PLAINTIFF'S EXHIBIT

ATT-331

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration
WASHINGTON, D.C. 20210

OCT 11 1978

STD 1-11-

OSHA PROGRAM DIRECTIVE #300-16

TO: REGIONAL ADMINISTRATORS/OSHA

THRU: DONALD E. MACKENZIE
Field Coordinator

SUBJECT: 29 CFR 1910.1001(j)(2) or (3) or (4), Minimum Airborne Fiber Concentration for Initiating and Continuing Asbestos Medical Examinations

1. Purpose

The purpose of this directive is to provide uniform inspection and compliance procedures for the medical examination requirement in the asbestos standard, 29 CFR 1910.1001(j)(2), or (3) or (4).

2. Documentation Affected

This directive supplements and provides reference for the OSHA Industrial Hygiene Field Operations Manual (IHFOM) and the OSHA Field Operations Manual (FOM).

3. Background

In 29 CFR 1910.1001(j)(2), or (3) or (4), Medical examinations, the term "... exposed to airborne concentrations of asbestos fibers...." has been the subject of considerable discussion and debate as to the meaning or interpretation of "airborne concentrations."

4. Action

a. Definition.

In 29 CFR 1910.1001(j)(2), or (3) or (4), Medical examinations, the term "... exposed to airborne concentrations of asbestos fibers...." is administratively interpreted to mean exposed to a minimum of 0.1 asbestos fibers longer than 5 micrometers per cubic centimeter

of air, as determined by the sampling method prescribed in section 4.c. of this directive. The phrase "fibers longer than 5 micrometers per cubic centimeter of air" shall hereafter be abbreviated as "fibers/cc."

b. Scope and applicability.

Medical examinations as per 29 CFR 1910.1001(j)(2), or (3) or (4) will be required for any 7- to 8-hour time-weighted average concentration of 0.1 fibers/cc, or for a greater concentration.

c. Sampling information.

(1) Sampling procedures will follow Chapter X of the IHFOM., with the additional guidance of 4.c.(2) and (3) of this directive.

(2) Exposure to asbestos dust with low levels of contamination (e.g., mixed with other minerals).

(a) For exposures to dust that is mostly asbestos and is expected to be below the permissible exposure limit, the same filter should be used for the entire shift, but no longer than 8 hours.

(b) For exposures expected to be at or above the permissible exposure limit, several samples may be required during the shift to avoid overloading the filters.

(3) Exposures to asbestos dust with high levels of contamination.

(a) Several samples may be required during the shift to avoid overloading the filter.

(b) Filters should be changed only after a minimum of 1 hour of sampling time for exposures expected to be close to 0.1 fibers/cc. Seven or eight 1-hour samples can be collected during the day.

c. Examples of types of violations.

(1) Where an employer does not provide the required medical examinations, and an employee is exposed to 0.1 or more fibers cc, it would be considered a "serious" violation of 29 CFR 1910.1001(j)(2), or (3) or (4).

(2) For definitions and guidance on "repeated," "willful," or a "failure to correct" violation, see the FOM, Chapter VIII.

5. Effective Date

This directive is effective immediately and will remain in effect until further notice.

Bruce Hallenbrand
Acting Director, Federal
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STANDARDS AND INTERPRETATIONS

The value of E_m shall not exceed unity.

(iii) To illustrate the formula prescribed in subdivision (i) of this subparagraph, consider the following exposures:

Material	Actual concentration of 8-hour exposure	8-hour time weighted average exposure limit
Acetone (Table Z-1)	500 p.p.m.	1,000 p.p.m.
2-Butanone (Table Z-1)	45 p.p.m.	200 p.p.m.
Toluene (Table Z-2)	40 p.p.m.	200 p.p.m.

Substituting in the formula, we have

$$E_m = \frac{500}{1,000} + \frac{45}{300} + \frac{40}{200}$$

$$E_m = 0.500 + 0.150 + 0.200$$

$$E_m = 0.925$$

Since E_m is less than unity (1), the employee's exposure is within acceptable limits.

(c) To achieve compliance with paragraphs (a) through (b) of this section, administrative or engineering controls must first be determined and implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and/or technical measures used for this purpose must be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with § 1910.134.

1910.1001—ASBESTOS

(a) Definitions.

For the purpose of this section:

(1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) Permissible exposure to airborne concentrations of asbestos fibers.

