8-hour time-weighted average exposure, and lower the permissible ceiling exposure to 5 million asbestos fibers per cubic meter (5 asbestos fibers per cubic centimeter) for any period not exceeding 15 minutes; extend the retention period for medical and monitoring records to forty years, or for the duration of employment plus twenty years, whichever is longer; provide procedures for the transfer of medical and monitoring records of certain former employers; require specific minimum data on medical and monitoring records; revise the procedures for initial and subsequent monitoring; modify the definitions of "asbestos" and "asbestos fiber;" add provisions for employee hygiene, information and training; revise and update the requirements for respirators, and warning signs and labels; and establish a time parameter for sampling ceiling concentrations. In addition, the proposal will suggest work practices to be followed for certain operations and processes involving asbestos.

— New designation

— Again, as in Lead Proposal, multiphase rulemak

— Certain to be requested and scheduled, some months from now.

— A ten-fold reduction in TWA and one-fourth of expected level!

— Ceiling limit cut in half from present standar

— Key provisions

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With the short time available for preparation and submission of such comment, it is important that a decision be made as soon as possible whether to submit comments as a company and/or as a member of an association such as Organization Resource Counselors or Asbestos Textile Institute. The Corporate Safety and Medical Departments will be glad to assist in the preparation of such comments for submission

L. F. Dudrow

LFD/df
Attachments

cc: D. E. Dudrow
J. D. Forbes, M.D.

... pro-
... include the following:

1. Whether, and by what date, the permissible limit for an 8-hour time-weighted average exposure to asbestos should be lowered to 500,000 fibers per cubic meter (0.5 fiber per cubic centimeter), and, if so, whether such an exposure limit would provide an adequate margin of safety to protect employees against known and suspected workplace hazards of asbestos.

2. Whether, and by what date, the permissible ceiling limit should be reduced to 5 million fibers per cubic meter (5 fibers per cubic centimeter), and, if so, whether such an exposure limit would provide an adequate margin of safety to protect employees against known and suspected workplace hazards.

3. Whether the proposed change in the definitions of "asbestos" and "asbestos fiber" would clarify the standard's intended scope, and properly relate to known or suspected workplace hazards.

4. Whether the proposed sampling period for the determination of ceiling concentrations would be appropriate and adequate.

5. Whether the proposed procedures for initial and subsequent exposure monitoring would be appropriate and adequate.

6. Whether the proposed retention period for medical and monitoring records would be appropriate and adequate.

7. Whether the requirement for specific data on medical and monitoring records would be appropriate and adequate.

8. Whether the procedure for transfering the medical and monitoring records of former employers would be appropriate and adequate.

9. Whether the information gathering requirements of the proposal would create any undue administrative and economic burdens on employers, particularly for those employing small numbers of employees, or workforces which are highly transient in nature.

10. Whether the revised schedule for allowable respirator use would be appropriate and adequate for protecting workers against exposure to asbestos.

11. Whether the provision for job reassignment on account of medical unsuitability is appropriate and, if so, whether it effectively furthers the purposes of the Act

12. Whether the appendices are appropriate and otherwise in the best interests of worker health and safety.

13. To what extent, if any, should the proposal be modified to reflect a concern for workplaces which are of a non-fixed nature or otherwise engage a highly transient workforce.

14. Whether compliance with the proposal as a whole would be technologically and economically feasible for all affected industries, and particularly for employers engaging small numbers of employees.

15. Whether the standard should have a delayed effective date for any industry sector and, if so, the extent to which a phased schedule for compliance would be appropriate.

16. What are the environmental and inflationary impacts of the proposal.

—Important but not exclusive listing.

—Indications of uncertainty?

—Phrase first seen in Lead Proposal.

—Substantial evidence for suspicions.

—Same issues as above.

—Do definitions expand scope to new areas?

—15 minute sampling.

—Some positive features, such as representative monitoring; needs close scrutiny.

—Long list of requirements.

—Needs critique from Physicians and Hygienists.

—To deal with job mobility/latency problem.

—Unquestioned burden must be balanced by long range employer liabilities.

—Needs critique.

—Far reaching employee relations issue; review underway.

—Question not posed in other proposals.

—Not only construction, but maintenance, others, as well.

—Explicit consideration of economics, with small business emphasis.

—Stems from D.C. Court of Appeals edict.

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—Specific procedures outlined herein.

I. Background

A. General

Asbestos is a generic term used to describe a number of naturally occurring fibrous, hydrated mineral silicates that differ in chemical composition. They may be divided into two mineral groups: (1) Pyroxenes, which include chrysotile ($3MgO \cdot 2SiO_2 \cdot 2H_2O$), the type most widely used in U.S. industry; and (2) amphiboles, including amosite ($FeMg_7SiO_{22}$), crocidolite ($NaFe(SiO_3)_2 \cdot FeSiO_3 \cdot H_2O$), tremolite ($Ca_2Mg_5Si_8O_{22}(OH)_2$), anthophyllite ($(MgFe)_7Si_8O_{22}(OH)_2$), an actinolite ($CaO \cdot 3MgFeO \cdot 4SiO_2$). Asbestos fibers are generally characterized by high tensile strength, flexibility, heat and chemical resistance, and favorable frictional properties. Certain grades of asbestos can be carded, spun, and woven, while others can be laid and pressed to form paper, or used for structural reinforcement of materials such as cement, plastic, and asphalt.

Chrysotile (white asbestos) is the fibrous form of the mineral serpentine. It is the most common variety of asbestos, widely distributed geographically, with the largest deposits being in Canada, Russia, and Rhodesia. It accounts for over 90 percent of world consumption. Chrysotile can be readily crushed or fiberized into fine, white, silky fibers which may be processed into numerous products. The fibers have good heat resistance, but are destroyed by acids. Crocidolite (blue asbestos) is another important, although more specialized, form of asbestos. It is the fibrous form of riebeckite, and has fine, resilient fibers of a characteristic blue color. It is mined in South Africa and Australia, and to a lesser extent, in Bolivia. Crocidolite is a strong, fast filtering fiber used especially in the manufacture of asbestos cement sheets and pressure pipes. It is also characterized by its high resistance to acids.

Amosite is the fibrous variety of the mineral grunerite, a ferrous magnesium silicate mined only in South Africa. Amosite can be readily broken down into long, somewhat harsh fibers, with a brownish-yellow to almost white color, depending upon the quality. It is used largely in the production of asbestos cement and heat-insulating products. It is characterized by a good resistance to acids and other chemicals.

Anthophyllite is a magnesium silicate of somewhat variable composition which has rather fragile, brownish or off-white fibers. It is rarer than other types described, but significant quantities have been mined in Finland, Kenya, and other countries. It is used primarily as an inexpensive filler, and for some specialized applications for which good heat or chemical resistance is required.

Tremolite, a calcium magnesium silicate, is often a major component of industrial and commercial talc. It is mined in various parts of the United States including New York, Vermont, and Montana.

Actinolite, a calcium magnesium iron-silicate, is rarely used in industry. It is found in various parts of the world, but its low fiber strength makes it less desirable for industrial use.

— Is this a technically accurate delineation of the scope?

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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 percent were used in non-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 remain 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 industrial workers. However, since the dust exposure to the individual workers 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.

REGULATION OF OCCUPATIONAL EXPOSURE TO ASBESTOS

A standard for occupational exposure 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. 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.

Inflationary impact ...

Accurate figures and descriptions?

Apparent typos indicative of a "rush job".

— Explicit placement of monkey on back of MESA.

— Antecedents of present proposals.

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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 13 January 1972 a proposal for a new permanent asbestos standard was published (37 FR 468), 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 (CADC 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.

Long history of adversary litigation.

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... 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 which OSHA has been directed to consider by the Court, in the interest of providing the Administrator with sufficient information 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.

— Justification/excuse for delayed response to ruling?

— Best defense is good offense?

— Inexcusable partial quote of 6(b)5 of the Act should include "to the extent feasible"!!!

— Must receive thorough review by Physicians.

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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 to be separately coded in the international classification of diseases. It may account for one death in several thousand in the absence of an environmental or occupational asbestos exposure. In some groups of asbestos workers, it may account for one death in ten.

