

**PLAINTIFF'S
EXHIBIT
FD-127a**

In the December 7, 1971 Federal Register (Vol 36, No. 235), EPA announced proposed emission standards for three hazardous air pollutants--asbestos, beryllium, and mercury.

The Clean Air Amendments of 1970 permit the Administrator to establish emission standards for these pollutants even though their current ambient levels do not constitute a dangerous threat.

EPA is required to hold public hearings and set forth standards within 180 days of this announcement unless the pollutants are clearly demonstrated to be not hazardous. A notice of the date, time and location of public hearings will be announced within 30 days and written comments will be received for 90 days. The Administrator specifically requested scientific information on the levels of these pollutants which constitute a risk to public health and the extent to which these emission standards would be of benefit to the public health.

Asbestos

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numerical values but are expressed in terms of required control practices that will limit emissions to an acceptable level. These practices include:

1. Use of filters to clean gases from mining, milling, manufacturing, and fabrication of asbestos-containing materials
2. Eliminate visible emissions from all sources related to asbestos.
3. Prohibit the spraying of asbestos for fire-proofing and insulation except where the spraying is done under controlled conditions.

The basic processing of asbestos is done in nine mills within the United States. It is estimated that the cost of complying in these mills will average about 0.9% per ton.

Manufacturing facilities to be controlled include asbestos-cement products, asbestos-containing floor tile, asbestos-reinforced friction material, asbestos paper, and asbestos textiles. An average increase in product price of 0.3% for all manufacturers of asbestos containing products is estimated. The most significant increase will be 2.6% for asbestos paper products.

The prohibition of spray applications of asbestos for insulating and fire-proofing is regarded as having no major impact on the price of asbestos. Substitute materials may increase raw material cost as much as 15%, but no new equipment or extensive retraining of personnel will be required.

Beryllium

The proposed beryllium standards are:

30 day-	0.01 $\mu\text{g}/\text{m}^3$
30 minutes-	25 $\mu\text{g}/\text{m}^3$

The beryllium emission standards will be applied to extraction plants, machine shops, foundries, ceramic plants, repellent plants, and incinerators designed to dispose of toxic substances. The sources may elect to comply with either the 30 day ambient air standard listed above, or an emission standard of no more than 10 grams of beryllium per 24 hour day. If the former control is chosen, the source must measure air concentrations using a sampling network proved by EPA. If the latter is chosen, the source

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must periodically test emissions, and report the results to EPA.

The extreme toxicity of beryllium has long been recognized, so most sources already have the emission controls in place to comply with these standards. The beryllium collected in the control equipment can be resold to primary extraction plants, and the cost of control will be almost entirely offset.

Mercury

The mercury emissions standards were developed to insure ambient air concentration of less than $1 \mu\text{g}/\text{m}^3$ averaged over 30 days. The proposed standard, which apply to plants manufacturing chlorine and alkali caustic, as well as, primary mercury mines, limit emissions from each facility to not more than 5 pounds of mercury during any 24 hour period.

It is estimated that the cost of controlling mercury emissions is equal to approximately 2.5-3.5% of the total product worth. Partial recovery of these costs can be expected from the resale of recovered mercury.

The hazardous air pollutants standards must be met by any existing source 90 days after the final regulations are published. However, a waiver of up to two years is possible if the facility cannot be controlled immediately and if steps are taken to assure that the public health will be protected from the immediate risks of significant harm. The President may grant a two year exception if he finds that the technology required is not available and the operation of the source is necessary for the national security.

The existing sources to which the standards apply are required to report to EPA giving information about operations and emissions control systems. New constructions or modification of existing sources can only be undertaken with approval of EPA. A fee will be charged to defray all or part of the cost of reviewing applications for approval of due construction or plant modification.

A copy of the proposed regulation is attached.

H.B.WEAVER, Manager
Environmental Engineering

Attachment
Copies to:

Industrial Plant Pollution Control Committee Company
Counsel - J2

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entitled to protection as trade secrets of such person. The Administrator shall consider such records, reports, or information, or particular part thereof, confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such records, reports, or information, or particular part thereof, may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out the provisions of the Act or when relevant in any proceeding under the Act.

