

Monsanto

PLAINTIFF'S
EXHIBIT

MON-286

FROM (NAME & LOCATION):

J. M. Harris - Chocolate Bayou Plant

DATE August 8, 1972

cc A. W. Adams

SUBJECT Use of Asbestos at
Chocolate Bayou

R. E. Belden

B. R. Bradshaw

H. C. Clark

F. H. Dupre

C. H. McComb

R. L. Miller - O.M.C.

TO : E. N. Brasfield

Since the O.S.H.A. has been enacted, the following activities and plans are in progress at Chocolate Bayou concerning insulation.

1. A study has been completed on what types we use. It is estimated that approximately 60% of all insulation used in the plant contains asbestos. (See attached memo.)
2. A request has been issued to Engineering Services to determine the feasibility of eliminating the use of asbestos at Chocolate Bayou. In turn, Engineering Services referred the study to R. L. Miller of St. Louis. Information received indicates St. Louis is to issue a standard bulletin describing suitable alternates.
3. O.S.H.A. approved respirators have been purchased for the insulators and are in use.
4. The fabrication saws in our insulation shop have vacuum exhausts in operation now. A dust collection system for these saws outside the buildings is in the planning stage, with completion expected September 1, 1972. The feasibility of installing a vacuum system above the saws is also being evaluated by our group.
5. A vacuum cleaner suitable for clean-up in the fabricating shop is being sought.
6. Special clothing (coveralls) requirements are to be dealt with as follows:
 - a) Fabricating man in the shop would require clothing.
 - b) Only major removal jobs in the field would require coveralls, such as: stripping of an exchanger head or shell. Removal of insulation on flanges or for a tie-in would not warrant the use of special clothing.

August 8, 1972

(c) Any large fabrication in the field where sawing and fitting is required would apply.

7. Caution signs and labels, as required by the standard, have been purchased and installed.

I feel that any mechanical item or facility revision required should be provided by Monsanto. Other items required in the standard should be complied with by the contractor. Some of these are:

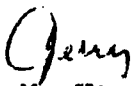
1. Monitoring for exposure to asbestos every six months.
2. Medical examinations at the beginning and end of employment.
3. Setting up program for maintaining respirators as per A.N.S.P.R.P. #288.2-1969.
4. Enforcing work habits as per requirements outlined in the standard.

The Safety Department would appear to be the most likely source for monitoring the asbestos concentrations in our operation.

Through our Purchasing Department, we have received information from the Owens-Corning sales representative (manufacturer of KayLo) that by the end of 1972 they will have an insulation on the market that will exceed KayLo in every respect. It will be asbestos free. B. R. Bradshaw is working with our Texas City plant on securing a sample of this material.

Based upon corporate and Federal Government guidelines to date, I feel the approach would be as outlined. To rush into a program that would cost great sums of money to revise our facilities and methods of fabrication at this time, is not considered necessary in order to comply with the intent or spirit of the new law.

Any comments or suggestions would be appreciated.


J. M. Harris

JMH:lm

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17628

BCC2288

Monsanto

FROM (NAME & LOCATION)

J. M. Harris - Chocolate Bayou Plant

June 26, 1972

cc: A. W. Adams

R. E. Belden

H. C. Clark

F. H. Dupre

C. H. McComb

R. L. Miller - O.M.C.

SUBJECT

Use of Asbestos at
Chocolate Bayou

REFERENCE

TO

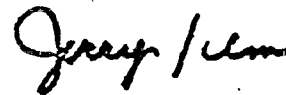
clint Britt

Please find attached a copy of the article highlighting the hazards of exposure to asbestos. I would like to request an Engineering study to determine the feasibility of eliminating the use of asbestos at Chocolate Bayou. The most frequent use of this material in our plant is:

1. Ethylene Furnaces - Weber #48 - contains asbestos used between brick and roof of Ethylene furnaces. Mixed up like mortar and sets up hard: Installed by J. W. Leavesley.
2. Insulation used in the plant
 1. Thermo-Bestos Contains asbestos
 2. Kaylo Contains asbestos
 3. Mono-block Does not contain asbestos
 4. Carey-temp Does not contain asbestos

The Thermo and Kaylo are used for hot service (high temperatures) and all fittings no matter if temperature is hot or ambient, due to the crumbling characteristics of the Mono and Carey. It is also used on straight runs sometimes due to the same problem.

If there is any assistance our group can furnish, please let me know.