Once established, the other asbestos associated cancers differ little from those occurring in the general population, although there may be variations in the location of the primary site. Appropriate treatment and prognosis follow for the particular tumor. There is very limited long term survival from lung cancer therapy; and only somewhat better from treated cancer of the colon or rectum.

Asbestosis and asbestos cancer—whether it be lung cancer, pleural mesothelioma, peritoneal mesothelioma, cancer of the stomach, colon, rectum—usually do not become clinically evident until more than 30 years have passed from onset of exposure. This time-frame is now widely recognized. While some such cancers may appear during the second decade following onset of occupational exposure, peak incidence is often not noted until the 30-years-from-onset point, or later. This is true both with regular, long-term asbestos work, and following short-term, brief or intermittent exposures. While variations in the time of occurrence may depend upon intensity and duration of exposure, with heavier exposure often being associated with shorter latency periods, variations among individual cases make it impossible to predict the latency period for the risk of any particular worker.

— Needs medical review.

E. PRIOR HISTORY

In 1971, in response to a petition of the Industrial Union Department, AFL-CIO, OSHA considered development of a standard regulating occupational exposure to asbestos. At that time, it had been well established that asbestosis was a major cause of disability and death among workers regularly exposed to asbestos dust in occupational circumstances in the United States, where the principal opportunity for such exposure occurred in the manufacture of asbestos products, and their use (Mancuso and Coulter, 1963; Selikoff, Churg and Hammond, 1964; Selikoff, 1965; Enterline and Kendrick, 1967; Selikoff, Hammond and Churg, 1968). The hazard of lung scarring resulting from the inhalation of asbestos ("asbestosis") had been a continuing problem from the time of its first identification. (Departmental Committee, 1907; Cooke, 1924; Merewether and Price, 1931 and Dreessen, et al, 1938).

— Epidemiological/clinical evidence set forth.

Data suggest that the incidence of asbestosis would be markedly diminished by reduction of occupational exposure to identified levels, in factories and during end product use. The British Occupational Hygiene Society reported in 1968 (Subcommittee on Asbestos, British Occupational Hygiene Society, 1968) that it had been given data by a single large asbestos textile mill which indicated that there was comparatively little clinical and/or roentgenological evidence of asbestosis at this factory in a survey com-

— Key British study.

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pleted in 1946. Recent measurements, using modern fiber-counting methods, were correlated with earlier dust assessments using other techniques. This allowed estimates of 4–15 fibers/ml to be made of worker's exposures since 1943 in the factory (Berry, 1973). These reported data carried considerable weight because information on both exposures and their effects were available. Moreover, all of the 290 individuals examined and x-rayed by the company medical department had been employed for at least 10 years; 112 had been employed for 20 years or more. There had thus been some opportunity to observe the incidence of asbestosis associated with longer exposure to asbestos, a factor of some importance since abnormal findings are often not seen until a significant period of time has elapsed from first exposure.

The Committee of the British Occupational Hygiene Society, in evaluating the information given to it on the recorded exposures in this plant and the infrequency of disease among the workers exposed to dust at these levels, came to the conclusion that, by lowering the permitted level still further, to 2 fibers/ml as a time-weighted average, employees could be permitted to work in such environments for a full working life-time (50 years) without substantial risk of developing asbestosis. It was calculated that workers exposed to 100 fiber-years/ml, that is, to 2 fibers/ml for 50 years, 4 fibers/ml for 25 years, or 10 fibers/ml for 10 years) would have a 1% risk of developing early signs of asbestosis.

The British Committee published in 1968 its report "Hygiene Standards for Chrysotile Asbestos" for the prevention of Asbestosis" in 1968. At the time, there were few data of comparable nature in the United States. While extensive clinical and epidemiological studies of the health effects of asbestos exposure on American workers had been made, comparatively few dust counts had been recorded during the years in which the exposure of these workers had occurred. Moreover, the dust counts that had been taken had utilized techniques other than the new membrane filter counting methods. For these reasons, NIOSH, in its evaluation of considerations relating to a standard for occupational exposure to asbestos (NIOSH, Criteria Document, 1971) stated that the recommendation of the British Occupational Hygiene Society was "given great weight in the development of this standard."

The asbestos standard set by OSHA in 1972 was thus based on a number of well-characterized observations. Lung scarring ("asbestosis") had been described as an important complication of occupational exposure to asbestos during the original descriptions of the problem in Great Britain. It had been found equally important in U.S. studies in the 1930's, and more recent investigations in the 1960's had demonstrated that it had continued as a serious problem. However, from the British Occupational Hygiene Society's evaluation of factory data relating the incidence of disease it appeared that the recognized, continuing important health hazard of asbestosis could be controlled on the basis of current observations.

— Updated background of 1972 standard.

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It was known at the time that asbestosis was not the only disease that could occur as the result of asbestos exposure. Reports were available that workers so exposed were also at increased risk of developing several types of cancer, and these reports had demonstrated that such risks were present during the use of asbestos in the United States, in factory production of asbestos products, and in their subsequent use (Mancuso and Coulter, 1963; Selikoff, Churg and Hammond, 1964; Enterline and Kendrick, 1965). However, these data had not yet been fully evaluated in terms of the extent of risk in large parts of the asbestos industry in the United States and there were few data which would allow judgment concerning intensity and extent of exposure to asbestos in relation to the subsequent risk of asbestos-associated cancer. The British Occupational Hygiene Society's Committee had recognized this problem in Great Britain as well, but developed its standard based on information related to the risk of developing asbestosis, noting in its report (1968) that it was "not possible, at this time, to specify an air concentration which is known will be free of [cancer] risk. In setting its standard, OSHA hoped that reduction of exposure levels designed to prevent asbestosis would also serve to control the hazard of asbestos-associated cancer. In this, it placed considerable reliance on an additional facet of the British experience. Concurrently a published report from the same factory by its medical director and recognized statisticians (Knox, Holmes, Doll and Hill, 1968) had indicated that no significant increase in cancer mortality had been found among workers first employed in this plant subsequent to 1932, when the improved conditions mandated by the 1931 Factory Regulations came into effect.

Conclusions now discarded?

Since the promulgation of the U.S. permanent asbestos standard, considerable new information has been forthcoming on the toxic effects of asbestos. This has been in two areas: in the widening spectrum of cancers associated with asbestos exposure, and in various manifestations of asbestos disease in individuals exposed to relatively low concentrations of dust. This extension of the initial data within recent years now requires refocusing of OSHA's concerns from a primary function of prevention of asbestosis with the expectation of concomitant reduction in the incidence of asbestos-associated cancer, to a new orientation, that of primary concern with the prevention of asbestos-cancer. There is an additional logic in this reorientation. Reduction of asbestos exposure to levels sufficient to prevent asbestosis is known, at least in some instances, to be insufficient to prevent asbestos-cancer. On the other hand, a reduction of asbestos exposure to an extent sufficient to prevent asbestos-associated cancer will also prevent asbestosis.

Reversal of position by OSHA.

Key statements of new intent.

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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 [illegible] or in the [illegible] of the lung [illegible] (Lewinsohn, 1972). There was thus a difference between the prevalence of abnormal x-ray findings among workers x-rayed in 1968 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, Lilis 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.

Due to latency?

Potential area of major concern, if valid.

Example of trans-national factors in OSHA rulemaking.

Rather clear statement.

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In many groups of asbestos workers, approximately 10% 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 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. Calculations suggest that an asbestos worker who smoked cigarettes had 92 times the risk of dying of lung cancer, as compared with non-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.

— Length of time from first exposure.

Critical connection of asbestos and smoking. Needs more emphasis and attention. Employer liability for non-work related hazard?

(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 Enticknap 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.

—Key difference from above.

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, Livernese 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).

—Imprecise statement.

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(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; Lilmes, 1963). 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 (Snell and McGill, 1972; Newhouse, 1973) and neoplasms of the oropharynx (Selikoff, Hammond and Chiurg, 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 experience 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.

Key statement.

Of significant importance, new data have recently been made available concerning the cancer risk of workers of 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 1960 had led to the development of the current standard, as detailed above (Brody, J. E., 1974).

New information on key British study.