(1) Standard effective July 1, 1972. The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers longer than 5 micrometers per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(2) Standard effective July 1, 1976. The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(3) Ceiling concentration. No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(c) Methods of compliance.

(1) Engineering controls.

(i) Engineering controls. Engineering controls, such as, but not limited to, total enclosure, exhaust ventilation, and dust

collection shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) Local exhaust ventilation.

(a) 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.

(b) Specification incorporated by reference. All of ANSI Z9.2-1971, and the mandatory nature of that standard in connection therewith. The address of the American National Standards Institute is given in § 1910.6(i).

(c) Particular tools. (1) All hand-operated and power-operated tools which would produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, such as, but not limited to, saws, scrapers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) 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 (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from any surface or other components of work by the use of compressed air, unless such removal is performed in such a manner as to effectively prevent the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) Employees engaged in the demolition of asbestos, the removal or demolition of pipes, structures, or equipment all or part of which is insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(iii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(d) Personal protective equipment.

(1) Compliance with the exposure limits prescribed by paragraph (b) of this section shall not be achieved by the use of respirators or shall protective [illegible] equipment.

(2) Respiratory protection. (i) Respirators, where required by this or any other section of this part, shall be provided by the employer at no cost to the employee and shall be used when such exposures exceed the permissible limits, except that they may be used in lieu of [illegible] controls as specified in paragraph (b) of this section.

(ii) In addition to the respirators specified for use under engineering controls and work practices, respirators shall be provided for use during:

(a) Work operations, such as maintenance and repair activities, for which engineering and work practice controls are not feasible or not sufficient to reduce airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section, or

(b) Emergencies.

(iii) Where both respirators and personnel rotation are allowed by subdivisions (i) or (ii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(a) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved for this purpose by the Bureau of Mines, Department of the Interior, in the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, pursuant to 30 CFR Part [illegible] Where [illegible] and [illegible] respirators [illegible] and [illegible] respirator [illegible]

(b) A dust-fume-mist respirator. A [illegible] single-use air-purifying respirator

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respirator described in subdivision [illegible] or (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) *Powered air purifying respirators.* A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) *Type "C" supplied-air respirators, continuous flow or pressure-demand class.* A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) *Establishment of a respirator program.*

(a) The employer shall establish a respirator program in accordance with the requirements of the American National Standard Practices for Respiratory Protection, ANSI Z88.2-1969, which is incorporated by reference herein.

(b) See § 1910.8 concerning the [illegible] of ANSI Z88.2-1969 and the [illegible] thereof. The address of the American National Standards Institute is given in § 1910.100.

(c) If employee shall be assigned to tasks requiring the use of respirators, based upon his most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by his use of a respirator. Such employee shall be rotated to another job or given the opportunity to transfer to a different position whose duties he is able to perform with the same employer, in the same geographical area and with the same seniority, status, and rate of pay he had just prior to such transfer, if such a different position is available.

(v) *Special clothing.* The employer shall provide and require the use of special 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 the ceiling level prescribed in paragraph (b) of this section.

(4) *Change rooms:*

(i) At any fixed place of employment exposed to airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, the employer shall provide change rooms for employees working regularly at the place.

(ii) *Clothes lockers:* The employer shall provide two separate lockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes.

(5) *Laundering:*

(a) Laundering of asbestos contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(b) Any employer who gives asbestos contaminated clothing to another [illegible]

son for laundering shall inform such person of the requirement in (d) of this subdivision to effectively prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(c) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with paragraph (g) of this section.

(e) Method of measurement.

All determinations of airborne concentrations of asbestos fibers shall be made by the membrane filter method at 400–400 × (magnification) 4 millimeter objective with phase contrast illumination.

(f) Monitoring.

(1) Initial determinations. Within 6 months of the publication of this section, every employer shall cause every place of employment where asbestos fibers are released to be monitored in such a way as to determine whether every employee's exposure to asbestos fibers is below the limits prescribed in paragraph (b) of this section. If the limits are exceeded, the employer shall immediately undertake a compliance program in accordance with paragraph (c) of this section.

(2) Personal monitoring.

(i) Samples shall be collected from within the breathing zone of the employees, on membrane filters of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by [illegible] paragraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of employees. In no case shall the sampling be done at intervals greater than 6 months for employees whose exposure to asbestos may reasonably be foreseen to exceed the limits prescribed by paragraph (b) of this section.

(3) Environmental monitoring.