§ 61.14 State authority.

The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from:

(a) Adopting and enforcing any emission standard or limitation applicable to a stationary source provided that such emission standard or limitation is not less stringent than the national emission standard for hazardous air pollutants applicable to such source.

(b) Requiring the owner or operator of a stationary source to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of such source.

Subpart B—National Emission Standards for Asbestos

§ 61.20 Applicability.

The provisions of this subpart are applicable to the following sources of atmospheric asbestos:

- Asbestos mines;
- Asbestos mills;
- Buildings, structures, or facilities within which manufacturing or fabricating operations involving the use of commercial asbestos are carried on;
- Buildings or structures which have been or will be constructed or modified using asbestos insulating products;
- Roadway facilities which would be surfaced or resurfaced using asbestos tailings.

§ 61.21 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given in the Act and in Subpart A of this part.

(a) "Asbestos" means any of six naturally occurring, hydrated mineral silicates: Actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite.

(b) "Commercial asbestos" means any variety of asbestos which is produced by the concentration of asbestos ore.

(c) "Asbestos mine" means any facility engaged in the extraction of asbestos ore from the earth for the purpose of recovering commercial asbestos.

(d) "Air flow permeability" means the volumetric rate of air flow in cfm, produced by a pressure decrease of 0.5 in. w.g. across a new, clean filtering fabric, divided by the area of the fabric in ft². The test air stream is maintained at nominal atmospheric pressure and temperature.

(e) "Dry drilling" means the process of drilling holes in the earth in the absence of an applied liquid stream, mist-containing stream or air stream.

(f) "Air-swept drilling" means the process of drilling holes in the earth in the presence of a forced or induced air stream, but not a liquid stream or mist-containing stream.

(g) "Wet drilling" means the process of drilling holes in the earth in the presence of a forced liquid stream or mist-containing stream.

(h) "Particulate matter" means any material, other than uncombined water, which exists in a finely divided form as a liquid or solid.

(i) "Asbestos tailings" means any solid waste product of asbestos mining or milling operations which contains asbestos.

(j) "Visible emission" means, for the purpose of this subpart, any emission which is visually detectable.

(k) "Asbestos mill" means any facility engaged in the conversion of asbestos ore into commercial asbestos.

(l) "Manufacturing operation" means the processing of commercial asbestos or the production of any product containing commercial asbestos.

(m) "Fabricating" means the cutting, shaping, assembly, mixing or other altering of any manufactured product containing commercial asbestos.

§ 61.22 Emission standards for asbestos.

(a) Emissions to the atmosphere from asbestos mines shall be limited as follows:

(1) Emissions of particulate matter from air-swept or dry drilling operations shall not exceed those which would be emitted from an air-swept or dry drill, respectively, equipped with a fabric filter device for collection of dust generated from drilling, as described in § 61.23(a).

(2) Emissions of particulate matter from wet drilling operations shall not exceed those which would be emitted from a wet drill equipped with a cyclone gas cleaning device for collection of dust or mist generated from drilling as described in § 61.23(b).

(3) Visible emissions of particulate matter from any mine road surfaced with asbestos tailings are prohibited.

(b) Emissions to the atmosphere from asbestos mills shall be limited as follows:

(1) Visible emissions of particulate matter from asbestos ore dumps, open storage areas for asbestos-containing materials, external conveyors for asbestos-containing materials, or asbestos-containing tailings dumps are prohibited.

(2) Emissions of particulate matter from asbestos ore dryers shall not exceed those which would be emitted from asbestos ore dryers equipped with fabric filter installations as described in § 61.23(c).

(3) Emissions of particulate matter from air streams used to process asbestos ores or for exhausting particulate matter resulting from milling operations shall not exceed the amounts which would be emitted if such air streams were treated in fabric filter installations as described in § 61.23(d).

(4) Emissions of particulate matter from any milling operation which continuously generates visible emissions shall not exceed the amounts which would be emitted if such air streams

were treated in fabric filter installations as described in § 61.23(d).