J. M. Harris

JMH:lm,

attachment

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BCC2289

XC { CHM
REB
RGM

To J.M. Harris

I have seen your letters (rough draft)
to Miller and Brasfield. They look good.

Some questions I have are:

- (1.) How do you plan on disposing of asbestos insulation from demolition work (or new work)? The Standard requires impermeable containers.
- (2.) Waste coveralls will be used in "asbestos" work. What laundering arrangements will be made?
- (3.) Do we do any mixing of asbestos in the plant? If so, closed containers should be used for mixing and it should be sealed in the wet state where practical.

Chuck

RCC2290

6113
17630

To: C. McComb

CC R.E.B

J.M.H.

In Answer To Your Memo Concerning Asbestos.

- 1) USING WATER HOSE ON CLEAN UP AFTER FIELD REMOVAL - THEN DUMP INTO DISPOSAL.
- 2) mesquite coversalls WILL BE USED. TO BE SEALED IN PLASTIC BAG BY USER. LAUNDRY TO BE ADVISED OF THE CONTENTS
- 3) MIXING CAN BE DONE IN CLOSED CONTAINERS. BY THE END OF THE YEAR THERE WILL BE NO ASBESTOS -

BCC2291

§ 1910.93 Air contaminants.

TABLE G-3—MINERAL DUSTS

Substance	Mppcl	Mg/M ³
Silica:		
Crystalline:		
Quartz (respirable).....	200	10mg/M ³
Quartz (total dust).....	%SiO ₂ +8	%SiO ₂ +2 10mg/M ³
Crystalline: Use 1/2 the value calculated from the quartz or mass formula for quartz.		%SiO ₂ +2
Tridymite: Use 1/2 the value calculated from the formula for quartz.		
Amorphous, including natural diatomaceous earth.....	20	10mg/M ³
Silicates (less than 1% crystalline silica):		
Mica.....	20	
Engelhardt.....	20	
Talc.....	20	
Portland cement.....	20	
Graphite (natural).....	15	
Coal dust (respirable fraction less than 0% SiO ₂).....		2.4mg/M ³ or 10mg/M ³
For more than 8% SiO ₂		%SiO ₂ +2
Iron or Substance Dust:		
Respirable fraction.....	15	8mg/M ³
Total dust.....	20	15mg/M ³

Note: Conversion factors—
1 mg/M³ = 1 million particles per cubic meter

1 million particles per cubic foot of air, based on impinger samples counted by light-scatter techniques.

The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

As determined by the membrane filter method at 42° X plate contrast magnification.
A health concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
4.0	25
10	0

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

2. A new § 1910.93a is added to Part 1910, reading as follows:

§ 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.

(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 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

Table Z-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.	50 p.p.m.	10 minutes.
Beryllium and beryllium compounds (Z37.20-1970).....	2 µg./M ³	5 µg./M ³	25 µg./M ³	30 minutes.
Cadmium fume (Z37.5-1970).....	0.1 mg./M ³	2 mg./M ³		
Cadmium dust (Z37.5-1970).....	0.2 mg./M ³	0.6 mg./M ³		
Carbon disulfide (Z37.3-1966).....	20 p.p.m.	30 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.	50 p.p.m.	5 minutes.
Ethylene dichloride (Z37.21-1969).....	50 p.p.m.	100 p.p.m.	200 p.p.m.	5 minutes in any 3 hours.
Formaldehyde (Z37.16-1967).....	3 p.p.m.	5 p.p.m.	15 p.p.m.	30 minutes.
Hydrogen fluoride (Z37.25-1969).....	do.	do.	do.	do.
Fluoride as dust (Z37.22-1969).....	2.5 mg./M ³	do.	do.	do.
Lead and its inorganic compounds (Z37.11-1969).....	0.2 mg./M ³	do.	do.	do.
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 (Z37.2-1969).....	500 p.p.m.	1,000 p.p.m.	2,000 p.p.m.	5 minutes in any 2 hours.
Organo (alkyl) mercury (Z37.30-1969).....	0.01 mg./M ³	0.04 mg./M ³	do.	do.
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.	do.	10 minutes once only if no other measurable exposure occurs.
Mercury (Z37.9-1971).....	1 mg./10M ³	do.	do.	do.
Chromic acid and chromates (Z37.7-1971).....	do.	do.	do.	do.