Jane Brody, N.Y. Times, #31 in the bibliography.

There are further data indicating the necessity for revaluation of the asbestos standard, albeit less directly derived from asbestos worker exposure. This information is derived from occurrence of asbestos cancer among individuals exposed to low levels of asbestos, as in environmental circumstances, or to brief or intermittent exposures to higher levels.

50100034

Analysis of the history of asbestos exposure among individuals in a large series of cases of mesothelioma in Great Britain and South Africa have provided evidence that brief or intermittent exposure to asbestos may, after the passage of decades, result in mesothelioma (Greenberg and Lloyd Davies, 1974; Webster, 1973). In such circumstances, it appears that the lifetime exposure was less than the 100 fiber-years/ml envisaged by the current standard. The same discrepancy between present projected exposures and the risk of asbestos cancer exists which considering cases of mesothelioma resulting from household contact to asbestos among members of families of asbestos workers (Hilliam-ton, 1974) or among residents living in the vicinity of asbestos plants.

Needs thorough review, potential involvement of EPA, other agencies?

Of considerable industrial importance, has been the recent description of asbestos disease among shipbuilding and ship repair workers, few of whom actually work with asbestos, but many of whom were, in the past, inadvertently exposed to the asbestos dust resulting from the use of asbestos products by a relatively few of their work mates. In 1968, Harries of the Royal Navy reported cases of mesothelioma among shipyard workers at the Royal Navy dockyard in Devonport, in trades which did not directly involve worker exposure to asbestos, but in which there had been occasional opportunity for exposure merely by virtue of working in the same areas. This original finding has been widely confirmed and numerous cases of mesothelioma have since been reported in former shipyard workers (Whitwell and Rawcliffe, 1970; McEwen et al, 1970; Stumphius, 1968; Greenberg and Lloyd Davies, 1974). Studies of populations of current shipyard workers have shown much radiological evidence of asbestos abnormalities among workers in trades only indirectly exposed to asbestos in the yards (Sheers and Templeton, 1968; Fletcher, 1972).

Low level exposure studies.

Gilliam et al (1973), studying the mortality and reviewing the chest x-rays of 439 underground metal miners exposed to an asbestiform mineral, found three times the risk of malignant respiratory disease than expected. The fiber concentrations averaged 0.34 fibers/ml.

Further, evidence has indicated that asbestos also acts as a lung carcinogen at levels much below those which will produce asbestosis. Two surveys of shipyard workers who had x-ray evidence of pleural plaques, but generally not of pulmonary fibrosis, showed a 3.5-fold excess risk of death from lung cancer and high risk of mesothelioma. (Fletcher, 1972; Edge, 1975). In a study of the mortality experience of a large U.S. asbestos products manufacturing facility, it was found that workers in low-dust areas, with a minimum risk of death from asbestosis, had the same high risk of death from various cancers as workers in dustier areas (Nicholson, 1975).

5010035

III. Certain Considerations Concerning Carcinogenicity

In the case of asbestos, we are dealing with a substance that poses a range of health risks to the working population. These include the threat of cancer, as well as asbestosis. In considering the controversial issue of carcinogenicity, OSHA is relying upon not only the new data reviewed above, but the leading scientific principles and opinions believed to reflect the research conclusions of international cancer experts, which were developed since or not known to OSHA at the time that the original standard was promulgated.

Exposition of current public policy dogma on carcinogenicity by OSHA. Key example of need for involvement even by those with no asbestos problem. Must receive intense examination.

Principles, opinions, research conclusions by experts explicitly relied on by OSHA.

A. The Latency of Carcinogenic Effects

In humans, the latency period for chemical carcinogens may well extend between 20 to 40 or more years. Analogous periods exist for test animals. This means that the disease may undergo a long development before a tumor is actually detected. At that point, it has reached a stage where removal of the worker from the workplace may be of no avail and where treatment may be extremely difficult, if not futile. Prudent policy would therefore seem to indicate that every reasonable measure should be taken to eliminate human exposure to chemical compounds as soon as their carcinogenic nature is identified.

In all cases?

Classic statements of "zero exposure" doctrine with few qualifications.

B. Variability in Individual Susceptibility in Relation to the Concept of a Threshold

Cancer development may be influenced by such factors as the differing susceptibility of various body organs. In animal studies it has been found that individual variability in response to carcinogens is great depending upon factors such as age, sex, hormonal status, diet, and genetic factors. Thus, in the working population, certain groups, such as those already biologically compromised, may be more susceptible than other groups.

EEO, other ramifications

C. A "Threshold" Limit

Because of the variability of individual response to carcinogens and other factors, the concept of a "no effect" or "threshold level" may have little real significance on the basis of existing knowledge. While some level, below which exposure to a carcinogen does not cause cancer, may conceivably exist for any one individual, other individuals in the working population may have cancer induced by doses so low as to be effectively zero. This is not to say that researchers will never find a threshold level for a carcinogenic substance, but it does mean that the threshold concept for carcinogens is, at present, more a matter of responsible regulatory policy than a precise, scientific determination.

These theoretical concepts have a bearing on the asbestos issue, particularly as to the question of the existence, or nonexistence, of a threshold level of carcinogenic effect. A "no effect" level theoretically may exist, but it has not been demonstrated.

Crucial statement.

EC150036

In previous rulemaking proceedings, OSHA has considered these issues and determined that in the absence of evidence to establish a safe level on the basis of present knowledge, employee exposure must be reduced as low as feasible. (See the preambles to the carcinogen standards 29 CFR 1910.1003-1016 (39 FR 3758); the vinyl chloride standard 29 CFR 1910.1018 (39 FR 35892); the coke oven emissions proposal (40 FR 32268), and the beryllium proposal.)

OSHA welcomes all views and comments on these subjects.

Reference to proposal not yet published!?

IV. Pertinent Legal Authority

The primary purpose of the Act is to assure, so far as possible, safe and healthful working conditions for every working man and woman. One means prescribed by Congress to achieve this goal is the authority vested in the Secretary of Labor to set mandatory safety and health standards pursuant to Section 6(b) of the Act, 29 U.S.C. 655(b). The standards setting process permits the participation of interested parties in the consideration of medical data, industrial processes and other factors relevant to the identification of hazards and the selection of appropriate control measures. Occupational safety and health standards provide notice of the permitted exposure levels and provide a basis for ensuring the existence of safe and healthful workplaces. Section 6(b)(5) of the Act, 29 U.S.C. 655(b)(5), provides that:

> The Secretary, in promulgating standards dealing with toxic materials or harmful physical agents under this subsection, shall set the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence, 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. Development of standards under this subsection shall be based upon research, demonstrations, experiments and such other information as may be appropriate. In addition to the attainment of the highest degree of health and safety protection for the employee, other considerations shall be the latest available scientific data in the field, the feasibility of the standards, and experience gained under this and other health and safety laws.

Same boilerplate language as in the Lead Proposal.

Sections 2(b) (5) and (6), 20, 21, 22, and 24 of the Act reflect Congress recognition that conclusive medical or scientific evidence, including causative factors, epidemiological studies or dose-response data, may not exist for many toxic materials or harmful physical agents. Nevertheless, standards cannot be postponed because definitive medical or scientific evidence is not currently available. Indeed, while final standards are to be based on the best available evidence, the legislative history makes it clear that "it is not intended that the Secretary be paralyzed by debate surrounding diverse medical opinion." H.Rpt. No. 91-1291, 91st Cong., 2d Session, p. 18 (1970). This Congressional judgment has been supported by the

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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. 3535 (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).

——Same as Lead Proposal.

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.

——Two sources of reliance.

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

5[illegible]38

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. There 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 feasibility 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 20 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 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.

Key statement of scope

§ 1910.1001 Asbestos.

(a) *Scope and application.* This section applies to every place of employment where asbestos or a product containing asbestos is manufactured, processed, packaged, stored, applied, used or otherwise handled. However, this section does not apply to construction work within the scope of § 1910.12 of this part nor to working conditions of employees with respect to which other Federal agencies exercise statutory authority to prescribe or enforce standards or regulations affecting occupational safety or health.

Proposal for construction in the works.

Indication of delayed hearing schedule?