(i) Samples shall be collected from areas of a work environment which are representative of the airborne concentrations of asbestos fibers which may reach the breathing zone of employees. Samples shall be collected on a membrane filter of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by [illegible] paragraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than 6 months for employees whose exposures to asbestos may reasonably be foreseen to exceed the exposure limits prescribed in paragraph (b) of this section.

(4) Employee observation of monitoring. Affected employees, or their representatives, shall be given a reasonable opportunity to observe any monitoring required by this paragraph and shall have access to the records thereof.

(g) Caution signs and labels.

(1) Caution signs.

(i) Posting. Caution signs shall be [illegible] at each location [illegible] the concentrations of asbestos fibers may be in excess of the exposure [illegible] Signs shall be posted at such [illegible] the signs and [illegible] marked by the signs. Signs [illegible]

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at all applicable times to a release resulting in excessive concentrations of airborne asbestos fibers.

(ii) Sign specifications. The warning signs required by subdivision (i) of this subparagraph shall conform to the requirements of 20" x 14" vertical format signs specified in § 1910.145(d)(4), and to this subdivision. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in this subdivision.

Legend	Minimum
Asbestos	1" Sans Serif, Gothic or Block
Cancer and Lung Disease Hazard	1" Sans Serif, Gothic or Block
Avoid Breathing Dust	1" Sans
Wear Assigned Protective Equipment	1" Sans
Do Not Remain In Area Unless Your Work Requires It	1" Gothic
Breathing Asbestos Dust May Be Hazardous To Your Health	1" Sans Serif, Gothic or Block

Spacing between lines shall be at least equal to the height of the upper of any two lines.

(2) Caution labels.

(i) Labeling. Caution labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonable foreseeable use, handling, storage, disposal, processing or transportation no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released.

(ii) Information and training. The [illegible] required by subdivision (i) of this subparagraph shall be printed in letters of sufficient size and contrast as to be readily [illegible] and legible. The [illegible] shall state:

Caution

Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

(h) Housekeeping.

(1) Cleaning. All external surfaces in any place of employment shall be maintained free of accumulations of asbestos fibers if, with their dispersion, there would be an excessive concentration.

(2) Waste disposal. Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing, consigned for disposal, which may produce in any reasonably foreseeable use, handling, storage, processing, disposal, or transportation airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(i) Recordkeeping.

(1) Exposure records. Every employer shall maintain records of any personal or environmental monitoring required by this section. Records shall be maintained for a period of at least 20 years and shall be made available upon request to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of the National Institute for Occupational Safety and Health, and to authorized representatives of either.

[41 FR 11504, March 19, 1976.]

(2) Employee access. Every employee and former employee shall have reasonable access to any record required to be maintained by subparagraph (1) of this paragraph which indicates the employee's exposure to asbestos fibers.

(3) Employee exposure determination. Every employer shall [illegible] each employee at any time [illegible] concentrations of asbestos fibers in excess of the limits prescribed in paragraph (b).

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this section shall be notified in writing of the exposure as soon as practicable but not later than 5 days of the finding. The employee shall also be timely notified of the corrective action being taken.

(j) Medical examinations.

(1) General. The employer shall provide or make available at his cost, medical examinations relative to exposure to asbestos required by this paragraph.

(2) Preplacement. The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1.0).

(3) Annual examinations. On or before January 31, 1973, and at least annually thereafter, every employer shall provide, or make available, comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1.0).

(4) Termination of employment. The employer shall provide, or make available, within 30 calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1.0).

(5) Recent examinations. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(k) Medical records.

(1) Maintenance. Employers of employees examined pursuant to this paragraph shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be retained by employers for at least 20 years.

(2) Access. The contents of the records of the medical examinations required by this paragraph shall be made available, for inspection and copying, to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of NIOSH, to authorized physicians and medical consultants of either of them, and, upon the request of an employee or former employee, to his physician. Any physician who conducts a medical examination required by this paragraph shall furnish to the employer of the examined employee all the information specifically required by this paragraph, and any other medical information related to occupational exposure to asbestos fibers.

1910.1002—COAL TAR PITCH VOLATILES; INTERPRETATION OF TERM

[illegible] 1910.1002 Tar [illegible] [illegible] which [illegible] from the distillation residues of coal petroleum, wood, and other organic matter [illegible] [illegible] of coal [illegible] other organic matter.