TABLE G-3—MINERAL DUSTS

Substance	Mppcf	Mg/M ³	Aerodynamic diameter (unit density sphere)	Percent passing selector
Silica:				
Crystalline:				
Quartz (respirable).....	250 ¹	10mg/M ³	2	90
	% SiO ₂ +5	% SiO ₂ +2	2.5	75
Quartz (total dust).....		30mg/M ³	5.0	50
		% SiO ₂ +2	10	25
				0
Cristobalite: Use 3/4 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	0.0mg/M ³		
		% SiO ₂		
Silicates (less than 1% crystalline silica):				
Mica.....	20			
Soapstone.....	20			
Talc (non-asbestos-form).....	20 ²			
Talc (fibrous). Use asbestos limit.				
Tremolite (see talc, fibrous)				
Portland cement.....	50			
Graphite (natural).....	15			
Coal dust (respirable fraction less than 6% SiO ₂).....		2.4mg/M ³		
		or		
For more than 6% SiO ₂		10mg/M ³		
		% SiO ₂ +2		
Inert or Nuisance Dust:				
Respirable fraction.....	15	5mg/M ³		
Total dust.....	50	15mg/M ³		

NOTE: Conversion factors—
mppcfX35.3=million particles per cubic meter
=particles per c.c.

¹ Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

² The percentage of crystalline silica in this formula is the amount determined from air-borne samples, except in those instances in which other methods have been shown to be applicable.

³ As determined by the membrane filter method at 430X phase contrast magnification.

⁴ Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

⁵ Containing < 1% quartz; if > 1% quartz, use quartz salt.

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 4.6 Mg/M³.

(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 10 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.

(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 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 laundrying 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—(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 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 (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...	¾" Gothic.
Wear Assigned Protective Equipment.	¾" Gothic.
Do Not Remain In Area Unless Your Work Requires It.	¾" Gothic.

Legend

Notation

Asbestos Dust. 14 point Gothic.
May Be Hazardous To
Your Health.

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

(2) **Caution labels**—(1) **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.

[1910.1001(i)(1) amended at 41 FR 11505, 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 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.

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

(2) **Examination.** 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) **Frequency.** 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**—(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.

(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 Sec. 1910.1000 (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.

[37 FR 24749 Effective November 21, 1972]

[Editor's Note: For the following carcinogens' standards, medical examination provisions were remanded by the Third Circuit Court of Appeals. Provisions regarding research laboratories were vacated by the court.]

§ 1910.1003 4-Nitrobiphenyl.

(a) **Scope and application.** (1) This section applies to any area in which 4-Nitrobiphenyl, Chemical Abstracts Service Registry Number 92933 is manufactured, processed, repackaged, released, handled, or stored, but shall not apply to transshipment in sealed containers, except for the labeling requirements under paragraphs (c) (2), (3), and (4) of this section.

(2) This section shall not apply to solid or liquid mixtures containing less than 0.1 percent by weight or volume of 4-Nitrobiphenyl.

(b) **Definitions.** For the purposes of this section: (1) "Absolute filter" is one capable of retaining 99.97 percent of a mono disperse aerosol of 0.3 µm particles.

(2) "Authorized employee" means an employee whose duties require him to be in the regulated area and who has been specifically assigned by the employer.

(3) "Clean change room" means a room where employees put on clean clothing and/or protective equipment in an environment free of 4-Nitrobiphenyl. The clean change room shall be contiguous to and have an entry from a shower room, when the shower room facilities are otherwise required in this section.

(4) "Closed system" means an operation involving 4-Nitrobiphenyl where containment prevents the release of 4-Nitrobiphenyl into regulated areas, non-regulated areas, or the external environment.

(5) "Decontamination" means the inactivation of 4-Nitrobiphenyl or its safe disposal.

(6) "Director" means the Director, National Institute for Occupational Safety and Health, or any person directed by him or the Secretary of Health, Education, and Welfare to act for the Director.

(7) "Disposal" means the safe removal of 4-Nitrobiphenyl from the work environment.

(8) "Emergency" means an unforeseen circumstance or set of circumstances resulting in the release of 4-Nitrobiphenyl which may result in exposure to or contact with 4-Nitrobiphenyl.

(9) "External environment" means any environment external to regulated and nonregulated areas.

(10) "Isolated system" means a fully enclosed structure other than the vessel of containment of 4-Nitrobiphenyl, which is impervious to the passage of 4-Nitrobiphenyl, and which would prevent