(c) Emissions to the atmosphere from buildings, structures, or facilities within which any fabricating or manufacturing operation is carried on shall be limited as follows:

(1) Emissions, in direct forced gas streams, of particulate matter resulting from manufacturing or fabricating operations shall not exceed the amounts which would be emitted if such forced exhausts were treated in fabric filter installations as described in § 61.23(d) or, where approved by the Administrator because of special process conditions, in wet collectors as described in § 61.23(f).

(2) Emissions of particulate matter from any manufacturing or fabricating operation which continuously generates visible emissions shall not exceed the amount which would be emitted if the air containing such emissions were treated in fabric filter installations as described in § 61.23(d) or, where approved by the Administrator because of special process conditions, in wet collectors as described in § 61.23(f).

(3) Visible emissions of particulate matter from any manufacturing or fabricating operations in an area directly open to the atmosphere are prohibited.

(d) Visible emissions to the atmosphere of asbestos particulate matter resulting from the repair or demolition of any building or structure, other than a single-family dwelling, are prohibited.

(e) The spraying of asbestos is limited as follows:

(1) The spraying of any product which contains asbestos on any portion of a building or structure is prohibited.

(2) The spraying of any product which contains asbestos in an area directly open to the atmosphere is prohibited.

(3) Emissions of particulate matter from spraying of any product which contains asbestos, if such spraying is not specifically prohibited in subparagraphs (1) or (2) of this paragraph, shall not exceed the amounts which would be emitted if the air containing such emissions were treated in fabric filter installations as described in § 61.23(d) or, where approved by the Administrator because of special process conditions, in wet collectors as described in § 61.23(f).

(f) The surfacing or resurfacing of any roadway with asbestos tailings is prohibited.

§ 61.23 Referenced equipment specifications.

(a) Fabric filters referred to in § 61.22 (a) (1) are equipped with fabrics having air-flow permeabilities not exceeding 40 cfm/ft².

(b) Cyclone collectors referred to in § 61.22(a) (2) are operated at not less than 7 in. w.g. pressure decrease as measured from the cyclone inlet to the outlet.

(c) Fabric filters referred to in § 61.22 (b) (2) are equipped with fabrics having air-flow permeabilities not exceeding 30 cfm/ft².

(d) Fabric filters referred to in § 61.22 (b) (3) and (4), (c) (1) and (2), and (e) (3) are equipped with woven cotton fabrics having air-flow permeabilities not

exceeding 20 cfm/ft². No bypass devices are utilized, and provisions are made for emptying the collection hoppers without creating visible emissions of particulate matter.

(c) Fabric filter devices do not meet the descriptions in paragraphs (a), (c), and (d) of this section if any of the following conditions exist:

(1) Leakage of gases containing particulate matter from the control system prior to filtration.

(2) Torn or ruptured bags.

(3) Improperly positioned bags.

(4) Badly worn or threadbare bags.

(f) Wet collectors referred to in § 61.22(c) (1) and (2) and (c) (3) are of the high-energy venturi type operated with a minimum gas pressure decrease across the venturi throat of 40 inches w.g.

(g) Wet collectors do not meet the description in paragraph (f) of this section if any of the following conditions exist:

(1) Leakage of gases containing particulate matter from the control system prior to filtration.

(2) Operation at less than 40 inches w.g. pressure decrease.

(3) Operation at a scrubbing medium flow rate less than specified by the manufacturer for optimum collection efficiency.

§ 61.24 Substitute devices for the attainment of equivalent emission control.

(a) Compliance with any applicable standard of this subpart which refers to a control equipment specification in § 61.23 shall be demonstrated in accordance with this section if the referenced control equipment is not used.

(b) The owner or operator of the emission source shall make available to the Administrator sufficient information as may be required to demonstrate that the substitute equipment will provide the degree of control which, in the judgment of the Administrator, is at least as stringent as that which would be achieved by using the equipment specified in the applicable standard. To the maximum extent practicable, the determination of equivalent degree of emission control will be based upon operation at the actual conditions at which the substitute device is or will be operated on the emission source. Factors which will be considered include, but are not limited to, collection efficiency, reliability, and maintenance practices associated with proper operation of the substitute device.