Small business sensitivity.

5010039

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 [illegible] 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.

— Intended principally, but not exclusively, for small business.

— Good opportunity to press performance standards, etc.

Definitions. OSHA believes the present standard's definitions of "asbestos" and "asbestos fiber" should be revised by adding to the existing definition of "asbestos" and phrase "and every product containing any of these minerals", and by substituting the phrase "particulate form of asbestos", for the words "asbestos fibers" in the definition of "asbestos fiber." This reflects OSHA's concern for the morphology and toxicity of the regulated substance rather than its geologic or mineralogic origin. The proposed definition of "asbestos fiber" would also add to the current specification (minimum length 5 micrometers), a minimum aspect ratio of 3 to 1 and a maximum diameter of 5 micrometers. Such a definition is consistent with the one appearing in the "Recommended Procedures for Sampling and Counting Asbestos Fibers (Joint AIHA Vol. 36, No. 2, February 1975, pp. 83-90). In addition, air samples are presently evaluated by OSHA in terms of the concentration of asbestos fibers greater than 5 micrometers in length, and with a length to width aspect ratio of at least 3-to-1. Thus, the definition as revised will set specific parameters for asbestos fibers which are known to be respirable, and which can be counted using phase contrast microscopy.

OSHA is aware of scientific exploration into the area of pathological response to fiber morphology, and is currently working on several projects with other agencies, including NIOSH, to provide additional knowledge of this area.

--Definitions seem to greatly expand scope and-- should be thoroughly evaluated.

(b) *Definitions.* For the purpose of this section—

(1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, and every product containing any of these mineral

(2) "Asbestos fiber" means a particle form of asbestos, longer than 5 micrometers, with a length-to-diameter ratio of at least 3 to 1, and with a maximum diameter of 5 micrometers.

(3) "Emergency" means an unforeseeable and unexpected occurrence likely release airborne concentrations of asbestos fibers in excess of 5 fibers per cubic centimeter of air, such as, but not limited to, failure of equipment or control devices, and rupture of containers.

(4) "Authorized person" means a person required by his duties to enter a regulated area and authorized to do so by his employer, this section, or the Occupational Safety and Health Act of 1970. The phrase includes a representative of employees who is designated to observe monitoring procedures.

(5) "Assistant Secretary" means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or any of his designees.

(6) "Director" means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare, or any of its designees.

50[illegible]40

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 appropriateness of a phased schedule for compliance with any new exposure level, based on such feasibility factors. In this respect, OSHA particularly invites comments on the structure of the asbestos industry generally including factors distinguishing particular sub-industries in terms of methods of asbestos use and capabilities of compliance.

Sampling of Ceiling Concentrations. The proposal provides for a sampling period up to 15 minutes for the determination of ceiling concentrations. The present standard contains no time parameters for measurement of the ceiling limit. A period of up to fifteen minutes is proposed because it has been found to be practical and is currently used by OSHA in determining compliance.

NOTE ABSENCE OF ACTION LEVEL. No explanation given.

Memo must be made part of public record.

New proposed levels will severely test scientific and technological capabilities.

Public Health Service doctrine.

As different from Lead Proposal, explicit recognition of economic factors in feasibility.

Some recognition of the complexities of the product distribution chain.

Cuts ceiling in half from present standard.

(c) *Permissible exposure to a*
concentrations of asbestos fibers—
hour time-weighted average conc
tion. No employee may be exposed
8-hour time-weighted average a
concentration of asbestos fibers in
of 0.5 fiber per cubic centimet
500,000 fibers per cubic meter) a
determined on the basis of a
work week and by the method pre
in paragraph (g)(2) of this sect

(2) *Ceiling concentration.* No emp
may be exposed to airborne concen
tions of asbestos fibers in excess
fibers per cubic centimeter (or 5 mi
fibers per cubic meter) of air, as d
mined over a period up to 15 minute
the method prescribed in paragr
(g)(2) of this section.

S01500041

Regulated areas. The proposal requires that regulated areas be established, that access be limited to authorized persons, and that a roster of persons authorized to enter be made daily and maintained for at least 40 years, or for the duration of employment plus 20 years, whichever is longer. One purpose of establishing regulated areas is to limit the exposure to as few people as possible. OSHA recognizes that in certain non-fixed workplaces this requirement would pose special problems. Therefore, comments relating to alternative procedures applicable to affected employers would be welcomed.

-Daily roster

Again, note no action level.

-Yet another request and opportunity for input.

(d) *Regulated areas.* Any work area where a person may be exposed to airborne concentrations of asbestos fibers in excess of either of the limits imposed by paragraph (c) of this section shall be designated a regulated area. Only authorized persons may be allowed to enter such an area. A daily roster of all persons entering a regulated area shall be made and maintained.

Monitoring Procedure. The proposal also revises monitoring requirements for initial occupational exposure to asbestos, and increases the frequency for subsequent monitoring in order to provide a more adequate basis for relating employee's health records to their exposure levels. The adoption of this proposal would revoke the current specific requirements for both personal and environmental monitoring as well as the specific provisions for the collection of samples. Such revocation, and the permission to discontinue monitoring after two consecutive measurements below the permissible exposure levels would allow the exercise of some judgment as to when and how monitoring would have to be performed. An employer would be expected to exercise this judgment with an adequate appreciation of the purpose of monitoring, and the possible grave consequences of over-exposure.

Adoption of performance concept; certain to draw fire from organized labor, but should be strongly supported.

(e) *Monitoring.* The purpose of monitoring required by this paragraph to measure accurately the airborne concentrations of asbestos fibers in a workplace to which employees would be exposed if they worked in the area without the use of personal protective equipment such as respirators. Monitoring shall be performed in a manner reasonably calculated to satisfy this purpose. It may not be necessary to monitor every employee exposed to airborne concentrations of asbestos fibers in order to meet the purposes of this paragraph. For instance, the employer, or his working locations likely to be exposed to the highest airborne concentration of asbestos fibers in a work area may be deemed representative of all the employees in the area. An employee in one shift may be deemed a representative of all employees in other shifts who, because they perform the same operation or are stationary in the same area, or for other relevant reasons, may reasonably be considered to have the same level of exposure as the representative employee. However, the results of a monitoring of a representative employee shall be deemed to apply, and to indicate the exposure level of, all employees represented.

Cuts both ways -

5013042

No action level -

Unclear useage of three similar but different words; monitoring, measuring, determination.-

Statutory requirement of 8(c)(3).

(1) *Initial.* Every employer sh
every place of employment whe
tos fibers may be released to be m
in such a manner as to determin
er employees are exposed to co
tions of asbestos fibers in excess
of the two limits prescribed in pa
(a) of this section. If either lim
ceeded, the employer shall imm
undertake a compliance progra
cordance with paragraph (f)
section.

(2) *Frequency.* (i) If monitori
that an employee's exposure t
either limit prescribed in paragr
of this section, the monitoring
repeated every month, except a
wise provided in paragraph (
of this section.

(ii) If monitoring shows that
ployee's exposure is below bot
prescribed in paragraph (a) of t
tion, the monitoring shall be r
every three months, except as o
provided in paragraph (e)(2)(i
(2)(iii), or (e)(2)(iv) of this sec

(iii) If two consecutive moni
made at least 5 days, but no
than 7 months apart, show that
ployee's exposure is, below both
prescribed in paragraph (a) of t
tion, monitoring need not be re
except as otherwise provided in
graph (e)(2)(iv) of this section.

(iv) Whenever an employer has
to believe that an employee's e
exposure has changed because
change in production, process, co
or other relevant factors, the em
shall be monitored as soon as prac
and thereafter paragraphs (e)(2)
(2)(ii), or (e)(2)(iii) shall apply.

(3) *Method of measurement.* A
terminations of airborne concentr
of asbestos fibers shall be made b
membrane filter method at 400-
(magnification) (4 millimeter obje
with phase contrast illumination.

(4) *Employee notification.* (i) W
five (5) working days after the r
of the measurement results, the em
shall notify each employee in writ
the results concerning the empl
exposure.

(ii) Where the results reveal an
ployee's exposure to be above eit
the permissible exposure limits,
notification shall also include a
ment of the corrective action being
to reduce exposure to or below the
missible exposure limits.