[illegible] F.R. [illegible] November 21, 1972.

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The value of E_m shall not exceed unity (1).

(ii) To illustrate the formula prescribed in subdivision (i) of this subparagraph, consider the following exposures:

Material	Actual concentration of 8-hour exposure	8-hour time weighted average exposure limit
Acetone (Table Z-1)	500 p.p.m.	1,000 p.p.m.
2-Butanone (Table Z-1)	45 p.p.m.	200 p.p.m.
Toluene (Table Z-1)	40 p.p.m.	200 p.p.m.

Substituting in the formula, we have:

$$E_m = \frac{500}{1,000} + \frac{45}{200} + \frac{40}{200}$$
$$E_m = 0.500 + 0.225 + 0.200$$
$$E_m = 0.925$$

Since E_m is less than unity (1), the exposure combination is within acceptable limits.

(e) To achieve compliance with paragraphs (b) through (d) of this section, administrative or engineering controls must first be utilized whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and/or technical measures used for this purpose must be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with [illegible]

1910.1001—ASBESTOS

(c) Definitions.

For the purpose of this section:

(1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) Permissible exposure to airborne concentrations of asbestos fibers.

(1) **Standard effective July 7, 1972.** The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(2) **Standard effective July 1, 1976.** The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(3) **Ceiling concentration.** No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of ~~5 fibers~~ [illegible] longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(d) Methods of compliance.

(1) Engineering methods.

(i) Engineering controls [illegible] enclosure, exhaust ventilation, and dust

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collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) **Local exhaust ventilation.**

(a) 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.

(b) See § 1910.6 concerning the availability of ANSI Z9.2-1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(iii) **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 (b) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) **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 (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) **Particular products and operations.** 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 [illegible] effectively the release of [illegible] fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) **Spraying, demolition, or removal.** Employees engaged in the spraying of asbestos, the removal or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(ii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(d) **Personal protective equipment.**

(1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or [illegible] rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section,

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section, or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by subdivisions (i), (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(2) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 [illegible] Mar. 25, 1972), and shall be [illegible] in accordance with subdivisions [illegible] of this subparagraph.

(i) **Air purifying respirators.** [illegible] single use air purifying respirator [illegible]

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respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) Powered air purifying respirators. A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) Type "C" supplied-air respirators, continuous flow or pressure-demand class. A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) Establishment of a respirator program

(a) The employer shall establish a respirator program in accordance with the requirements of the American National Standard Practices for Respiratory Protection, ANSI Z88.2-1969, which is incorporated by reference herein.

(b) See § 1910.6 concerning the availability of ANSI Z88.2-1969 and the name of the organization from which it may be obtained. Copies are also available for inspection at the National Standards Institute as listed in § 1910.100.

(c) No employee shall be assigned to tasks requiring the use of respirators if, based upon his most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by his use of a respirator. Such employee shall be rotated to another job or given the opportunity to transfer to a different position whose duties he is able to perform with the same employer in the same geographical area and with the same seniority, status, and pay as the employee had just prior to such transfer, or to a different job for which he is qualified.

(3) Special clothing. The employer shall provide and require the use of special 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 the ceiling level prescribed in paragraph (b) of this section.

(4) Change facilities.

(i) At any fixed place of employment exposed to airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, the employer shall provide change rooms for employees working regularly at the place.

(ii) Clothes lockers. The employer shall provide two separate lockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes.

(iii) Laundering.

(a) Laundering of contaminated clothing shall be done so as to prevent the release of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(b) Any employer who launders contaminated clothing to another em-

son for laundering shall inform such person of the requirement in (d) of this subdivision to effectively prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(c) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with paragraph (g) of this section.

(e) Method of measurement.

All determinations of airborne concentrations of asbestos fibers shall be made by the membrane filter method at 400–450 × magnification (4 millimeter objective) with phase contrast illumination.

(f) Monitoring.

(1) Initial determinations. Within 6 months of the publication of this section, every employer shall cause every place of employment where asbestos fibers are released to be monitored in such a way as to determine whether every employee's exposure to asbestos fibers is below the limits prescribed in paragraph (b) of this section. If the limits are exceeded, the employer shall immediately undertake a compliance program in accordance with paragraph (c) of this section.

(2) Personal monitoring.

(i) Samples shall be collected from within the breathing zone of the employees, on membrane filters of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by [illegible] paragraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall the sampling be done at intervals greater than 6 months for employees whose exposure to asbestos may reasonably be foreseen to exceed the limits prescribed by paragraph (b) of this section.

(3) Environmental monitoring.

(i) Samples shall be collected from areas of a work environment which are representative of the airborne concentrations of asbestos fibers which may reach the breathing zone of employees. Samples shall be collected on a membrane filter of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by sub-paragraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than 6 months for employees whose exposures to asbestos may reasonably be foreseen to exceed the exposure limits prescribed in paragraph (b) of this section.

(4) Employee observation of monitoring. Affected employees, or their representatives, shall be given a reasonable opportunity to observe any monitoring required by this paragraph and shall have access to the records thereof.

(g) Caution signs and labels.

(1) Caution signs.

(i) Posting. Caution signs shall be provided and displayed at each location where airborne concentrations of asbestos fibers may be in excess of the exposure limits prescribed in paragraph (b) of this section. Signs shall be posted at such a distance from such location so that [illegible] may read the signs and take [illegible] protective steps before entering the marked by the signs. Signs shall be [illegible]

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at all approaches to areas containing excessive concentrations of airborne asbestos fibers.

(ii) **Sign specifications.** The warning signs required by subdivision (i) of this subparagraph shall conform to the requirements of 20" x 14" vertical format signs specified in § 1910.145(d)(4), and to this subdivision. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in this subdivision.

Legend	*Notation*
Asbestos	1" Sans Serif, Gothic or Block.
Dust Hazard	¾" Sans Serif, Gothic or Block.
Avoid Breathing Dust	¼" Gothic.
Wear Assigned Protective Equipment.	¼" Gothic.
Do Not Remain In Area Unless Your Work Requires It.	¼" Gothic.
Breathing Asbestos Dust May Be Hazardous To Your Health.	14 point Gothic.

Spacing between lines shall be at least equal to the height of the upper of any two lines.

(2) Caution labels.

(i) **Labeling.** Caution labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released.

(ii) **Label specifications.** The caution labels required by subdivision (i) of this subparagraph shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION

Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

(h) Housekeeping.

(1) **Cleaning.** All external surfaces in any place of employment shall be maintained free of accumulations of asbestos fibers if, with their dispersion, there would be an excessive concentration.

(2) **Waste disposal.** Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing, consigned for disposal, which may produce in any reasonably foreseeable use, handling, storage, processing, disposal, or transportation airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(i) Recordkeeping.

(1) **Exposure records.** Every employer shall maintain records of any personal or environmental monitoring required by this section. Records shall be maintained for a period of at least 20 years and shall be made available upon request to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of the National Institute for Occupational Safety and Health, and to authorized representatives of either.

[41 F.R. 11504, March 19, 1976.]

(2) **Employee access.** Every employee and former employee shall have reasonable access to any record required to be maintained by subparagraph (1) of this paragraph, which indicates the employee's own exposure to asbestos fibers.

(3) **Employee notification.** Any employee found to have been exposed at any time to airborne concentrations of asbestos fibers in excess of the limits prescribed in paragraph (b) of

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this section shall be notified in writing of the exposure as soon as practicable but not later than 5 days of the finding. The employee shall also be timely notified of the corrective action being taken.

(j) Medical examinations.

(1) General. The employer shall provide or make available at his cost, medical examinations relative to exposure to asbestos required by this paragraph.

(2) Preplacement. The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(3) Annual examinations. On or before January 31, 1973, and at least annually thereafter, every employer shall provide, or make available, comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(4) Termination of employment. The employer shall provide, or make available, within 30 calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(5) Recent examinations. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(6) Medical records.

(i) **Maintenance.** Employers of employees examined pursuant to this paragraph shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be retained by employers for at least 20 years.

(ii) **Access.** The contents of the records of the medical examinations required by this paragraph shall be made available, for inspection and copying, to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of NIOSH, to authorized physicians and medical consultants of either of them, and, upon the request of an employee or former employee, to his physician. Any physician who conducts a medical examination required by this paragraph shall furnish to the employer of the examined employee all the information specifically required by this paragraph, and any other medical information related to occupational exposure to asbestos fibers.

1910.1002—COAL TAR PITCH VOLATILES; INTERPRETATION OF TERM

As used in § 1910.1002 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum, wood, and other organic matter.

lation residues of coal, petroleum, wood, and other organic matter.

[37 F.R. 24749, November 21, 1972.]

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