(c) The owner or operator of the emission source shall submit to the Administrator performance data including, but not limited to, total mass collection efficiency of the substitute control device under actual operating conditions or conditions which are representative of those of the existing or planned operating conditions.

(d) In cases for which it is not reasonable, in the judgment of the Administrator, to require an owner or operator to submit performance data which are based upon actual operating conditions or conditions which are representative of

these, the owner or operator shall make available to the Administrator performance data on comparative tests, using suitable standard test aerosols, on the substitute device and the device specified by the applicable standard. The performance data shall include, but not be limited to, the total mass efficiencies of the substitute device and the device specified by the applicable standard.

(e) The total mass efficiency of any substitute device for those specified by § 61.23 (a), (c), or (d) shall not be less than 99.9 percent.

(f) The total mass efficiency of any substitute device for that specified by § 61.23 (b) shall not be less than 85 percent.

(g) The total mass efficiency of any substitute device for that specified by § 61.23 (f) shall not be less than 99.5 percent.

Subpart C—National Emission Standards for Beryllium

§ 61.30 Applicability.

The provisions of this subpart are applicable to the following sources:

- Machine shops;
- Ceramic plants;
- Propellant plants;
- Foundries;
- Extraction plants;
- Incinerators designed or modified for disposal of toxic substances.

§ 61.31 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them by the Act and in Subpart A of this part.

(a) "Beryllium" means the element beryllium excluding any associated elements.

(b) "Extraction plant" means a facility chemically processing beryllium ore to beryllium metal, alloy or oxide, or performing any of the intermediate steps in these processes.

(c) "Beryllium ore" means any material mined, hand cobbled, or gathered in any way specifically for its beryllium content.

(d) "Machine shop" means a facility performing cutting, grinding, turning, honing, milling, deburring, lapping, electrochemical machining, hot rolling, etching or other similar operations on beryllium metal, alloys or oxide.

(e) "Ceramic plant" means a manufacturing plant producing commercial ceramic stock forms, ware, or other items from beryllium oxide.

(f) "Foundry" means a facility engaged in the melting and/or casting of beryllium metal or alloy.

(g) "Propellant" means a fuel and oxidizer physically or chemically combined which undergoes combustion to provide rocket propulsion.

(h) "Beryllium alloy" means any metal to which beryllium is deliberately added and contains more than 0.1 percent beryllium by weight.

(i) "Propellant plant" means any facility engaged in the mixing, casting, or machining of propellant that contains beryllium.

(j) "Total emissions" means the emissions of beryllium in any form or any compound, from all points within a stationary source including emissions from the disposal of beryllium contaminated waste.

§ 61.32 Emission standards for beryllium.

A stationary source subject to this subpart shall, in accordance with the provisions of § 61.38, elect to comply with either paragraph (a) or (b) of this section.

(a) Total emissions to the atmosphere from sources subject to this subpart shall not exceed 10 grams of beryllium in a 24-hour day as measured in accordance with Method 3 in the appendix.

(b) Total emissions to the atmosphere from sources subject to this subpart shall not exceed amounts which result in an outplant concentration of 0.01 micrograms of beryllium per cubic meter of air averaged over a 30-day period, measured in accordance with a sampling network approved by the Administrator.

§ 61.33 Test methods and procedures—stack sampling.

Owners or operators electing to comply with § 61.32(a) shall comply with the requirements of this section and § 61.34.

(a) All beryllium emissions shall be transported through stacks or ducts which permit testing by the methods set forth in Method 3 in the appendix to this part.

(b) All tests shall be conducted to indicate the weight emitted per 24-hour day.

(c) Method 3 set forth in the appendix to this part shall be used as follows:

(1) The minimum sampling time shall be 2 hours, and the minimum sampling volume shall be 75 ft³ as measured by the gas meter. The total gas volume sampled at stack conditions shall be calculated.