Performance statement-
but then:

Virtually unchanged
from Arsenic Proposal
1/21/75.

What is difference in
"lowest practicable"
and "lowest possible"?

Interesting exception -

New heights of speci-
fication.

Raises real question on
procedure.

(f) *Methods of compliance.* Employe exposure to asbestos fibers shall be con trolled to or below the permissible ex posure limits by engineering controls work practices, and personal protection controls.

(1) *Engineering and work practice controls.* Engineering controls shall be instituted immediately to reduce employee exposure to or below the permissible exposure limits, except to the extent tha such controls are not feasible. Wher engineering controls which can be instituted immediately are not sufficien to reduce exposure to or below the per missible exposure limits, they shall nonetheless be used to reduce exposure to the lowest practicable level, and shall be supplemented by the use of work practice controls.

(2) *Personal protection controls.* Where engineering and work practice controls are not sufficient to reduce employee exposure to or below the permissible exposure limits, they shall nonetheless be used to reduce exposure to the lowest possible level, and shall be supplemented by the use of respirators, in accordance with paragraph (g) of this section.

(3) *Particular tools.* All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (c) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems.

(4) *Work practices.* (i) *Wet methods.* Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (c) of this section, unless the usefulness of the product would be diminished thereby.

(ii) *Particular products and operations.* (A) No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (c) of this section. (B) Employees engaged in the spraying of asbestos, and in the removal of asbestos insulation or coverings shall be provided with respiratory equipment and protective clothing in accordance with paragraph (g) of this section.

(5) *Local exhaust ventilation.* Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1971, which is incorporated by reference herein. (See § 1910.6 of this part concerning the availability of ANSI Z9.2-1971, and the maintenance of a historic file in connection therewith.)

(6) *Mechanical ventilation.* When mechanical ventilation is used to control exposure, measurements which demon-

Similar to Ketones --

Yet another written program.

Far more specific than any previous requirement.

Rather broad

Similar to previous proposals.

Example of standards to standard spillover.

Open for discussion

Raises same issues as Lead Proposal, and other previous proposals.

Respirators. The proposal revises the requirements for respirators, referencing NIOSH as the current approving authority and listing those respirators allowed for various air concentrations based on known protection factors. This is consistent with the selection of respirators recently developed for use in the Joint OSHA-NIOSH Standards Completion Project. The proposed revision will not render any existing respirators obsolete, but rather will enable a greater variety of respirators to be used under different conditions of exposure.

strate the effectiveness of the syster control the exposure, such as pre velocity, duct velocity, or static press shall be made at least every 3 mon Measurements of the system's effect ness to control exposure shall also made within 5 days of any change production, process, or control wh might result in any change in emplo exposure.

(7) *Compliance program.* (i) E employer shall establish and implem a written program to reduce expos to or below the permissible exposure l its solely by means of engineering work practice controls.

(ii) The written program shall clude:

(A) A description of each exposed eration, e.g., crew size, operating cedures, and maintenance practices

(B) Engineering plans and stu used to determine the controls for operation;

(C) A report of the technology c sidered in meeting the permissible posure limits;

(D) Monitoring data;

(E) A detailed schedule for im mentation of the engineering con and work practices that cannot be plemented immediately, as well as for development and implementation of additional engineering and work pr tices necessary to meet the permissi exposure limits;

(F) Other relevant information.

(iii) Written plans for compliance grams shall be submitted, upon req to the Assistant Secretary and Direc and shall be available at the worksite examination and copying by the Ass ant Secretary and the Director. W written plans shall be revised and dated at least every six months to ref the current status of the program.

(g) *Respiratory protection.* (1) Respirators shall be used where requ under this section. Compliance with permissible exposure limits may no achieved by the use of respira except:

(i) During the time period nece to install engineering or work prac controls; or

(ii) In work situations in which gineering controls and supplemen work practice controls are insufficien reduce exposure to or below the per sible exposure limits; or

(iii) In emergencies.

(2) *Selection.* Where respirators permitted by this section, the emplo shall select them from among those proved by the National Institute for cupational Safety and Health, U.S. partment of Health, Education, and W fare, pursuant to 30 CFR Part 11, an accordance with Table I set out belo

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 with a full facepiece in pres (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 res a full facepiece operated demand or other positive pr or with a full facepiece, hoo operated in continuous flow
Up to 1,000 times the applicable exposure limit prescribed in paragraph (c) of this section.	(A) A type C supplied air resp ated in pressure-demand or tive pressure or continuous or (B) A powered air purifyir with a high efficiency partic (C) self contained breathin in pressure demand (positi mode.
Up to 50 times the applicable exposure limit prescribed in paragraph (c) of this section.	(A) A high efficiency partic respirator with a full facepi Any supplied air respirator facepiece; or (C) Any sel breathing apparatus with a piece.
Up to 10 times the applicable exposure limit prescribed in paragraph (c) of this section.	(A) Any air purifying respi replaceable particulate filt Any single use respirator wit out valve; or (C) Any fi respirator; or (D) Any self breathing apparatus.

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

Job Reassignment. The proposal also retains a provision from the existing standard (29 CFR 1910.1001(d)(3)(iv)(a)) which requires job rotation or transfer without loss of pay (where such positions are available) for employees found unable to function normally as a result of having to wear one of the prescribed respirators. OSHA is aware that the concept has been the subject of considerable controversy. However, actual labor management experience as to the operation of this provision has yet to be reviewed by OSHA. Therefore, OSHA would welcome comments from interested parties concerning not only the effectiveness of this provision, but as to the relative merits of the concept itself. Based on the receipt of such information, OSHA will reconsider the provision's applicability and scope. If warranted, OSHA may consider job reassignment based on medical unsuitability, per se, as the subject for a separate rulemaking procedure.

Of major employee relations significance as precedent,

Separate inquiry by ORC underway,

When in doubt, stick it in???

seems preferable,

Slight change in wording from 1910.1001 (d)(2)(iv)(a); Addition of "to the maximum extent possible" and deletion "if such a different position is available", except for parenthetical reference in the preamble.

(3) ***Respirator program.*** (i) ters shall be used and maintai cordance with § 1910.134 (a) this part.

(ii) The employer shall i respiratory protection progra cordance with § 1910.134(b) of

(iii) Employees who wear r shall be allowed to leave work wash their face and respirator to prevent skin irritation that for use.

(iv) No employee shall be as tasks requiring the use of a res based upon his most recent exa an examining physician has de that the employee would be u function normally while wearin pirator, or that the safety or h the employee or other employee impaired by his use of a respir the maximum extent possible, a ployee shall be rotated to anothe given the opportunity to trans different position, whose duties h to perform, with the same em in the same geographical area a the same seniority, status, and pay he had just prior to such tran

Different from previous - proposals "shall ensure"?

More often?

Similar in most respects to present standard.

(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 (b) 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.

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.

- Gum, chewing tobacco ?

(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 area.

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

Refusal of Medical Exams. The proposed revision also contains a procedure to be followed by the employer in the event that an employee refuses to undergo any medical examination which must be offered. The procedure involves informing the employee of the potential risks that are incurred by his refusal to be examined and obtaining a signed statement from the employee repeating to the fact that the employee has been informed of the potential risks, but still does not wish to be examined. It is not OSHA's intent to encourage employees to avoid medical examinations. On the contrary, OSHA believes that positive action taken by the employer to inform employees of the risks involved will encourage employees to undergo such examinations.

As pointed out previously, does not hold legal water beyond OSHA, in terms of other liabilities.

Diagnostic Testing. The proposal also adds sputum cytology as a diagnostic test. The use of sputum cytology is proposed only for those workers who are 45 years of age or older or who have been employed in occupations involving exposure to asbestos 10 years or more. Although there has been some concern as to the value of sputum cytology, OSHA believes its usage for special high risk groups can be beneficial.

Discussed in detail at N.Y. Academy of Science Meeting March, 1975.

Entire Medical Surveillance procedure should be reviewed and critiqued by the physicians.

(j) ***Medical surveillance.*** (1) Every employer shall provide available at his cost medical e tions relative to exposure to ash required by this paragraph. If ployee refuses a medical exa provided in accordance with th graph, the employer shall ins employee of the possible ad quences of such refusal, and ob a signed statement from the e stating that such employee has formed of the consequences a to be examined.

(2) ***Preplacement.*** The employ provide or make available to eac employees, within 30 calendar d lowing his first employment in exposed to airborne concentrat asbestos fibers, a comprehensive examination. Such examinatio include, as a minimum, a chest roentgenogram (posterior-anterior 1 inches), a history to elicit symp respiratory disease, pulmonary f tests to include forced vital c (FVC) and forced expiratory vol 1 second ($FEV_{1.0}$), and for em with 10 or more years of expo airborne concentrations of asbesto or who are 45 years of age or sputum cytology examination.

(3) ***Annual.*** Every employer sha vide or make available compre medical examinations in accor employees exposed to airborne c trations of asbestos fibers at le nually. Such examination shall i as a minimum, a chest roentgen (posterior-anterior 14 x 17 inch history to elicit symptoms of respi disease, pulmonary function tests clude forced vital capacity (FVC forced expiratory volume at 1 s ($FEV_{1.0}$) and, for employees with more years of exposure to airborn centrations of asbestos fibers or w 45 years of age or older, a sputum ogy examination.

(4) ***Termination of employment.*** employer shall provide or make ava within 30 calendar days before or termination of employment of an ployee exposed to airborne conce tions of asbestos fibers, a comprehe medical examination. Such examin shall include, as a minimum, a roentgenogram (posterior-anterior 14 inches), a history to elicit symp of respiratory disease, pulmonary tion tests to include forced vital c ity (FVC) and forced expiratory vo at 1 second ($FEV_{1.0}$) and, for empl with 10 or more years of exposure to borne concentrations of asbestos f or who are 45 years of age or old sputum cytology examination.

(5) *Recent examinations.* No
examination is required of any e
if adequate records show that
ployee has been examined in acc
with this paragraph within the
year period.

(6) *Physician's written opin*
With respect to each examina
quired by this paragraph, the e
shall obtain a written opinion f
examining physician, containi
following:

(A) The physician's opinion
whether the examined employee
medical conditions which woul
the employee at increased risk o
rial impairment of his or her hea
exposure to asbestos fibers, or
would, directly or indirectly, be
vated by such exposure;

(B) Any recommended lim
upon the employee's exposure to
fibers, or upon the use of pr
clothing and equipment, such as
tors; and

(C) A statement that the emplo
been informed by the physician
medical conditions which requi
ther examination or treatment.

(ii) The written opinion shall
veal specific findings or diagno
related to occupational exposure
bestos fibers.

(iii) A copy of the written
shall be provided to the affect
ployee.

Covers sensitive employees.

(7) *Withdrawal from expos*
employee shall be exposed to
fibers in such a way as would
employee at increased risk of n
impairment of his or her healt
such exposure. This determinati
be based on the physician's writte
ion.

Employee Information and Training. Information and training are essential for the protection of employees, because employees can do much to protect themselves if they are informed of the nature of the hazards in the workplace. To be effective, however, an employer education system must apprise employees of the specific hazards associated with the work environment. For this reason, the 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.

Similar to previous proposals.

(k) *Employee information an*
ing. (1) *Training program.* (i) Ev
ployer shall provide a training p
for employees assigned to re
areas.

(ii) The training program s
provided at the time of initial
ment and at least annually the
and shall include informing ea
ployee of:

(A) The specific nature of the
tions which could result in expo
asbestos fibers as well as any ne
protective steps;

(B) The engineering control
work practices associated with t
ployee's job assignment;

(C) The purpose, proper use, a
itations of respiratory protection
ment as specified in § 1910.134 (
and (f) of this part;

(D) The purpose for, and a d
tion of, the medical surveillance p
required by paragraph (x) of th
tion; and

(E) A review of this standard.

(2) *Access to training materi*
A copy of this standard and its
dixes shall be made readily avail
all employees working in regulated

(ii) All materials relating to t
ployee information and trainin
gram shall be provided upon req
the Assistant Secretary and the D

5022 0019

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.

Absurd specification in old standard but not in all other carcinogen standards.

Product labeling?

Why performance language here and not for signs?

Virtually identical with old standard.

(l) *Danger signs and labels.* (1) *Danger signs.* (i) *Posting.* Signs shall vided and displayed at each re area. Signs shall be posted at suc tance from such an area that ployee may read the signs and ta essary protective steps before c the area marked by the signs.

(ii) *Sign specifications.* The sig display the following legend, wit sizes and styles of a visibility equal to the following:

Legend	Notat
Asbestos	1 inch s if, ge block.
Cancer hazard.....	3/4 inch s if, ge block.
Avoid breathing dust...	1/2 inch g
Wear assigned protective equipment	Do.
Do not remain in area unless your work requires it.	Do.

Spacing between lines shall be a equal to the height of the upper two lines.

(2) *Danger labels.* (i) *Labeling.* shall be affixed to all raw material tures, scrap, waste, debris, and products containing asbestos fibers their containers, except that no is required where asbestos fibers been modified by a bonding agent ing, binder, or other material s during any reasonably forseeabl handling, storage, disposal, proc or transportation, no airborne co trations of asbestos fibers in exc the exposure limits prescribed in graph (c) of this section will be rel

(ii) *Specifications.* Labels sha printed in letters of sufficient siz contrast as to be readily visible and ble. The label shall state:

DANGER

Cancer Hazard

Contains Asbestos Fibers

Avoid Creating Dust

(3) *Prohibition of contrary state* No statement may appear on or nec sign or label required by this para which would contradict or detract the sign or label.

(m) *Housekeeping.* (1) *Cleanin* exposed surfaces in any place of em ment shall be maintained free of mulations of asbestos fibers if thei persion would create an airborne centration in excess of the exp limits prescribed in paragraph t this section.

(2) *Waste disposal.* Asbestos w scrap, debris, bags, containers, c ment, and asbestos-contaminated c ing, consigned for disposal, which produce in any reasonably forse use, handling, storage, processing, posal, or transportation airborne centrations of asbestos fibers in c of the exposure limits prescribed in graph (c) of this section shall be lected and disposed of in sealed im meable bags, or other closed, impe able containers.

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Recordkeeping. OSHA proposes to extend the period for employer retention of monitoring records from three years to forty years, or for the duration of employment plus twenty years, whichever is longer. As the Court in *Industrial Union Department, AFL-CIO, supra,* 499 F. 2d at 487 pointed out, although the existing three-year period is adequate for OSHA's enforcement purposes, it may not be sufficient for the development of essential data regarding the causes of asbestos related diseases, some of which appear to have latency periods of up to forty years. The extended period for retention, with resultant data accumulation, will be vital to epidemiological and diagnostic investigations to determine such things as dose-response relationships in diseases caused by exposure to asbestos.

Court edict

For the next generation

OSHA believes that it is essential to such scientific investigations that both medical and monitoring records be retained for a similar period of time. Therefore, OSHA has proposed that the retention period for employee medical records be extended from the present twenty years to a period commensurate with that for monitoring records, i.e., forty years, or for the duration monitoring records, i.e., forty years, or for the duration of employment plus twenty years, whichever is longer.

The proposal also outlines specific items of data which would be recorded with regard to employee exposure monitoring and medical examinations. OSHA views these requirements as the minimum necessary to develop the cause relationships between exposures and pathology. OSHA believes these modifications to be consistent with the Court's direction, as well as with the recordkeeping requirements of section 8(c) of the Act, 29 U.S.C. 657(c).

The proposal would also add a requirement concerning the transfer of monitoring and medical records (1) when one employer succeeds another, or when an employer ceases to do business, without a successor. An employer succeeding another would be required to receive and maintain those records which the predecessor would have been required to keep. Employers terminating their businesses without successors would be required to send their records to OSH.

Lead includes:
Time factor
and
"evidence of
their accuracy"

Recordkeeping provisions raise the same issues as in Lead Proposal with slight variations.

Lead states two years.

Lead states one year.

(n) *Recordkeeping.* (1) *Exposure records.* Every employer shall make an accurate record of every monitoring of employee exposure as required in paragraph (e) of this section.