(2) The velocity of the effluents shall be determined at stack conditions.

(3) For each repetition, beryllium emission expressed in grams per day shall be determined in accordance with Method 3.

§ 61.34 Periodic stack sampling and reports.

(a) All existing sources shall be tested within 3 months of the effective date of these regulations and at least once every 3 months thereafter.

(b) All sources constructed after the effective date of these regulations shall be tested immediately upon start-up of operations and at least once every 3 months thereafter.

(c) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle.

(d) All samples shall be analyzed, and beryllium emissions shall be calculated within 5 working days after collection of samples. A total emission exceeding the

Open-Air Spraying of Asbestos Materials Would Be Banned by New EPA Standards

By WALL STREET JOURNAL Staff Reporter

WASHINGTON. — Open-air spraying of asbestos fireproofing and insulation would be prohibited under new air-emission standards proposed by the Environmental Protection Agency.

The clean-air standards, which cover beryllium and mercury as well as asbestos, also would:

- Require industry to use filters to clean any gases produced in the mining, milling and manufacturing of asbestos-containing materials and to eliminate visible emissions from certain sources related to their operations.

- Set beryllium-emission ceilings for extraction plants, machine shops, foundries, ceramic plants, propellant plants and incinerators that are designed to dispose of toxic substances. These ceilings would limit emissions of the poisonous metal to a maximum of 10 grams per 24-hour day, or to the point that beryllium concentrations won't exceed an average 0.01 microgram per cubic meter of air for 30 days.

- Require rocket-motor test facilities to keep concentrations of beryllium in the surrounding atmosphere within a ceiling of 75 microgram minutes per cubic meter of air accumulated during any two consecutive weeks. (A microgram minute is derived by dividing the weight of the material collected by the flow rate expressed in cubic meters of air per minute. The rule provides that the sampling must be done in not less than 10 minutes and not more than 60 minutes. An EPA official explained that the agency would require a network of sampling devices set to collect for varying periods of time within this range.

- Require mercury-cell chlor-alkali plants which produce chlorine and alkali caustic, and primary mercury mines to limit emissions to a maximum of five pounds of mercury over a 24-hour period.

The inhalation of asbestos fibers has been linked to a number of human diseases including bronchial cancer. Beryllium in high concentrations can cause pneumonia-like diseases, while mercury poisoning disables the nervous system.

Costs of Compliance Assessed

The greatest economic impact from the proposed standards would be felt by the nine asbestos mills processing domestic ores. The EPA estimated that their cost of complying will range up to 6.7% of the average 1969 selling price of a ton of domestically produced asbestos. The average figure for all the mills, however, only would amount to 0.9%, the agency said.

Producers of asbestos products, including floor tile, reinforced friction materials, paper and textiles, face an "annualized cost" equal to 0.3% of the "output product value," according to the EPA. This would result in an average product price increase of 0.3%, with the most significant being 2.6% for asbestos paper products, the agency said.

The ban on sprayed asbestos would affect only about 0.5% of annual domestic consumption. The EPA said that increased costs for substitute materials will range up to 15%, but that new spraying equipment and extensive re-

training of workers won't be needed. Additional costs aren't anticipated for beryllium users, but the mercury-cell chlor-alkali plants will have to spend from 0.5% to 0.9% of annual total products' worth. The figure for mines will be 2.5% to 3.5%, the agency estimated.

At a briefing on the proposal, Dale M. Slaughter, chief of the EPA's hazardous pollutants branch, said the agency has been advised by industry that the additional costs mean the end of mercury mining in the U.S. However, Mr. Slaughter argued that depressed mercury prices, not environmental costs, would be the real cause of such a development. At present, the industry, located in California, Nevada and Utah, consists of two large mines with fewer than 200 workers altogether, plus 30 to 40 one-man and two-man mines. In 1969, when mercury prices were triple current levels, 109 mercury mines were operating, he noted.

The asbestos-spraying ban would be tempered by the provision that spraying may be done indoors "under conditions where the air that would be released to the atmosphere can be cleaned."