(i) The record shall include:

(A) Date of monitoring;

(B) Operation involving exposure to asbestos fibers;

(C) Sampling and analytical methods used;

(D) Number, duration, and results of samples taken;

(E) Type of protective devices worn, if any; and

(F) Names, social security numbers, job titles, and exposure levels of all employees monitored.

(ii) Each record of an employee's exposure shall be maintained for at least 40 years, or for the duration of the employee's employment plus 20 years, whichever period is longer.

(2) *Medical records.* The employer shall keep an accurate medical record for each employee subject to medical surveillance required by paragraph (j) of this section.

(i) A record shall include:

(A) Physician's written opinion;

(B) Any employee medical complaint related to exposure to asbestos;

(C) A signed statement of any refusal to be examined, in accordance with paragraph (j)(i) this section.

(ii) Each record shall be maintained for at least 40 years, or for the duration of the employee's employment plus 20 years, whichever period is longer.

(3) *Mechanical ventilation measurements.* When mechanical ventilation is used as an engineering control, the employer shall maintain a record of the measurements demonstrating the effectiveness of such ventilation, as required by paragraph (f)(6) of this section.

(i) The record shall include:

(A) Date and location of measurements;

(B) Type of measurements taken; and

(C) Result of measurements;

(ii) Each record shall be maintained for at least 3 years.

(4) *Employee training.* The employer shall keep an accurate record of all employee training required by paragraph (k) of this section.

(i) The record shall include:

(A) Date of training;

(B) Name, social security number and job title of employee trained;

(C) Content or scope of training provided; and

(D) Identification of materials distributed to the employee.

(ii) Each record shall be maintained for at least 3 years.

(5) *Rosters.* Each roster required by paragraph (d) of this section shall be maintained for at least 40 years or for the duration of the personnel's employment plus 20 years, whichever period is longer.

(6) *Availability.* (i) All records required to be maintained by this section shall be made available, upon request, to the Assistant Secretary and the Director for examination and copying.

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 workpractices for clean-up operations. Two guides for workpractices 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.

Not registered mail, as in Lead?

Thorough critique must be given, including answer to question in preamble of conceptual propriety.

(ii) Employee exposure meas records required by this paragr be made available for examina copying to employees, former e and their designated representa

(iii) Employee medical rec quired by this paragraph shall available upon request for exa and copying to a physician de by the employee or former emp

(7) *Transfer of records.* (i) event the employer ceases to do the successor shall receive and records required to be maintaine paragraph.

(ii) In the event the employe to do business and there is no to receive and retain his records prescribed period, these records transmitted by mail to the Direc each employee and former emplo be individually notified in writin transfer.

(a) *Observation of monitori Employee observation.* The e shall give employees or their rep tives an opportunity to obser measuring or monitoring of thei sure to asbestos fibers conducted ant to this section.

(2) *Observation Procedures.* (i) observation of the measuring or m ing of employee exposure to asbe bers requires entry into an area the use of personal protective equ is required, the observer shall b vided with and required to u equipment and shall comply w other applicable safety and healt cedures.

(ii) Without interfering wit measurement, observers shall be p to receive an explanation of the toring or measurement proce observe all steps related to the me ments and record the results obta

(p) *Appendices.* The information tained in the appendices to this s is not intended, by itself, to crea additional obligations not otherwi posed, or to detract from any ex obligation.

APPENDIX A—SUBSTANCE SAFETY DATA—

Asbestos

I. SUBSTANCE IDENTIFICATION

A. Substance: Asbestos

For purposes of the asbestos standa bestos is identified as including the f ing hydrated silicates: chrysotile, am crocidolite, tremolite, anthophyllite an tinolite.

B. Permissible airborne exposures

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

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

C. Description

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

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II. HEALTH HAZARD DATA

A. General

Asbestos poses a hazard as an ai
nant. Tissue pathology may be a
site of retained fine asbestos fi
have been inhaled.

B. Asbestosis

A lung disorder characterized by
interstitial fibrosis at times inclu
ral changes of fibrosis and calcific
companying clinical changes ma
fine rale, and dyspnea, finger clut
cyanosis. Many of the people expo
bestos fibers develop asbestosis if
concentration is high or the du
their exposure is long. In general
a considerable time lapse betwee
tion of the fibers and the appe
changes as determined by x-ray.

C. Neoplasms

Neoplasms, such as mesothelio
occur without radiological evidence
ists at exposure levels lower than
quired for prevention of radiologic
dent asbestosis.

III. RESPIRATORS AND PROTECTIVE C

A. Respiratory

You must wear a respirator when
are in an atmosphere where asbes
concentrations exceed the permissib
However, respirators can only be
for routine use if your employer i
process of installing controls, or in s
where these controls cannot feasibl
exposure levels to within permissib
If respirators are worn, they must be
in accordance with Table 1 of the
standard and have a National Insti
Occupational Safety and Health
seal of approval. If you experience
breathing while wearing a respira
your employer.

B. Clothing

The purpose of wearing protectiv
ing is to prevent additional exposur
would result from asbestos dust fi
sonal clothing and/or the body, be
airborne. It is essential that contam
clothing be removed and handled in
way that the dust will not become a
and inhaled.

IV. PRECAUTIONS FOR SAFE USE AND
HANDLING

Perform all operations in a manner
will keep the amount of dust which
airborne and potentially inhaled to
solute minimum. Follow the requir
of the asbestos standard regarding en
ing controls, regulated areas, work pr
respiratory protection and protective
ing. Special work practices may be de
for your particular operations. Find ou
they are and follow them. If you not
erations which may be exposing you or
to asbestos dust, tell your supervisor.

Appendix B—Substance Technic
Guidelines

Asbestos

I. PHYSICAL AND CHEMICAL DATA

A. Identification

Asbestos includes several different hy
silicates, all fibrous minerals.

B. Minerals named in the asbestos st

Chrysotile, amosite, crocidolite, tre
anthophyllite and actinolite.

C. Physical characteristics

Asbestos fibers generally have high
strength, flexibility, heat and chemic

Thorough critique needed.

5005053

Thorough critique needed.

SC15-0034

sistance and good frictional p
Characteristics vary with the mine
(1) Chrysotile, the fibrous form of
tite, is the most common variety of
It can be crushed into fine, whit
fibers. It has high heat resistance p
stroyed by acids.
(2) Crocidolite, the fibrous form
ocklite, has fine resilient blue-gra
fibers are strong and resist acids.
(3) Amosite, the fibrous variety of
ite, can be broken down into long to
harsh fibers, brownish-yellow to w
ular. It is characterized by good re
to acids and other chemicals.
(4) Anthophyllite has rather
brownish or off-white fibers with go
and chemical resistance.
(5) Tremolite (a calcium magnesiu
cate) fibers have low tensile strength, r
them undesirable for many industrial
pications. It is often a major component
dustrial and commercial talc.
(6) Actinolite (a calcium magnesiu
silicate) fibers, like tremolite fibers, ha
tensile strength so that industrial
limited.

II. CLEAN-UP OF ASBESTOS AND CONTAMINA
AREAS

A. Clean-up of asbestos and asbestos
taining materials must be done in a m
which will not result in employee expo
asbestos dust. Do not dry sweep, bl
otherwise move the material so that it
become airborne. Wet the material b
handling when possible. If loose mat
must be cleaned up dry, use vacuum c
ning or other methods which will keep
under control.
B. Employees involved in clean up op
tions should be restricted from the
until clean up has been completed.
C. Employees involved in clean up op
tions should wear respiratory protect
specified in Table 1 of the asbestos stan
when air concentrations are unknown. W
air concentrations are known, select ap
priate respirators from Table 1 of
asbestos standard.
D. Enclose waste asbestos materials in c
tainers which are impermeable to asbes
fibers and dispose of in a manner which
not result in subsequent exposures.