Beryllium users also would have the choice of complying with the 24-hour-day maximum or the ceiling average over a 30-day period.

Approximately 300 machine shops, ceramics plants, propellant plants, extraction plants and foundries could cause beryllium emissions. But because the light metal's extreme toxicity long has been recognized, "the major portion of the industry already has the emission controls needed to comply with the proposed standards," the agency said. For this reason, and because beryllium trapped in air filtration devices has reprocessing value, it said the standards "are expected to have little impact on the industry."

The EPA said it will announce public hearings on the proposals within 30 days and also is allowing 90 days for written comments.

Agency Looks to Further Limitations

Earlier this year, the EPA made final the maximum atmospheric levels of six major pollutants, including particulates sulphur dioxide and carbon monoxide, that will be permitted under federal-state control plans due to take effect in mid-1975.

In addition, the agency is authorized by the Clean Air Act of 1970 to establish specific source emission limits for toxic substances. The proposals announced Friday represent the first response to this mandate. But the agency now is looking into the possible need for similar emission limits on air-borne cadmium, vanadium, manganese and arsenic. Dr. Vaun A. Newell, EPA health effects director, told the briefing.

One major source of air-borne asbestos, motor-vehicle brake linings, isn't covered by the proposed standards. However, control of brake emissions is "being assessed," EPA officials said.

Sources of mercury in the air also not covered by the proposed standards are fossil fuels, notably coal. Dr. Newell explained that because high stacks and even higher-rising smoke plumes distribute emissions from such sources quite widely, the EPA believes there's "little chance" of them exceeding the ceiling.

Questions, Answers On Price Commission, Cost Council Rulings

WASHINGTON. — Here are questions and answers the Internal Revenue Service issued in explanation of rulings of the Cost of Living Council and the Price Commission.

Q: May a firm with a loss in its base period raise its prices to create a projected profit?

A: The general rules of the Price Commission make no provision for a firm in a loss position during the base period, but the Price Commission will consider any such situation and determine whether it justifies special relief. In addition, more specific guidelines will soon be issued.

Q: Do the economic controls apply to college tuition charges?

A: Yes, tuition as well as room and board are covered.

Q: Must a company which is a prenotifying firm also submit quarterly reports to the Price Commission?

A: Yes.

Q: May individual health insurance premiums be raised if based on a formula in a contract in effect prior to the imposition of economic controls where the formula reflects only changed conditions of risk (e.g. number of claims)?

A: Yes, premium increases based on a formula in a pre-existing contract which reflects only changed conditions of risk may be applied normally.

Q: If a corporate parent and its subsidiaries are located in different IRS districts, where should requests for rulings or information be filed?

A: All inquiries, ruling requests, etc. should go to the IRS district director in the district where the parent corporation is located.

Q: Service charges such as utility, parking meter and bridge tolls were subject to Phase I while licenses and fines such as vehicle licenses and parking tickets were exempt. Does the same situation apply to Phase 2?

A: Yes. Unless specifically altered by regulation or published rulings, policy rulings issued by the Cost of Living Council and interpretations issued by the Office of Emergency Preparedness continue to be applicable after Nov. 13, 1971.

San Diego G&E Accord

SAN DIEGO, Calif. — San Diego Gas & Electric Co. said it entered into an agreement with Magma Energy Inc. and Magma Power Co., two related Los Angeles-based companies, for exploration of geothermal energy resources in Imperial Valley, Calif., for power plant use. The utility said it would finance drilling Magma-leased sites to obtain geologic information and to investigate the geothermal energy potential in Imperial Valley. San Diego Gas declined to disclose specific terms of the agreement.

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Washington Metro Wins Financial Victory

RULES AND REGULATIONS

TABLE O-2

Material	8-hour time-weighted average	Acceptable ceiling concentration	Acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift	
			Concentration	Maximum duration
Benzene (Z37.4-1969)	10 p.p.m.	25 p.p.m.	60 p.p.m.	10 minutes.
Beryllium and beryllium compounds (Z37.3-1970)	2 µg./lit.	5 µg./lit.	25 µg./lit.	30 minutes.
Cadmium fume (Z37.5-1970)	0.1 mg./M ³	3 mg./M ³		
Calcium dust (Z37.5-1970)	0.2 mg./M ³	0.6 mg./M ³		
Carbon disulfide (Z37.3-1968)	20 p.p.m.	20 p.p.m.	100 p.p.m.	Do.
Carbon tetrachloride (Z37.17-1967)	10 p.p.m.	25 p.p.m.	200 p.p.m.	5 minutes in any 4 hours.
Ethylene dibromide (Z37.31-1970)	20 p.p.m.	30 p.p.m.	60 p.p.m.	5 minutes in any 4 hours.
Ethylene dichloride (Z37.21-1969)	60 p.p.m.	100 p.p.m.	500 p.p.m.	5 minutes in any 3 hours.
Formaldehyde (Z37.16-1967)	3 p.p.m.	5 p.p.m.	10 p.p.m.	30 minutes.
Hydrogen fluoride (Z37.24-1969)	do.	do.	do.	do.
Fluorides as dust (Z37.24-1969)	2.6 mg./M ³			
Lead and its inorganic compounds (Z37.11-1967)	0.2 mg./lit.			
Methyl chloride (Z37.18-1969)	100 p.p.m.	200 p.p.m.	300 p.p.m.	5 minutes in any 3 hours.
Methylene chloride (Z37.23-1969)	600 p.p.m.	1,000 p.p.m.	2,000 p.p.m.	5 minutes in any 2 hours.
Organic (alkyl) mercury (Z37.30-1969)	0.01 mg./M ³	0.04 mg./M ³		
Styrene (Z37.15-1969)	100 p.p.m.	200 p.p.m.	600 p.p.m.	5 minutes in any 3 hours.
Trichloroethylene (Z37.19-1967)	do.	do.	300 p.p.m.	5 minutes in any 2 hours.
Tetrachloroethylene (Z37.22-1967)	do.	do.	do.	5 minutes in any 3 hours.
Toluene (Z37.12-1967)	200 p.p.m.	300 p.p.m.	500 p.p.m.	10 minutes.
Hydrogen sulfide (Z37.2-1966)		20 p.p.m.	50 p.p.m.	10 minutes once only if no other measurable exposure occurs.
Mercury (Z37.8-1971)		1 mg./10M ³		
Chromic acid and chromates (Z37.7-1971)		do.		

TABLE O-3—MINERAL DUSTS

Substance	Mppcf*	Mg/M ³	Aerodynamic diameter (unit density sphere)	Percent passing selector
Silica:			2	60
Crystalline:			2.5	75
Quartz (respirable).....	250†	10mg/M ³ =	3.5	80
	%SiO ₂ +4	30mg/M ³	5.0	25
Quartz (total dust).....		%SiO ₂ +3	10	0
		%SiO ₂ +3		
Cristobalite: Use 1/2 the value calculated from the count or mass formulae for quartz.				
Tridymite: Use 1/2 the value calculated from the formulae for quartz.				
Amorphous, including natural diatomaceous earth.....	20	80mg/M ³		
		%SiO ₂		
Silicates less than 1% crystalline silica:				
Mica.....	20			
Soapstone.....	20			
Talc (non-asbestos form)....	20*			
Talc (fibrous). Use asbestos limit.				
Tremolite (see talc, fibrous)				
Portland cement.....	50			
Graphite (natural).....	15			
Coal dust (respirable fraction less than 5% SiO ₂).....		2.4mg/M ³ or 10mg/M ³		
For more than 5% SiO ₂		%SiO ₂ +3		
Inert or Nuisance Dust:				
Respirable fraction.....	15	5mg/M ³		
Total dust.....	50	15mg/M ³		

NOTE: Conversion factors—
 * ppcf (×33.3 = million particles per cubic meter = particles per c.c.)
 * Millions of particles per cubic foot of air, based on impinger samples counted by light-field technique.
 * The percentage of crystalline silica in the formula is the amount determined from air-borne samples, except in those instances in which other methods have been shown to be applicable.
 * As determined by the membrane filter method at 40× magnification.
 * If all concentrations and percent quartz for the application of this limit are to be determined from the fraction passing a selector with the following characteristics:
 * Counting < 15% quartz; if > 1% quartz, 0% quartz limit.