IV. SAMPLING AND MEASUREMENT PROCEDU

A. General

Measurements taken for the purpose of d
termining employee exposure are best tak
in a fashion such that the average e
exposure may be determined from a sing
sample or two (2) random samples. Sho
time interval samples (up to 30 minute
may also be used to determine the averag
exposure level if a minimum of five (5
measurements are taken in random manne
over the 8-hour work shift. Random sam
pling means that any portion of the wor
shift has the same chance of being sample
as any other. The arithmetic average of a
such random samples taken on one (1) work
shift is an estimate of an employee's average
level of exposure for that workshift. A
samples should be taken in the employee's
breathing zone (air that would most nearl
represent that inhaled by the employee).
The concentration of dust in the air i
which a worker is exposed will vary, depend
ing upon the nature of the operation and
upon the type of work performed by the
operator and the position of the operato
relative to the source of the dust. The
amounts of dust inhaled by a worker can
vary daily, seasonally, and with the weather.
In order to obtain representative samples
of workers' exposure, it is necessary to col
lect samples under varying conditions of

Thorough critique needed.

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

The percentage of working time
different tasks will affect the conc
of dust the worker inhales since
ferent tasks usually result in ex
different concentrations. The perce
be determined from work schedule
observation of work routines

The concentration of any air con
resulting from an industrial opera
varies with time. Therefore, a lon
pling time will better approximate t
average.

With the following recommended
procedure, it is possible to collect
at the workers' breathing zones fo
from 4 to 8 hours, thus permitting t
ation of average exposures for a ha
8-hour shift—a desirable and reco
procedure. Furthermore, dust expos
more normal work pattern result
use of personal samplers.

E. Recommended method

The recommended sampling and
tion method is described in a paper
NIOSH Membrane Filter Method fo
ating Airborne Asbestos Fibers" by
Leidel, Stephen Q. Bayer and Ralph
mualdo, U.S. Department of Health
tion, and Welfare, Public Health
Center for Disease Control, Nation
tute for Occupational Safety and
Cincinnati, Ohio 45202 (in press).
summary is given below.

Samples are collected by dra
through a cellulose ester membrane
means of a battery powered perso
pling pump. The filter, after collecti
sample, is transformed from an opa
to a transparent, optically homoge
The fibers are sized and counted b
contrast microscopy at 400-450X m
tion.

V. WORK PRACTICES FOR CERTAIN OPER

Work practices for certain work i
asbestos follow as enclosures to
pendix.

They are advisory in nature and
intended to create any additional
tions not otherwise imposed by the
or to detract from any existing ob

ENCLOSURE I

LOADING, UNLOADING AND STORAGE AS CARGO

(a) Prior to unloading bags or ot
tainer of asbestos fiber from a railca
ship, or other carrier, make a visual
tion of the cargo and cargo space t
mine if leakage or spillage of asbest
has occurred and the extent of loose
and dust present, if any.

(b) If the cargo has not been damag
there is no visible loose asbestos fiber
on the cargo or in the cargo space,
ing and transport to storage or anot
rier may proceed normally. Handle a
asbestos fiber which is in sealed bags
closed containers impermeable to
fiber in a manner that will minim
damage that could create an exposu
lem.

Thorough critique needed.

(c) If visual inspection of cargo
space reveals bag or other containe
or loose asbestos fiber or dust at
do not proceed with unloading of c
precautions have been taken to
employee exposure.

(d) Collect any loose asbestos
dust found in the process of unlo
in the storage area, by vacuum cl
other suitable methods that do not
selves produce air concentrations
those prescribed in paragraph (b) o
bestos standard, and dispose of it
bags or other closed containers imp
to asbestos fiber. Do not clean up a
blowing or dry sweeping. Repair
bags or other containers by taping
sorting into bags or other conta
permeable to asbestos fibers. Make t
edies before transporting the ba
container to storage or use point

(e) If it is known that railcars
ships or other carriers have conta
bestos as their last cargo, inspect t
and clean up any visible asbestos
dust, prior to loading the next cargo, to ensure that no residue of asbe
and dust will contaminate the subs
go.

(f) If the airborne concentrations
tos fibers to which employees are
during asbestos cargo loading, unlo
storage are unknown select any
from Table 1 of the asbestos for
use. During clean-up operations in
storage areas where airborne concen
of asbestos fibers are unknown have
ees wear respirators selected from T
the Asbestos standard which provi
to 50 times or more of the limits in p
(b) of the asbestos standard. W
concentrations are known have e
wear appropriate respirators as sp
Table 1 of the asbestos standard.

(g) Special clothing is to be pro
employees engaged in loading u
and storage of asbestos cargo when
ing of such clothing is required by p
(d)(3) of the asbestos standard.

ENCLOSURE II

INTRODUCTION OF ASBESTOS FIBER
MANUFACTURING PROCESSES

(a) Conduct production operation
ing introduction of asbestos fiber int
ess under dust controlled conditio
that employees are not exposed to
trations of asbestos fiber above the
limits prescribed in paragraph (b)
asbestos standard.

(b) In those operations where bu
bestos fiber is being used, ensure
fiber bags arrive at the work station
condition, free of loose fiber on the
face. If the bags are stacked on pal
pallets must be clean and free of loo

(c) Place empty bags or other pa
which have contained asbestos fi
closed or sealed containers impermea
asbestos fibers until disposed of by
that do not create airborne concen
in excess of the exposure limits pr
in paragraph (b) of the asbestos st

Page 056

Must be thoroughly evaluated by physicians.

Barely beat original deadline.

APPENDIX C—MEDICAL SURVEIL
GUIDELINES

I. ROUTE OF ENTRY

Inhalation.

II. TOXICOLOGY

A. Exposure to asbestos dust may
asbestosis if the dust concentratio
or the duration of exposure is fon
eral, there is a considerable time
tween inhalation of the dust and
pearance of changes as determined
Asbestosis is characterized by:

1. A pattern of roentgenographi
consistent with diffuse interstitial
variable degree and, at times, pleur
of fibrosis and calcification.

2. Clinical changes including fine
finger clubbing. These may be p
absent in any individual case.

3. Physiological changes consist
a lung disorder.

B. *Neoplasms*

Neoplasms, such as mesothelioma
sur without radiological evidence
tosis at exposure levels lower than
quired for prevention of radiologi
dent asbestosis.

III. SPECIAL TESTS

A. Chest roentgenographs.
B. Lung function tests.
1. Forced vital capacity.
2. Forced respiratory volume at
3. Sputum cytology.

VI. SURVEILLANCE AND PREVENTI
CONSIDERATIONS

A. Preplacement

A routine medical examination an
plete medical and work history are
to be made available. The examin
cludes a chest roentgenogram (
anterior 14 x 17 inches), a history
symptomatology of respiratory di
pulmonary function tests to inclu
vital capacity (FVC) forced expira
ume at 1 second (FEV$_{1.0}$), and, for e
with 10 or more years of exposure to
concentrations of asbestos fibers or
45 years of age or older, a sputum
examination. Those employees with
tory disorders generally should not
where there is increased risk to inha
asbestos fibers.

C. Annual and termination examina

Annual and termination examina
required to be made available. Th
include, as a minimum, a chest ro
gram (posterior-anterior 14 x 17 i
history to elicit symptomatology of
tory disease, pulmonary function te
clude forced vital capacity (FVC) a
expiratory volume at 1 second (FEV
for employees with 10 or more yea
posure to airborne concentrations of
fibers or who are 45 years of age or
sputum cytology examination.

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

[FR Doc.75-[illegible]] Filed 9-30-75;4:

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VI. Environmental Impact Assessment

The National Environmental Policy Act of 1969 (NEPA), (43, U.S.C. 4331-4343), 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, 30 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, 300 Constitution Avenue, N.W., Room N-3608, 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.

Of little demonstrated consequence.

Input date.

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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-043, U.S. Department of Labor, Room N-3620, 200 Constitution Avenue, N.W., Washington, D.C. 20210 Telephone 202/523-8078. 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.

Does this comment date make sense in light of possible delayed hearings and far reaching scientific and technical issues raised?

Pursuant to 29 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, and 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.

Entire new process will be explained in detail at November Group Meeting.

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 hearing 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 (38 January 1975), issued pursuant to Executive Order 11821.

Accordingly, pursuant to sections 6(b) and 8(g) 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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Section 1910.1001 is proposed to be revised to read as follows:

Bibliography must be examined for completeness and objectivity.

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