The measurements under this note refer to the use of an AEC instrument. If the respirable fraction of coal dust is determined with a MRE the figure corresponding to that of 2.4 Mg/M³ in the table for coal dust is 4.5 Mg/M³.

§ 1910.93a 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 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 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 methods. (i) Engineering controls. Engineering controls, such as, but not limited to, isolation, 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) 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 so as to prevent effectively the release of airborne asbestos 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) (iii) of this section and with special clothing in accordance with paragraph (d) (3) of this section.

(4) 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 shift 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 (37 F.R. 6244, Mar. 25, 1972), and shall be used in accordance with subdivisions (i), (ii), (iii), and (iv) of this subparagraph.

(i) *Air purifying respirators.* A reusable or single use air purifying respirator, or a respirator described in subdivision (ii) 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 Standards 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 maintenance of an historic file in connection therewith. The address of the American National Standards Institute is given 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 rate of pay he had just prior to such transfer, if such a different position is available.

(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 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.

(iii) *Laundrying:* (a) Laundrying 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 person for laundering shall inform such person of the requirement in (a) 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 X (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—(1) 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 subparagraph (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—(1)* 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 subparagraph (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 a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs. Signs shall be posted at all approaches to areas containing excessive concentrations of airborne asbestos fibers.

(ii) *Sign specifications.* The warning signs required by subdivision (1) 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.....	3/4" Sans Serif, Gothic or Block.
Avoid Breathing Dust....	1/4" Gothic.
Wear Assigned Protective Equipment.	3/4" Gothic.
Do Not Remain In Area Unless Your Work Requires It.	1/4" 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 3 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.

(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.

(2) **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 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).

(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).

(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).

(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.

§ 1910.94 Ventilation.

(a) **Abrasive blasting.**—(1) **Definitions applicable to this paragraph.**—(i) **Abrasive.** A solid substance used in an abrasive blasting operation.

(ii) **Abrasive-blasting respirator.** A continuous flow air-line respirator constructed so that it will cover the wearer's head, neck, and shoulders to protect him from rebounding abrasive.

(iii) **Blast cleaning barrel.** A complete enclosure which rotates on an axis, or which has an internal moving tread to tumble the parts, in order to expose various surfaces of the parts to the action of an automatic blast spray.

(iv) **Blast cleaning room.** A complete enclosure in which blasting operations are performed and where the operator works inside of the room to operate the blasting nozzle and direct the flow of the abrasive material.

(v) **Blasting cabinet.** An enclosure where the operator stands outside and operates the blasting nozzle through an opening or openings in the enclosure.

(vi) **Clean air.** Air of such purity that it will not cause harm or discomfort to an individual if it is inhaled for extended periods of time.

(vii) **Dust collector.** A device or combination of devices for separating dust from the air handled by an exhaust ventilation system.

(viii) **Exhaust ventilation system.** A system for removing contaminated air from a space, comprising two or more of the following elements (a) enclosure or hood, (b) duct work, (c) dust collecting equipment, (d) exhaust, and (e) discharge stack.

(ix) **Particulate-filter respirator.** An air purifying respirator, commonly referred to as a dust or a fume respirator, which removes most of the dust, or fume from the air passing through the device.

(x) **Respirable dust.** Airborne dust in sizes capable of passing through the upper respiratory system to reach the lower lung passages.

(xi) **Rotary blast cleaning table.** An enclosure where the pieces to be cleaned are positioned on a rotating table and are passed automatically through a series of blast sprays.

(xii) **Abrasive blasting.** The forcible application of an abrasive to a surface by pneumatic pressure, hydraulic pressure, or centrifugal force.

(2) **Dust hazards from abrasive blasting.** (i) Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting