December 17, 1971

MEMORANDUM FOR THE RECORD

SUBJECT: MEETING ON DECEMBER 13, 1971, CONCERNING NIOSH/PITTSBURGH CORNING CORPORATION RELATIONSHIPS

References:

1. Letter to James E. Peavy, M.D., Commissioner of Health, State of Texas, from William M. Johnson, M.D., Acting Deputy Director, Division of Field Studies and Clinical Investigations, NIOSH, dated November 16, 1971

2. Letter to William M. Johnson, M.D. from the undersigned dated November 29, 1971.

The subject meeting was requested by the undersigned to avoid further misunderstanding between Dr. Johnson and the undersigned as set forth in Reference 2 above. This meeting was attended by Dr. Joseph K. Wagoner, Director of the Division of Field Studies and Clinical Investigations, NIOSH and several members of his staff and also by Dr. Charles Powell from Dr. Marcus Key's office in Rockville, Maryland.

NIOSH expressed their concern for the employees of the Tyler Plant of Pittsburgh Corning whom they felt were being exposed to too much amosite asbestos and were evidencing some adverse effects based on data they had available from their own study of the employees, including a history, auscultation of the chest and inspection of the hands and data on mechanical ventilation studies of the lungs assumed by the undersigned to have been given them by Dr. George Hurst, Director, East Texas Chest Hospital, who is conducting a medical study at the request of and financially supported by Pittsburgh Corning Corporation. They were also concerned that Mr. McMillan, who was the former Plant Manager had died from lung cancer, Mr. Snavely, the Plant Accountant, apparently has a partially disabling lung disease, and one other employee has a pleural lesion as yet undiagnosed.

They felt that little had been done to control the exposure to asbestos at the Tyler Plant since the Public Health Service Study in 1967, while they felt that the conditions at the Port Allegany Plant were much better. They wanted their panel of experts to review the chest x-rays taken of the employees by Dr. Hurst as soon as possible.

The undersigned indicated he has also evidenced a long-standing interest in the health of the Tyler employees. He said that following the Public Health Service Industrial Hygiene Survey in 1967, he discussed a medical examination follow-up

with Dr. Hurst who agreed to perform same, but this was deferred on information from the Public Health Service that they anticipated performing such medical examinations on the Tyler and Port Allegany employees. The undersigned said that the Public Health Service never got around to performing these examinations, so in 1971 Dr. Hurst was requested by him to go ahead with the studies. These studies were delayed until August because of personnel shortages in Dr. Hurst's hospital. These facts were mentioned to put in perspective the urgency of NIOSH now to have their panel of experts review the Hurst films. The undersigned indicated he does not want to unnecessarily delay this review but feels that it will serve the best interest of the employees if the x-rays are released following his meeting with Dr. Hurst on January 5 and 6, 1972, at which time the complete study will be discussed so as to determine (a) If a health problem related to employment exists, (b) If so, the extent of the problem, (c) What further study or clinical care may be indicated, if any. A NIOSH representative was invited to participate in this meeting with Dr. Hurst and the undersigned.

The undersigned, again attempting to put the industrial hygiene data obtained at Tyler in 1967 by the Public Health Service into proper perspective, made the following analysis based on a reasonable industrial hygiene interpretation of the data in terms of the TLV for asbestos of 5 million particles per cubic foot of dust. It was pointed out that the material being manufactured was only 60% amosite asbestos, not 100%: (The complete report as submitted to the Tyler Plant Management is shown in Attachment #1).

Mixing Area	-	5 samples taken: 5, 13, 9, 7 for a 8 MPPCF average. One sample of 51 was considered contaminated since it was 6X greater than average of other samples.
Forming Area	-	8 samples taken: None above TLV for average of 3.1 MPPCF.
Curing	-	1 sample: .1 MPPCF.
Finishing	-	6 samples taken: 1.9, 1.6, 2.6, 2.0, 2.4 for 2.1 MPPCF average. One sample was 10.9 and was considered contaminated since it was 5X greater than average of other samples.
Inspection	-	3 samples taken: 2.5, 2.1 for 2.3 MPPCF average. One sample, 45, was considered contaminated since it was 20X greater than average of other samples.

EG 15933

In no case was the average of the samples that agreed relatively closely, one with the other, in excess of the then TLV. This TLV was not changed to 12 fibers/ML until 1970, at which time the intended value became TLV.

The undersigned pointed out that in a study done by University of California at Berkeley, at the request of and supported by Pittsburgh Corning, comparing Unibestos and 4 leading asbestos-containing thermal pipe insulation materials indicated that none of these products would be used in the construction industry without exceeding the 12 fibers/ML TLV and that this study intensified the research effort in Pittsburgh Corning to find an asbestos substitute. Being

unsuccessful in finding such a product that was economically competitive with the asbestos-containing products was a factor in the Pittsburgh Corning decision to get out of this market. The undersigned had provided copies of this University of California Study back in September, 1971, to Dr. Johnson.

The undersigned requested the following be provided to him, if possible:

(1) Copy of OCAW request to NIOSH to investigate asbestos exposures at Tyler, Texas.

(2) Copy of NIOSH Survey of October 26-29, 1971, at Tyler.

(3) History and physical findings of NIOSH on Tyler employees.

(4) NIOSH recommendations on type of medical follow-up on current and past employees of Tyler Plant. — HELD FOR REPORT REMINDER

(5) NIOSH recommendations on immediate corrective action to reduce asbestos exposure at Tyler.

(6) Report of medical studies on Port Allegany Plant employees.

Lee B. Grant, M.D.

Lee B. Grant, M.D.
Medical Director

LBG:lc
Attachments
cc: Dr. J. K. Wagoner
Dr. Charles Powell
Dr. Marcus Key
Mr. E. W. Holman
Mr. C. E. Van Horne

bcc: R. C. Packard
P. Martha
C. A. Morat, M.D.

GG 15634

March 27, 1968

Mr. J. W. McMillan
Works Manager
Pittsburgh Corning Co.
Tyler, Texas 75701

Dear Mr. McMillan:

The analysis of the air samples collected in your plant during our survey in March 1967 has been completed, and the results are attached. The impinger samples were counted during the survey using the American Conference of Governmental Industrial Hygienists' method. The membrane filters were rendered transparent with a 50-50 mixture of diethyl oxalate, dimethyl phthalate and counted at 430X magnification with phase contrast illumination.

The dust concentrations as measured by impinger exceeded the 5 million particles per cubic foot Threshold Limit Value currently in use, in a number of locations. The membrane filter method is experimental and no standard has been set for its interpretation in this country. (The British Occupational Hygiene Society has issued "Hygiene Standards for Chrysotile Asbestos Dust" for the 5 u + fiber counts in fibers/cc as follows: Negligible, Less than 0.5; Low, 0.5-2.0; Medium, 2.0-10.0; High, More than 10.0. They also recommend that "When it is necessary to work in a 'high dust' area an approved mask should be worn, ..." The standards are for three-month averages.) Some relationships between the impinger and filter measurement, and some results of surveys of other asbestos product areas, are discussed in the enclosed reprints.

Your cooperation in this study is sincerely appreciated and the data gained from your plant is of considerable value.

Sincerely yours,

Jeremiah R. Lynch
Asst. Chief, Environmental Activities
Field Studies
Occupational Health Program

Enclosure

cc: Dr. Lee Grant

Results of Air Samples of March 19[illegible]7

Pittsburgh Corning, Tyler, Texas

Operation		Impinger		Membrane Filter		
		Sample #	mppcf	Sample #	Fibers/cc Total	5 μ +
Mixing						
Feeder Man	B	200	8.8	201	608.78	355.56
		212	51.4	213	491.44	255.77
		214	13.5	215	451.46	216.73
	P			7	613.39	336.61
				9		
				28		
				109	240.5	115.6
				114	280.23	200.57
Scrap Grinder	B	202	9.1	203	7.8	3.9
		210		211	18.4	8.2
		216	6.8	217	178.13	71.08
	P			8	75.5	45.3
				33	266.4	119.0
	G	117	4.9			
		102	2.2			
		105	7.8			
Forming						
Builder	B	204	4.7	205	92.9	53.4
		330	3.3	329	177.3	49.9
		328	2.9	327	61.6	21.8
		319	4.0	318	39.3	15.3
		317	1.2	316	11.9	7.2
		309	4.7	308	11.3	7.6
		26	1.4	27	78.6	20.3
		24	2.4	25	26.7	15.2

NOTES:

B - Breathing zone simultaneous impinger-membrane filter samples.

P - Personal membrane filter samples collected by a sampling pump worn by the worker.

G - General Air samples.

Pittsburgh Corning

Operation		Impinger		Membrane Filter		
					Fibers/cc	
		Sample #	MMMF	Sample #	Total 5 μ +	
Forming						
Builder	P			1	35.5	15.4
				2	54.7	22.5
				3	26.0	12.8
				5	10.1	5.5
				10	44.5	21.4
				11	30.6	14.7
				29	78.6	20.3
				30	26.4	10.1
				32	77.2	45.9
				36	41.2	26.9
				38	51.8	21.0
				39	31.7	11.1
				106	88.8	30.4
				107	87.8	60.5
				108	134.65	66.35
				111	87.1	48.0
				112	93.4	48.3
				113	267.51	117.37
	G	120	4.7			
Curing						
Oven Man	B	332	0.1	331	.8	.8
	P			37	6.0	2.
Finishing						
Saw Operater	B	313	10.9	312	260.5	140.6
	P			19		
Nob Catcher	B	311	1.6	310	199.9	67.2
	P			13	121.0	72.3
Saw Feeder	B	334	2.6	333	69.2	37.8
		336	2.0	335	38.4	20.1
		206	2.4	207	74.0	46.4
	P			18	84.0	51.6

Pittsburgh Corning

Operation		Impinger		Membrane Filter		
						Fibers/cc
		Sample #	mppcf	Sample #	Total	5 μ +
Finishing						
Lift Truck Driver	P			6	70.8	28.8
	C	123	1.9			
Packing						
Packer	B	208	2.5	209	101.7	27.9
		338	45.5	337		
	P			16		
Box Maker	P			14	10.7	4.7
Weigher	P			22	40.2	20.1
				23	28.2	7.0
Sealer	B	315	2.1	314	69.2	31.0
	P			17	24.8	13.2
Material Handler	P			21	27.4	10.0
Fork Lift Operator	P			110	11.2	9.0

PPG INDUSTRIES

PPG INDUSTRIES, INC./ONE GATEWAY CENTER/PITTSBURGH, PENNSYLVANIA 15222/AREA 412/434-3846

December 20, 1971

LEE B. GRANT, M.D.
Medical Director

Mr. Charles E. Van Horne
Pittsburgh Corning Corporation
P. O. Box 3057
Tyler, Texas 75702

Subject: Emergency Standard for Asbestos

Dear Charlie:

Please see a copy of the Memorandum for Record on my meeting with NIOSH in Cincinnati, which is attached (Attachment #1). See also a copy of the subject Standard published and effective on December 7, 1971 (Attachment #2). See also a copy of my letter to Carl Olm, dated December 21, 1971, in which I discuss the subject Standard and respiratory requirements

From previous dust surveys at Tyler, I believe that you face the same problem as Port Allegany. I will keep you advised as to the response to my letter to the Bureau of Mines.

Very truly yours,

Lee

Lee B. Grant, M.D.
Medical Director

LBG:lc
Enclosures
cc: E. W. Holman
G. S. Gregory

To be a valid assay, the percent column very should be 106±2 percent.

(7) *Identity.* Proceed as directed in [redacted] 1 of this chapter, using a 0.5 [redacted]rcent potassium bromide disc prepared described in paragraph (b)(1) of that section.

(7) *Crystallinity.* Proceed as directed in § 141.504(a) of this chapter.

§ 150g.11 Minocycline hydrochloride capsules.

(a) *Requirements for certification*—(1) *Standards of identity, strength, quality, and purity.* Minocycline hydrochloride capsules are composed of minocycline hydrochloride and one or more suitable and harmless lubricants and diluents enclosed in a gelatin capsule. Each capsule contains minocycline hydrochloride equivalent to 100 milligrams of minocycline. Its potency is satisfactory if it is not less than 90 percent and not more than 115 percent of the number of milligrams of minocycline that it is represented to contain. Its moisture content is not more than 12 percent. The minocycline hydrochloride used conforms to the standards prescribed by § 150g.1(a)(1).

(2) *Labeling.* It shall be labeled in accordance with the requirements of § 148.3 of this chapter.

(3) *Requests for certification; samples.* In addition to complying with the requirements of § 146.3 of this chapter, each such request shall contain:

(i) Results of tests and assays on:

(a) The minocycline hydrochloride in making the batch for potency, [redacted]y, moisture, pH, minocycline con[redacted]ent, identity, and crystallinity.

(b) The batch for potency and moisture.

(ii) Samples required:

(a) The minocycline hydrochloride used in making the batch: 10 packages, each containing approximately 300 milligrams.

(b) The batch: A minimum of 30 capsules.

(b) *Tests and methods of assay*—(1) *Potency.* Proceed as directed in § 141.111 of this chapter, preparing the sample for assay as follows: Place a representative number of capsules into a high-speed glass blender jar with sufficient 0.1*N* hydrochloric acid to give a stock solution of convenient concentration containing not less than 150 micrograms of minocycline per milliliter (estimated). Blend for 3 to 5 minutes. Remove an aliquot and further dilute with 0.1*M* potassium phosphate buffer, pH 4.5 (solution 4), to the reference concentration of 0.100 microgram of minocycline per milliliter (estimated).

(2) *Moisture.* Proceed as directed in § 141.502 of this chapter.

Data supplied by the manufacturer concerning the subject antibiotic have been evaluated. Since the conditions prerequisite to providing for its certification have been complied with and since not delaying in so providing is in the public interest, notice and public procedure and delayed effective date are not prerequisites to this promulgation.

Effective date. This order shall be effective upon publication in the FEDERAL REGISTER (12-7-71).

(Sec. 507, 59 Stat. 463, as amended; 21 U.S.C. 357)

Dated: November 21, 1971.

H. E. SIMMONS,
Director, Bureau of Drugs.

[FR Doc.71-17773 Filed 12-6-71;8:45 am]

Title 29—LABOR

Chapter XIII—Bureau of Labor Standards, Department of Labor

PART 1518—SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

Standard for Exposure to Asbestos Dust

Pursuant to section 4(b)(2) of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1592, 29 U.S.C. 653), § 1518.55 of Title 29, Code of Federal Regulations, is hereby amended in the manner indicated below in order to prescribe a new standard limiting the exposure of workers to asbestos dust. The new standard limiting the exposure of employees to asbestos dust is that adopted under section 6(c) of the Williams-Steiger Occupational Safety and Health Act of 1970 and published in the FEDERAL REGISTER on this date. The standard is hereby determined to be more effective than that presently provided under § 1518.55 to the extent that it prescribes minimum levels of exposure to asbestos dust. Therefore, by operation of section 4(b)(2) of the Act the new standard issued under section 6(c) supersedes the construction safety standard relating to exposure to asbestos dust.

Section 1518.55 is hereby amended by adding a new paragraph (c) thereto. As amended § 1518.55 reads as follows:

§ 1518.55 *Gases, vapors, fumes, dusts, and mists.*

* * * * *

(c) Paragraphs (a) and (b) of this section do not apply to the exposure of employees to airborne asbestos dust. Whenever any employee is exposed to airborne asbestos dust, the requirements of § 1910.93a of this title shall apply.

Effective date. This amendment shall become effective upon publication in the FEDERAL REGISTER (12-7-71).

(Sec. 4(b)(2), 84 Stat. 1592, 29 U.S.C. 653; Secretary's Order No. 12-71, 36 F.R. 8754)

Signed at Washington, D.C., this 2d day of December 1971.

G. C. GUENTHER,
Assistant Secretary of Labor.

[FR Doc.71-17835 Filed 12-6-71;8:47 am]

Chapter XVII—Occupational Safety and Health Administration, Department of Labor

PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

Emergency Standard for Exposure to Asbestos Dust

Pursuant to section 6(c) of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1596, 29 U.S.C. 655), Part 1910 of Title 29, Code of Federal Regulations (36 F.R. 10466, May 29, 1971) is hereby amended in the manner indicated below in order to provide an emergency standard dealing with the exposure of employees to asbestos dust.

In light of increasing information on the results of exposure of employees to airborne asbestos dust, including recent studies by the National Institute for Occupational Safety and Health and others, and recommendations by the American Conference of Governmental Industrial Hygienists (ACGIH), it is hereby determined that (1) exposure under the present standard for asbestos dust in Table G-3, § 1910.93, of 12 fibers per milliliter greater than 5 microns in length or 2 million particles per cubic foot of air, which is derived from an established Federal standard promulgated under the Walsh-Healey Public Contracts Act on May 20, 1969, constitutes a grave danger to employees exposed to this 8-hour time-weighted average concentration; and that (2) an emergency standard is necessary to protect employees from this excessive exposure. The National Institute for Occupational Safety and Health concurs that the proposed change in the asbestos dust standard recommended by the American Conference of Governmental Industrial Hygienists should be the substantial base for the emergency standard.

Action concerning the standard will be commenced under section 6(b) in the immediate future. Any notice of proposed rulemaking under section 6(b) will give notice of the emergency standard as a proposed rule and also of any appropriate subsidiary proposals which may be required under subparagraphs (5) and (7) of section 6(b) relating to the exposure of employees to toxic substances.

Part 1910 is amended as follows:

1. Table G-3 following § 1910.93 (36 F.R. 15104, Aug. 13, 1971) is hereby amended by deleting the following:

Asbestos—12 fibers per milliliter greater than 5 microns in length or		2 Mppcf.
Tremolite	5 Mppcf.	20mg/M³ % SiO₂

As amended, Table G-3 reads as follows:

TABLE G-3—MINERAL DUST

Substance	Mppcf *	Mg/M³
Silica:		
Crystalline:		
Quartz (respirable)	250 †	10mg/M³ =
	%SiO₂+6	%SiO₂+2
Quartz (total dust)		30mg/M³
		%SiO₂+2
Cristobalite: Use ½ the value calculated from the count or mass formulas for quartz.		
Tridymite: Use ½ the value calculated from the formulas for quartz.		
Amorphous, including natural diatomaceous earth	20	80mg/M³
		%SiO₂
Silicates (less than 1% crystalline silica):		
Mica	20	
Soapstone	20	
Talc	20	
Portland cement	50	
Graphite (natural)	15	
Coal dust (respirable fraction less than 5% SiO₂)		2.4mg/M³ or 10mg/M³
For more than 5% SiO₂		%SiO₂+2
Inert or Nuisance Dust:		
Respirable fraction	15	5mg/M³
Total dust	50	15mg/M³

NOTE: Conversion factors—
mppcf×35.3=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 technics.

† 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 430× phase contrast magnification.

= 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:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this note refer to the use of an AEC instrument. If the respirable fraction of coal dust is determined with a M.R.E. 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. The new § 1910.93a reads as follows:

§ 1910.93a Asbestos dust.

(a) The 8-hour time-weighted average airborne concentration of asbestos dust to which employees are exposed shall not exceed 5 fibers per milliliter greater than 5 microns in length, as determined by the membrance filter method at 400–450× magnification (4 millimeter objective) phase contrast illumination. Concentrations above 5 fibers per milliliter but, not to exceed 10 fibers per milliliter, may be permitted up to a total of 15 minutes in an hour for up to 5 hours in an 8-hour day.

(b) Engineering methods, such as but not limited to, enclosure, vacuum sweeping, and local exhaust ventilation, shall be used to meet the exposure [illegible] scribed in paragraph (a) of this section. Where such engineering methods are not feasible, or do not otherwise reduce the concentrations below those prescribed in paragraph (a) of this section, respiratory protective devices shall be provided and used in accordance with paragraph (c) of this section.

(c) (1) (i) When the limits of exposure to asbestos dust prescribed in paragraph (a) of this section are exceeded and when engineering controls required by paragraph (b) of this section are not feasible or do not otherwise reduce the concentration of asbestos dust below those prescribed in paragraph (a) of this section, the employer shall require the use of respiratory protective devices. The selection of respiratory protective devices shall be limited to those specified in the remaining subparagraphs of this paragraph (c).

(ii) The employer shall require that each employee test his respiratory protective device before each use in order to insure a proper fit according to the manufacturer's instructions. The employer shall further provide for effective training or supervision of employees in the testing of respiratory protective devices for fit before their use.

(2) For an atmosphere containing not more than 25 fibers per milliliter greater than 5 microns in length over an 8-hour average, or more than 50 fibers per milliliter over any period of 15 minutes, a reusable or single-use filter type respirator, operating with negative pressure during the inhalation phase of breathing, approved by the U.S. Bureau of Mines under the provisions of 30 CFR Part 14 (Bureau of Mines Schedule 21B), or a valveless respirator providing equivalent protection, shall be used.

(3) For an atmosphere containing not more than 250 fibers per milliliter greater than 5 microns in length over an 8-hour average, or more than 500 fibers per milliliter over any period of 15 minutes, a powered filter positive pressure respirator approved by the U.S. Bureau of Mines under the provisions of 30 CFR Part 14 (Bureau of Mines Schedule 21B) shall be used.

(4) For an atmosphere containing more than 250 fibers per milliliter greater than 5 microns in length over an 8-hour average a type C positive pressure supplied-air respirator approved by the U.S. Bureau of Mines under the provisions of 30 CFR Part 12 (Bureau of Mines Schedule 19B) shall be used.

(5) The employer shall establish a respirator program in accordance with the requirements of American National Standard Practice for Respiratory Protection Z88.2—1969.

(6) The respirators provided each employee shall be properly inspected, cleaned, repaired and stored.

(d) (1) When an employer has employees who are exposed to asbestos dust exceeding the limits prescribed in paragraph (a) of this section and the exposure results from the operations described in the remaining subparagraphs of this paragraph (d), the employer shall comply with the requirements of th subparagraphs relating to the operati involved. The requirements of this pa graph are in addition to those prescri in paragraph (b) of this section.

(2) All hand- or power-operated to which produce asbestos dust such as, not limited to, saws, scorers, abras wheels, and drills shall be provided w local exhaust ventilation and dust c lectors in accordance with the Americ National Standard Fundamentals Go erning the Design and Operation of Loc Exhaust Systems; ANSI Z9.2—1971.

(3) Employees exposed to the sprayi of asbestos or the demolition of pip structures, or equipment covered or i sulated with asbestos shall be provid with respiratory protective devices accordance with paragraph (c) (4) this section.

(e) Asbestos cement, mortar, coating grout, and plaster shall be mixed closed bags or other containers.

(f) Asbestos waste and scrap shall b collected and disposed of in sealed bag or other containers.

(g) All cleanup of asbestos dust an blowing shall be performed by vacuum cleaners. No dry sweeping shall be per formed.

3. Section 1910.12 is amended by changing paragraph (a) in order to appl the emergency standard prescribed in the new § 1910.93a, which is published in this document, to construction work which is subject to the Act. The amendment is necessary in light of the rule of regulatory construction set forth in § 1910.5(c). As amended, § 1910.12 reads as follows:

§ 1910.12 Construction work.

(a) (1) *Adoption and extension of established safety and health standards for construction.* The standards prescribed by Part 1518 of this title and in effect on April 28, 1971, are adopted as occupational safety or health standards under section 6(a) of the Act and shall apply, according to the provisions thereof, to every employment and place of employment of every employee engaged in construction work. Each employer shall protect the employment and places of employment of each of his employees engaged in construction work by complying with the appropriate standards prescribed by this paragraph.

(2) The standards prescribed in § 1518.55(c) of this title shall apply in the case of the exposure of any employee in construction work to airborne asbestos dust.

* * * * *

Effective date. These amendments shall become effective immediately upon publication in the FEDERAL REGISTER (12-7-71).

(Sec. 6(c), 84 Stat. 1596, 29 U.S.C. 655; Secretary's Order No. 12-71, 36 F.R. 8754)

Signed at Washington, D.C., this 2d day of December 1971.

G. C. GUENTHER,
Assistant Secretary of Labor.

[FR Doc.71-17833 Filed 12-6-71;8:47 am]

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION
Cincinnati, Ohio 45202

RECEIVED
DEC 27 1971
MEDICAL DIRECTOR

December 21, 1971

National Institute for Occupational Safety and Health

NOTE: THIS DOCUMENT DID NOT COME FROM PPG FILES

James E. Peavy, M.D.
Commissioner of Health
Texas State Department of Health
1100 West 49th Street
Austin, Texas 78756

Attention: Mr. Martin C. Wukasch, P.E., Director
Division of Occupational Health and Radiation Control

Dear Dr. Peavy:

Enclosed is a report of an industrial hygiene and medical survey of the Pittsburgh-Corning Corporation plant in Tyler, Texas. This study was conducted on October 26 - 29 by the National Institute for Occupational Safety and Health at the request of the Texas State Department of Health, and Local 4202, Oil, Chemical, and Atomic Workers International Union.

The principal objectives of the study were to determine the levels of asbestos dust in the working environment, to evaluate the existing environmental controls for asbestos, and to perform medical examinations of the workers.

The results of the study revealed exposures to asbestos considerably in excess of present standards, which, coupled with the medical findings, represent an extremely serious occupational health problem. The report contains recommendations for correction of the situation which we feel should be implemented immediately in order to assure that the health of the workers in this plant is adequately protected.

Your cooperation in this study is greatly appreciated. If we can be of further assistance, please feel free to call.

CC 15512

Sincerely yours,

Bobby F. Craft

BB 0007897

Bobby F. Craft, Ph.D.
Acting Director, Division of Technical Services

William M. Johnson

William M. Johnson, M.D.
Acting Deputy Director, Division of Field Studies and Clinical Investigations

Enclosure

cc: M. P. Hunt

Foil

ASBESTOS SURVEY

PITTSBURGH-CORNING CORPORATION

TYLER, TEXAS

PROJECT NO: 71-45
DATE: 12/7/71

Project 71-45

N.I.O.S.H. SURVEY
PITTSBURGH-CORNING CORPORATION
TYLER, TEXAS
OCTOBER 26 - 29, 1971

Study requested by:

Martin C. Wukasch, P.E., Director
Division of Occupational Health and Radiation Control
Texas State Health Department
Austin, Texas

Local 4202
Oil, Chemical, and Atomic International Workers

Study conducted by:

National Institute for Occupational Safety and Health
Cincinnati, Ohio 45202

Division of Technical Services
Thomas L. Anania, Acting Chief
Industrial Hygiene Services Branch
Steven F. Alder, Engineer
Francis J. LaPallo, Engineer

Harry Markel, Industrial Hygienist
Region VI

Division of Field Studies and Clinical Investigations
William M. Johnson, M.D., Acting Deputy Director
Richard Spiegel, M.D.
Richard Lemon, Epidemiologist

Other persons present:

Charles E. Van Horne, Plant Manager
Pittsburgh-Corning Corporation
Tyler, Texas

Horace Adrian, Chief
Industrial Hygiene Program
Texas State Department of Health

SUMMARY OF REPORT

During the week of October 26 - 29, 1971, the National Institute for Occupational Safety and Health conducted a comprehensive industrial hygiene and medical survey of the Pittsburgh-Corning Corporation amosite asbestos thermal pipe insulation plant in Tyler, Texas.

The survey pointed out major industrial hygiene deficiencies which included a grossly inadequate ventilation system and poor housekeeping practices. Personal air samples yielded grossly excessive fiber concentrations. One hundred seventeen of 138 samples exceeded 5 fibers/ml for fibers >5μ in length.

The National Institute for Occupational Safety and Health medical questionnaires and examinations for rales and clubbing were conducted on 63 male employees in order to complement the X-rays and pulmonary function tests performed by Dr. George Hurst at the East Texas Chest Hospital in August 1971. Even without benefit of interpretation of the X-rays, 7 of 18 workers with 10 or more years employment meet at least 3 of 4 criteria for asbestosis, and reduced pulmonary function was observed in a few workers with less than 5 years employment.

In conclusion, an extremely serious and critical occupational health situation exists at this plant. Immediate corrective action is necessary to reduce asbestos exposures to conform to existing standards.

Appropriate recommendations are presented in this report. In all areas and operations except the office area, average and maximum concentrations of dust greatly exceeded the presently existing Threshold Limit Value of the American Conference of Governmental Industrial Hygienists and the Emergency Standards of the U. S. Department of Labor (see Table I).

INTRODUCTION AND PURPOSE

On October 26 - 29, 1971, at the request of Mr. Martin C. Wukasch of the Texas State Health Department and Local 4202, Oil, Chemical, and Atomic Workers International Union, an environmental and medical survey was made of the Pittsburgh-Corning Corporation plant in Tyler, Texas. The survey was made to determine the level of asbestos dust in the working environment, to evaluate the existing environmental controls for asbestos and to conduct medical questionnaires and examinations for rales and finger clubbing. The study was conducted by the Division of Technical Services and the Division of Field Studies and Clinical Investigations of the National Institute for Occupational Safety and Health (NIOSH).

Previous industrial hygiene surveys for asbestos dust were made of this plant in March 1967 and January 1970. On both occasions the levels for asbestos dust greatly exceeded the threshold limit value (TLV) for asbestos dust as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH). In this study the asbestos dust was also grossly in excess of the existing TLV's (see Table I).

DESCRIPTION OF PLANT AND MANUFACTURING OPERATIONS

The plant occupies two large buildings approximately 1000 ft. long and 50 ft. wide and covers approximately 100,000 sq. ft. The buildings are approximately 30 ft. high with corrugated metal roofs, a wooden shell, and concrete floors.

The plant employs 74 persons, including 62 hourly and 12 salaried employees. There are four major departments:

1. Production
2. Finishing
3. Shipping, Receiving and Warehouse
4. Maintenance

With the exception of the production department which operates three full shifts, the plant operates only one shift. In this plant asbestos insulation for pipe is manufactured from a variable mixture of asbestos (approximately 90%) and varying amounts of natural diatomaceous earth, sodium silicate and mineral wool.

The amosite asbestos used by Pittsburgh-Corning is mined in East Africa. It arrives at the Tyler plant by railroad cars packaged in polyethylene lined hissian bags with each bag weighing 110 lbs. After the materials are received they are stored and used as needed.

There is also a large inventory of "governmental surplus" amosite asbestos in the warehouse. This material is stored in burlap bags without the polyethylene liners. All types of used asbestos bags are sold to nursery companies to wrap trees or they are disposed of in the local dump.

When the materials are ready for processing they are placed in material feeders. There are 3 feeder lines with each line having 3 stations. Each station contains different materials. The first station contains the virgin amosite; the second contains mineral wool (at times the final formulation contains approximately 5% mineral wool). The third station contains scrap. (Scrap is regenerated asbestos and is approximately 25% of the formula.) The new bags of asbestos are placed on top of the feeder and cut with a knife and allowed to fall into the feed hopper. The scrap is removed from metal containers using a large fork and placed in the feeder hopper. Both systems generate excessive amounts of dust. The diatomaceous earth used in the formula (7%) is placed in large hoppers and fed by auger to the conveyor system.

After the material is placed in the feeder hoppers it is transported by conveyor belts to the attrition mill which opens the amosite fibers and blends all the ingredients together. From the attrition mill the material is transported through ducts to the cyclone where the heavy material is separated out and the light material is recycled to the attrition mill. From the cyclone the heavy material goes to the building machines.

In the building machine, through a system of spiked belts and lay belts, a lap is formed. The lap is a dry mass of the total blend of the raw materials. Controlling the speed of the spike belt determines the thickness of the lap. The material then goes through a mechanical rake to smooth the lap; it is then sprayed with sodium silicate. After the lap is sprayed it exits the building machine and is rolled on a mandrel to desired size. Sand or Perlite is applied at the beginning of the roll to ease the mandrel from the finished roll. It then goes to the finishing mill. From the finishing machine it goes to the coating machine where a clay coating is applied.

At the building machine in the roll-up process, small amounts of the material cling to the lap belt and are scraped off the bottom side of the turn around drum. This material is gathered up, loaded on a truck and dumped in a large field adjacent to the plant as waste. At the present time no provisions have been made to bury this material. This practice has been carried out for at least 15 years. This produces a serious air pollution problem.

After the rolls have been clay coated they are removed from the mandrel and put into a drying room. From the drying oven the rolls go to the finishing department where the ends are sawed off, split down the middle, bound together with string, packaged and then removed to the warehouse for storage.

ENVIRONMENTAL STUDY PROCEDURES AND INSTRUMENTATION

Atmospheric samples for fiber count were collected on Millipore filters, Type AA*, encased in three-piece plastic Millipore aerosol field monitor with face cap removed and filter completely exposed. The samples were taken at the operators' breathing zone using battery powered Mine Safety Appliance (MSA) gravimetric pumps, Type G. The pumps and samplers were worn by the employees. The pumps were calibrated to operate at 1.7 liters/minute with each sample being taken for one hour. Each employee on each shift was sampled at least twice, with some employees on the first shift being samples three times.

Ventilation measurements were made using pitot static tubes and a magnehelic gauge. A ten-point traverse was attempted on the larger ducts with a six-point traverse on ducts six inches or smaller. A more detailed report of the ventilation system will appear later in this report. Face velocity measurements were made on hoods using a thermal anemometer.

Noise measurements were also made of the plant using a General Radio sound level meter, Type 1565-A, calibrated at the time of this study. No readings were found to be above 85dBA.

TOXICOLOGY AND HYGIENIC STANDARDS

Asbestos is a general name given to a variety of fiberous minerals. The major asbestos minerals are chrysotile, crocidolite, amosite and anthophyllite. Asbestosis, lung cancer, pleural and peritoneal mesotheliomas may follow exposure to asbestos. The risk is related to the length of exposure and the dust concentration.

*Registered trade name of the Millipore Corp., Bedford, Massachusetts

The Threshold Limit Value (TLV)* for asbestos dust, as listed in the Threshold Limit Values for 1971 of the ACGIH is 5 million particles per cubic foot of air. In 1968, the U.S. Department of Labor (Walsh-Healey Act) promulgated a standard limit of 12 fibers per ml of asbestos, for fibers >5μ in length. On December 7, 1971, the U.S. Department of Labor established an "Emergency Standard for Asbestos Dust Exposure of 5 fibers per milliliter, >5μ in length for an eitht-hour weighted exposure. The ceiling exposure conditions shall not exceed 10 fibers per milliliter >5μ in length."

RESULTS OF STUDY

A total of 138 personal samples were taken of the various operations at the Tyler plant. These samples were analyzed in the Cincinnati laboratory of NIOSH. Each of the membrane filters were rendered transparent using a 50:50 mixture of dimethyl phthalate and diethyl ozalate and counted using a 4 mm (43X) phase contrast objective 400X magnification and phase contrast illumination. Counts were recorded for all fibers >5μ.

Of the total of 138 samples taken, 117 exceed the presently accepted Hygienic Standards of 5 fibers/ml of air and >5μ in length. In all areas and operations, except the office area, average and maximum concentrations of dust greatly exceeded the presently existing TLV of the ACGIH and the Emergency Standard of the U.S. Department of Labor. (see Table I.)

The plant was in very poor condition including housekeeping, health hazards, ventilation, and storage and disposal methods. Each aspect will be discussed below.

*TLV Booklet. Threshold limit values refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect. Because of wide variation in individual susceptibility, however, a small percentage of workers may experience discomfort from some substances at concentrations at or below the threshold limit, a smaller percentage may be affected more seriously by aggravation of a pre-existing condition or by development of an occupational illness.

HOUSEKEEPING

The housekeeping was very poor. At the time of our arrival, when a walk-through survey was made, the floors, ceilings and rafters had an excessive amount of dust on them. The drinking fountains and eye bubblers were very dirty as were the rest rooms. There were also small piles of dust around the machines that had been swept there by the operators using push brooms. Thus, asbestos dust was re-disbersed into the work atmosphere.

VENTILATION

The ventilation system, as a whole, was found to be grossly inadequate. Some of the deficiencies are listed below.

1. Blast gates were closed.
2. Small ducts on all three feeder stations were plugged.
3. Large holes in main and auxiliary ducts and in the bag collectors.
4. Conveyor system from feeders to attrition mills have large separations in the facility.
5. Many of the ducts are disfigured, probably caused by bumping by machinery.
6. Holes in ducts were repaired by applying Permagum, a putty like substance.
7. Too many 90° entries were attached to the main ducts, which can cause excessive air turbulance and static pressure losses.

An attempt was made to do a pitot traverse of the ventilation system. This was impossible since the ducts on each of the three feeder stations were plugged. Static pressure reading could not be made due to holes in the blower housing and the bag collectors.

SCRAP GRINDER

The scrap grinder is located north of the feeder stations. Scrap from various operations are ground up to be reused in the process. The operator must lift the pieces of scrap above his head to feed the grinder. After the scrap is ground up it is deposited in a metal container approximately 4' x 4' with wheels. After the container is full it is removed and then taken to the feeder stations where it is reintroduced into the process. The grinding operation was very dusty and the ventilation was insufficient. Velocity across the face of the opening was only 20-30 ft./minute (fpm). A slot at the floor level was pulling approximately 200 fpm but is incorrectly placed; it should be located above and close to the metal container.

MATERIAL FEEDERS

The material feeders consist of three lines with each line having three stations. The ductsused to ventilate these stations are located approximately 2 ft. from the opening of the feeders with each having a 90° entry. The ducts are 4", 5", and 6" in diameter, depending on the location to the main duct. Face velocities across each station ranged from 0-15 fpm. A fan located in the area contributed to the turbulence and redispersion of dust in the work atmosphere at the feeder stations. There were openings on the feeder stations that allowed the operator to see into the feeder. Although they were equipped with plexiglass they were left open. This also contributed to the dust buildup in the area. The scrap grinder and the feeder stations are on the same collection system. This collecting system, consisting of three units of canvas bags with 16 bags in each unit, is located inside the plant. These bags are cleaned by mechanical shaking with the asbestos falling into 55 gallon drums located beneath the bags. There is a large opening between the bags and the drums and when the bags are shaken a large portion of the dust is released to the work area. The spillage, like the spillage from the scrap grinder and the feeders,

is swept up by using a push broom. Although the plant has a vacuum cleaner it was not used in these areas.

BLOCK SAW OPERATION

The exhaust on this operation was in the best condition of any in terms of removing the dust at the source. However, the blower assembly and the collector bags had holes in them and the dust exhausted from the operation was released into the work area.

LARGE SAW OPERATION

In this operation the larger sections of pipe insulation are trimmed. The pipe is put on a conveyor and both sides are trimmed simultaneously using a band saw. At the base on each side of the saw there is a 6" duct to exhaust the dust. The face velocity at these ducts was measured at 200 fpm. This does a good job at the bottom but the dust generated at the top of the cut is released to the work area. When the ends are trimmed, the pipe then goes to a splitter which makes a cut along the length of the pipe. For exhausting the dust from this operation there is a side draft or suspended hood arrangement. It does a good job of exhausting the dust around the outside and along the cut, but the dust is not removed from the inside of the pipe. When it is removed it is inverted and the dust is released to the work area. There is a considerable amount of dust in this part of the operation. This was the only operation in which the dust collector was located on the outside of the building.

RESPIRATORS

In 1971, the wearing of respirators was made mandatory in all areas of the plant. Respirators used in the plant were MSA Comfo Mask with BM21B-90 filters. Although they have a definite application, respirators should not be worn as a regular means of protection. Respirators should be used only as an

emergency or for backup protection. This does not seem to be the intent at this plant. Unless properly fitted, correctly used, and properly maintained, a respirator may become a hazard because it gives the wearer a false sense of security and permits him to become careless and may add to his exposure. If respirators must be used they should be controlled through a company operated program providing for proper selection, fitting, maintenance and cleaning. This part of the program is lacking since many workers were seen with straps too loose, and straps not connected. There is no maintenance and standardization program for the respirators.

HEALTH HAZARDS

In addition to the health hazard from the amosite asbestos, the following potential hazards were noted:

1. The lunch room is located too close (approximately 40-50 ft.) to the dustiest operation in the plant.
2. Workers are allowed to go into the lunch room wearing clothes contaminated with asbestos.
3. There is a potential health hazard from the diatomaceous earth handling operation.
4. The scrap material that is dumped into the open field may cause a serious community health problem.
5. The sand, used on the floor to enable cartons to be moved more easily, may present a silica dust problem.

ADDITIONAL COMMENTS

Some additional potential hazards were observed as follows:

1. There are 6 homemade natural gas heaters located throughout the plant. Since they are vented into the plant this may cause carbon monoxide or fire and explosion hazard.

2. Compressed air outlets operating at 90 psi are located throughout the plant for the purpose of blowing excess dust off employees. This is not only a hazard to the employees but it reintroduces the asbestos dust to the working environment.

MEDICAL PROGRAM

The company has no in-plant medical facilities or first aid room. Two first aid cabinets were stocked inadequately, and one first aid cabinet had a door with broken glass.

Occupational health consultation is available from corporate headquarters in Pittsburgh, Pennsylvania. Dr. Lee Grant, Medical Director of PPG Industries, Inc., is Medical Consultant to the Pittsburgh-Corning Corporation.

Employees are sent to the Tyler Medical and Surgical Clinic for X-rays, physical examinations, and emergency care. Pulmonary function and X-rays were performed on all male employees in August 1971, at the nearby East Texas Chest Hospital by Dr. George Hurst, an internist and specialist in chest diseases.

Diffusion studies and arterial blood gases were obtained on those male employees with greater than 5 years employment. At the present time the workers do not receive pre-employment X-rays due to the high turnover of new personnel; however, after 60 days employment chest X-rays are taken.

In August 1971, U.S. Bureau of Mines approved respirators were made mandatory throughout the plant concomitant with an application to the Occupational Safety and Health Administration, U.S. Department of Labor, for variance from the asbestos standard. In the finishing and batching area of production (feeders and scrap grinders), the use of respirators has been mandatory since 1965. Safety glasses are required. No protective clothing is issued to employees, and there are 5 air hoses operating at 90 lbs/sq. in. and located throughout the plant to blow off excessive dust.

Also, the variance request sets forth the requirement: "Continuing health education program on asbestos will be provided." However, during the present survey, many employees apparently were unaware of the serious implications of asbestos exposure.

MEDICAL DATA AND RECOMMENDATIONS

Asbestos is a general name given to a variety of fibrous minerals. The major asbestos minerals are chrysotile, crocidolite, amosite, and anthrophylite. Amosite is used exclusively at this plant in the production of thermal pipe insulation.

Asbestos-related diseases have been well documented in the medical and occupational health literature. The risk of developing asbestosis or pulmonary fibrosis varies directly with length of exposure and concentration of exposure. The association between occupational exposure to asbestos and lung cancer, pleural mesothelioma, and peritonial mesothelioma is recognized.

NIOSH industrial hygiene surveys in 1967 and 1970 yielded grossly excessive fiber concentrations compared to current and proposed standards. Again, the present survey yielded grossly excessive fiber concentrations in all production, finishing, and shipping areas.

NIOSH medical questionnaires and examinations for rales and finger clubbing were conducted by our survey team on 63 male employees in order to complement the X-rays and pulmonary function tests performed by Dr. George Hurst of the East Texas Chest Hospital in August 1971, at the request of the Pittsburgh-Corning Corporation. Several films were read as possible pulmonary fibrosis. Dr. Lee Grant, Medical Consultant to Pittsburgh-Corning Corporation, has delayed release of these films to NIOSH and its expert panel of radiologists pending his personal review of the X-rays. Even without benefit of X-rays, 7 of 18 workers with 10 or more years employment at the Tyler plant meet at least 3 of 4 criteria for asbestosis. These criteria include:

1. Forced vital capacity below 80% of predicted.
2. Dyspnea.
3. Finger clubbing.
4. Rales.

Positive X-rays could increase further the number of cases of asbestosis. Reduced pulmonary function was also observed in a few workers with less than five years employment.

In conclusion, the following medical recommendations are set forth:

1. Chest X-rays obtained in August 1971, should be forwarded to NIOSH and its expert panel of radiologists for the benefit of the Tyler employees.
2. Reduction of asbestos exposure levels to conform to existing standards is imperative in order to prevent any irreversible pulmonary damage.
3. Following a review of the X-rays, further and more specific medical recommendations will be made.
4. Medical follow-up of present and past employees is indicated. Certainly asbestosis has been reported to progress following cessation of asbestos exposure.

DISCUSSION AND CONCLUSIONS

Inhalation of asbestos dust has long been recognized as a serious occupational health hazard. Asbestos-related health effects were detected in many Tyler employees.

This plant has been in operation since 1954. NIOSH surveys in 1967 and 1970 yielded excessive fiber concentrations, and again, this survey yielded fiber concentrations grossly in excess of current and proposed standards.

Housekeeping practices and the ventilation system were inadequate. According to the AIHA Industrial Ventilation Manual, a minimum capture velocity of 200 fpm at the face of the material feeders and a duct velocity of 3500 to 4500 fpm should be maintained. Since the open area of the material feeders is approximately 9 sq. ft., the minimum effective air movement would be 8 ft. x 200 fpm = 1600 cfm. The carrying velocity in the main duct should be approximately 3100 cfm. The present system does not meet these criteria.

The respirator program is inadequate and does not offer sufficient protection.

In conclusion, immediate measures should be taken to insure the employees a safe and health work environment. Further asbestos exposure could result in irreversible pulmonary damage. Immediate corrective action is mandatory and the following industrial hygiene recommendations are set forth:

1. A complete redesign of the ventilation system.
2. Locate all dust collectors on outside building and equip collectors with automatic shakers.
3. Appoint a safety committee to educate employees to hazards of asbestos.
4. Remove all homemade gas heaters from the plant.

5. Do not allow employees to use compressed air to remove dust from clothes.

6. Establish a company operated and controlled respirator program providing for proper selection, fitting, maintenance and cleaning.

7. The lunch room should be located in a clean area of the plant and employees should not be allowed to enter with dirty clothing.

8. All employees should be issued protective clothing such as coveralls and cotton caps and these clothes should be removed before eating and before going home.

9. All scrap materials should be buried.

10. Used asbestos bags should be buried also and not sold to nurseries or removed to the local dump.

11. Do not use sand on floor to transport cartons.

REPORT PREPARED BY:

Thomas L. Anania

William Johnson, M.D.

REFERENCES

1. Documentation of Threshold Limit Values, American Conference of Governmental Industrial Hygienists, Committee on Threshold Limit Values, Cincinnati, Ohio 1971.

2. Threshold Limit Values of Airborne Contaminants and Physical Agents, American Conference of Governmental Industrial Hygienists (1971).

3. Industrial Ventilation - A Method of Recommended Practice. 11th ed.

TABLE I

ANALYSIS OF PERSONAL SAMPLES

PITTSBURGH-CORNING ASBESTOS PLANT, TYLER, TEXAS

ASBESTOS PIPE-INSULATORS

OPERATION		SAMPLE	CONC. (FIBERS >5μ/ml)
Mixing			
	Feeder	45	54.04
	Feeder	139	105.83
	Feeder	117*	101.71
	Feeder	99*	169.7
	Scrap Feeder	106	9.58
	Feeder	60*	188.91
	Feeder	12*	92.77
	Feeder	57	26.4
	Feeder	82	9.14
	Feeder	132	22.5
	Feeder	29	37.6
	Maximum Concentration		189
	Average Concentration		75
Forming			
	Builder	18	40.93
	Builder	91	26.11
	Builder	103	14.61
	Builder	88	7.45
	Builder	119	9.42
	Builder	83	25.79
	Builder	85	42.77
	Relief Builder	105	22.33
	Builder	89	6.67
	Builder	121	25.53
	Builder	54	12.28
	Builder	25	57.72
	Relief Builder	71	35.24
	Builder	90	17.
	Builder	92	37.54
	Builder	120*	90.9
	Builder	110	70.36
	Builder	107*	103.97
	Relief Builder	111	30.43
	Builder	16*	134.41
	Builder	20	53.23
	Builder	14	44.31
	Builder	17	59.58
	Builder	53	42.99

Forming			
	Maximum Concentration		134
	Average Concentration		42
	Relief Builder	27	72.12
	Builder	74	9.74
	Builder	15	64.35
	Builder	24*	111.15
	Builder	131	13.8
	Builder	136	9.9
	Builder	122	14.8
	Builder	101	26.9
	Builder	124	8.44
	Builder	65	56.45
	Builder	95	36.41
	Builder	58	14.75
	Relief Builder	56	24.27
	Builder	102	31.2
	Labor	52	11.26
	Maximum Concentration		134
	Average Concentration		36
Curing			
	Oven Tender	47	23.5
	Oven Tender	140	5.08
	Oven Tender	112	6.89
	Oven Tender	93	19.87
	Oven Tender	84	16.40
	Maximum Concentration		29
	Average Concentration		14
Finishing			
	Supervisor	68	20.38
	Wrapper	130	11.43
	Wrapper	98	37.45
	Finishing Laborer	1	30.43
	Utility-Finishing	3	48.53
	Utility-Finishing	66	12.03
	Wrapper	8	94.81
	Utility-Finishing	4	55.11
	Finishing Laborer	22	22.83
	Saw Operator	30	27.36
	Saw Operator	126	19.38
	Saw Helper	78	14.18
	Saw Operator	76	31.23
	Saw Operator	94	21.9
	SRL Saw	118	1.73
	Cutting Saw	51	91.76

Finishing			
	SRL Cutting Saw	55	40.28
	Saw Feeder	35	2.30
	Pine Machine Oper.	006*	208.42
	Saw Labor	007	97.26
	Saw Labor	116	6.59
	SRL Saw	134	25.97
	SRL Saw	141	1.96
	Saw Labor	109	11.62
	SRL Labor	26	91.52
	Maximum Concentration		208
	Average Concentration		41
Inspection			
	Box Marker	86	20.71
	Weigher	59	34.49
	Fork Lift Operator	2	11.71
	Packer	21	9.5
	Packer	42	1.84
	Shipping Supervisor	43	2.18
	Packer	10	13.08
	Fork Lift Operator	62	20.42
	Labeler	63	20.72
	Inspector	69	92.26
	Weigher	5	29.45
	Inspector	23	73.62
	Packer	9	3.83
	Packer	44	.71
	Weigher	125	6.8
	Maximum Concentration		92
	Average Concentration		23
Miscellaneous			
	Maintenance	75	32.08
	Utility	135	2.09
	Utility	133	8.36
	Maintenance	108	18.12
	Utility	39	30.38
	Maintenance	11	42.28
	Maintenance	13	26.81
	Maintenance	50	28.43
	Maintenance	64	37.54
	Sweeper	97	3.61
	Maintenance	123	2.10
	Maintenance	127	0.94
	Janitor	129	2.29
	Shipping	40	1.36
	Guard	73	1.94

Miscellaneous			
	Guard	113	4.58
	Guard	72	0.64
	Supervisor	128	1.57
	Supervisor	080	14.92
	Supervisor	19	29.91
	Supervisor	79	6.28
	Supervisor	77	24.25
	Supervisor	104	25.2
	Supervisor	115	2.28
	Maximum Concentration		42
	Average Concentration		14
Office Workers			
		154	0.04
		152	0.04
		158	0.03
		155	0.66
	Maximum Concentration		.66
	Average Concentration		.22

* = Approximate (too many to count)

Samples taken on October 26, 27, 28, 29, 1971

National Institute for Occupational Safety and Health
550 Main Street, Federal Office Bldg., Rm. 7033
Cincinnati, Ohio 45202

December 21, 1971

George A. Hurst, M.D.
East Texas Chest Hospital
Post Office Box 2003
Tyler, Texas 75701

Dear Dr. Hurst:

Dr. Richard Spiegel and Richard Lemen will be attending the meeting with Dr. Lee Grant beginning at 9:00 A.M. in your office on January 6, 1972.

They will be ready, if necessary, to remain for a two-day meeting.

Thank you.

Sincerely yours,

William H. Johnson, M.D.
Acting Deputy Director
Division of Field Studies
and Clinical Investigations

cc: Dr. Lee Grant ✓
Dr. Joseph K. Wagoner
Mr. George Pettigrew, NIOSH, Region VI

(1-)

220 -71

PITTSBURG CORNING

NAME	NUMBER	COUGH	PHLEGM	BREATHLESSNESS	WHEEZE	SMOKING HIST. PKG. PER WK.	LENGTH OF EMPL.	AGE	OTHER PERTINENT INFO.
Walker M	X 17071	yes	yes	yes	yes	12	10 yrs.	51	Sinusitis
dle, H L.	X 17068	yes	No	yes	yes	14	10 yrs	36	
ell, E.B.	X 17061	No	No	yes	yes	Smoked 34 yrs. Quit	16 yrs.	52	Sinusitis High Blood pres
e, D.	O 17058	No	No	No	only with Cold	Quit after 11 yrs.	8 yrs.	37	Was had sinusitis Pleurisy + Bronchitis
Haina C.E	O 17048	No	No	No	with Cold	6	7 yrs.	47	Sinusitis Pneumonia + Bronchitis
ren, D A.	X 17052	No	No	yes	with Cold	Quit	17 yrs.	39	Pleurisy
nde, J C.	X 17055	yes	yes	yes	yes	4 oz Tandrail	10 yrs.	46	Bronchitis Sinusitis
en, O	X 17056	No	No	yes	yes	14 pipes	11 yrs.	60	Flue - sinusitis Pneumonia Bronchitis
man, H	O 17057	No	No	No	with Cold	Quit	6 yrs.	30	
uely, E M	O 17060	No	No	No	with Cold	7	8 yrs Then 20 yrs	45	
ron, R.	O 17050	No	No	yes	with Cold	Never	5 1/2 yrs.	33	sinusitis
s, W C.	X 17070	No	No	No	with Cold	Quit	17 yrs.	49	
ks, R L.	O 17049	No	No	yes	No	Cigar 2 or 3 wk.	9 1/2 yrs.	32	Pneumonia
	X 17067	No	No	No	No	Cigar [illegible] day	16 1/2 yrs	26	

NOTE: THIS DOCUMENT WAS RECEIVED NOT COME FROM PPG FILES

PITTSBURG CORNING

NAME	NUMBER	COUGH	PHLEGM	BREATHLESSNESS	WHEEZE	SMOKING HIST. PKG. PER WK.	LENGTH OF EMPL.	AGE	OTHER PERTINENT INFO
Harris, H.L.	17054	Yes	Yes	Yes	No	10	17 yrs.	44	Bronchoscopy
Lee, E.	17051	No	No	No	No.	Cigars 50	17 yrs.	44	Sinusitis Pleurisy
Dearden, A.B.	17057	Morning	Yes	Yes	With cold	5	10 yrs.	45	Pneumonia Sinusitis
Thomas, H.T.	17062	Yes	Yes	Yes	Yes	4	10 yrs.	45	Pleurisy Sinusitis
Thomas, R.F.	17063	No	No	Yes	Yes	4-5	10 yrs.	49	
Belcher, T.V.	17069	Yes	Yes	No	With cold	7	15 yrs.	48	Pneumonia
Spencer, H.	17047	No	No	No	Yes Cold	Quit	11 yrs.	38	sinusitis
Jenkins, W.B.	17059	No	No	No	With cold	7	17 yrs.	40	sinusitis
Lee, O.F.	17065	Yes	Yes	Yes	Yes	7½ hand-rolled	10½ yr.	58	Pneumonia
Fitzgerald, J.J.	17064	Yes	Yes	Yes	With cold	7	9 yrs.	52	Pleurisy Sinusitis
McKee, M.O.	17046	Yes	Yes	Yes	No.	7	5¼ yrs.	38	Pneumonia
Ridway, J.	17017	No	No	No	No	Beer	1¼ yr	45	Pulse skips heat. sinusitis
Jesse, D.	17018	Yes	Yes	Yes	Yes	5	1¾ yr.	38	sinusitis
Stephenson, R.	17033	No	No	Yes	With cold	Quit	1 yr.	50	

PITTSBURG CORNING

NAME	NUMBER	COUGH	PHLEGM	BREATHLESSNESS	WHEEZE	SMOKING HIST. PKG. PER WK.	LENGTH OF EMPL.	AGE	OTHER PERTINENT INFO.
Fitzhenry, J	17020	Yes	Yes	Yes	No	7	4 yrs	X 40	
Laplocks E	17028	No	No	No	No.	Never	3½ yrs	X 43	Pneumonia
Brooks. L	17036	Yes	Yes	No.	with cold	7	3½ yrs	54	sinusitis
Carpenter, H.C.	17045	Yes	No.	No.	No	8	3 yrs.	O 30	
Clark, E	17044	Yes	Yes	No	with cold	Yes	6 mos.	20	Flu 3 yrs in succession
Cobb. B	17039	No.	No.	No	No	Never	8 mos	57	
Coaks, D	17019	No	No.	No	No.	Never	2 yrs.	X 46	
Conaway, J.	17027	No	No.	No	No	7	3 yrs.	O 30	Flu
Cole, J	17032	No	No.	No.	No	3½	1½ yrs	26	Pleurisy Pneumonia Flu
Cortson, C	17066	No	No	No.	with Cold	7	1 yr.	23	sinusitis
Crocker, F.	17038	No	No	Some	No	Never	15 mos.	25	Flu
Dargist. O	17042	No	No	No	with Cold	5	2 yrs	X 48	Sinusitis Flu
Elm, D	17037	No	No	No	with Cold	7	8 mos	24	
[illegible]	[illegible]	No	No	Yes	Yes	2½	[illegible]	O 37	Flu - 1969-70

NOTE: THIS DOCUMENT DID NOT COME FROM PPG FILES

PITTSBURG CORNING

NAME	NUMBER	COUGH	PHLEGM	BREATHLESSNESS	WHEEZE	SMOKING HIST. PKG. PER WK.	LENGTH OF EMPL.	AGE	OTHER PERTINENT INFO
Hicks, H	17034	No	Yes	Yes	Yes	Cigars 4-5	4 yrs.	42	
Hilton, H	17043	No	No	No	No	Quit	1½	30	sinusitis
Jackson, J	17014	No	No	No.	with cold	7½	2 yrs.	24	
Jones, E	17029	No	No	No	No	Never	9 mos.	20	Pneumonia
Kay, L	17015	No	No	Yes	No	Quit	2 yrs.	60	Enlarged heart
Lambkin, J	17035	No	No	No.	with cold	3	6 mos	20	Pneumonia
Moore, J	17012	No	No	No	No	Quit	2 yrs.	59	Sinusitis
Oakley, M	17016	Yes	Yes	No.	with cold	7	6 mos	30	
Phillips, L	17011	No	No	No	No	Never	2 2/12	38	
Pike, H	17022	No	No	No	No	3	1 yr	24	
Pope, A	17041	Some	Yes	No	with cold	2½	1 yr	27	Pneumonia
Pitch, C	17031	No	No	No	with cold	Quit	1½ yr.	20	~~Bronchial~~ asthma
Robinson, E	17024	No	No	No	No	Quit	2 yrs.	60	
Ray, D	17010	No	Some	No	No	4	2½ yrs.	21	

PITTSBURG CORNING

NAME	NUMBER	COUGH	PHLEGM	BREATHLESSNESS	WHEEZE	SMOKING HIST. PKG. PER WK.	LENGTH OF EMPL.	AGE	OTHER PERTINENT INFO.
Dixon, M.	17023	No	No	No	No	Cigars 24	9 mos	X43	
Farren, DE	17040	No	No	No	with Cold	10	2 yrs	31	Sinusitis
Farren, W. N.	17013	Yes	Some	Yes	Yes	20	3½ yrs	39	
Foliski, E	17030	No	No	Yes	with Cold	Quit	6 mos	33	
Knight, F	17026	Yes	Yes	No	Yes	20	1 yr	21	Pleurisy Bronchitis Sinusitis
Sack, J	17021	Yes	Yes	No	No	7	1 yr		

NOTE: THIS CARD WAS NOT COMPLETED AT THE TIME INTERVIEWED

The proposal contained in this notice may be changed in the light of comments received.

An official docket will be available for examination by interested persons at the Federal Aviation Administration, Office of the General Counsel, Attention: Rules Docket, 800 Independence Avenue SW., Washington, DC 20591. An informal docket will also be available for examination at the office of the Regional Air Traffic Division Chief.

The FAA proposes to amend Part 75 of the Federal Aviation Regulations by designating an area high route as follows:

J990R PHOENIX, ARIZ., TO BRIGGSPORT, TEX.

Reference facility, Theta/Rho, north latitude/west longitude

Phoenix, Ariz.,	000.0/00.0,	33°25'53"/ 111°53'17".
St. Johns, Ariz.,	168.4/63.5,	33°21'55"/ 109°11'49".
Socorro, N. Mex.,	187.1/67.3,	33°16'57"/ 107°16'48".
Roswell, N. Mex.,	000.0/00.0,	33°20'15"/ 104°37'15".
Texico, N. Mex.,	169.1/63.7,	33°20'52"/ 103°50'29".
Abilene, Tex.,	351.7/49.5,	33°18'28"/ 99°50'01".
Ardmore, Okla.,	198.3/65.6,	33°14'16"/ 97°45'58".

This amendment is proposed under the authority of section 307(a) of the Federal Aviation Act of 1958 (49 U.S.C. 1348(a)) and section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Issued in Washington, D.C., on November 30, 1971.

H. B. HELSTROM,
Chief, Airspace and Air Traffic Rules Division.

[FR Doc.71-17797 Filed 12-6-71;8:46 am]

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 61]

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Proposed Standards for Asbestos, Beryllium, Mercury

Pursuant to section 112 of the Clean Air Act, as amended, the Administrator published in the FEDERAL REGISTER of March 31, 1971 [36 CFR Part 62] an initial list of three hazardous air pollutants which in his judgment may cause, or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness. Publication of the list constituted an announcement of the Administrator's intention of establishing, under section 112, national emission standards for certain source categories known to emit these hazardous pollutants. The standards are based on information derived from many sources, including health effects levels, meteorology, technical analysis of control [illegible] and economic impact. The overriding considerations are health effects. Consideration also has been given to the need to minimize the emission of hazardous pollutants that can accumulate in the environment.

In many cases, information on possible sources of the hazardous pollutants is not available in sufficient detail to determine the need for emission standards. Investigations are underway to fill these gaps in knowledge, and the results of these investigations may require modification of these standards and inclusion of additional source categories for these pollutants.

Beryllium, mercury, and asbestos are very different in the number and type of sources and control options available; therefore, each standard has been written in a different manner to optimize effectiveness and facilitate compliance.

Asbestos—The proposed standards for asbestos are designed to minimize emissions to the atmosphere. Because there is no suitable technique for sampling and analyzing asbestos in the ambient air or in emission gases, the standards are expressed as requirements for the operation of specific control equipment (or other equipment of comparable effectiveness), or in situations where no control system is available as prohibitions on the use of asbestos. When acceptable source sampling and analytical methods are available and it is possible to delineate hazardous levels, these standards may be revised to require compliance with a measured allowable emission.

The sources covered in the asbestos standard are: Mining, milling, spraying, and manufacturing. Specific examples of emission sources which would be subject to the proposed standards applicable to manufacturers of asbestos-containing products include, but are not limited to, manufacturers of the following products when those products contain asbestos: Cement, textiles, paper and board, friction products, plastics, floor tiles, gaskets, packings, roofing felts, and insulation products.

Beryllium—A maximum allowable concentration of beryllium for ambient air has been in use by the Department of Defense and the Atomic Energy Commission for many years. This guideline has been used in the development of the beryllium standards. The proposed standards offer the owner or operator the option of measuring compliance by either emission testing or measurement of ambient concentration levels in the vicinity of the plant. However, it is anticipated that most sources will elect to comply with the given emission limitation. Buildings or other obstructions in the vicinity of the source, or location in highly urbanized areas, may make it impossible to design and locate a sampling network that provides sufficient assurance that areas of maximum concentration are measured.

The known major sources of beryllium are extraction plants, machine shops and foundries handling beryllium or beryllium-containing alloys, ceramic plants using beryllium, rocket propellants contaminated beryllium, and incinerators burning beryllium-containing waste. These are covered in the proposed standards. Other possible sources of beryllium are being investigated, and those sources which can potentially cause ambient concentrations to exceed 0.01 $\mu g/m^3$ will be included in revisions to this standard.

Mercury—Information currently available suggests that an ambient concentration level in the air below one (1) microgram per cubic meter is sufficient to protect the public health from illness due to inhalation of mercury. However, mercury is mobile in the environment, and once released to the atmosphere may cycle between air, land, and water for long periods of time. Natural processes and living organisms can change mercury from one form to another, at times converting mercury into its most hazardous forms. Therefore, when sufficient information and understanding are available, it will be necessary to consider the broader environmental problems caused by mercury emissions to the atmosphere.

The only industries known to be emitting mercury in quantities and in a fashion such that these facilities, assuming a negligible background level, may cause the ambient concentration level to exceed 1 $\mu g/m^3$ are the facilities producing mercury from ore and the mercury cell chlor-alkali plants. These industries are covered in this standard. Other sources may emit mercury, but present information indicates that these sources alone will not cause the ambient concentration level to exceed 1 $\mu g/m^3$.

Investigations are underway to identify all mercury sources and to quantify their emissions into the air. As more information becomes available, this subpart will be revised, as necessary, to add additional source categories.

The proposed regulations require application to the Administrator for approval for construction or modification of any stationary source to which a standard prescribed in the regulations is applicable. The Administrator will notify the applicant of approval or disapproval of such application within 60 days of receipt. A fee will be charged to defray part or all the costs of the review. The fee structure will be revised from time to time as experience with the program is developed.

Omitted from the proposed regulations are provisions for delegations of authority to States under section 112(d)(1). Nevertheless, it is the Administrator's intention to encourage States to assume the principal responsibility for enforcement of national emission standards for hazardous air pollutants. Toward this end, procedures for delegating authority will be established early next year, after the States have submitted their plans for implementation of national ambient air quality standards.

In accordance with section 117(f) of the Act, publication of these proposed standards was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies.

Interested persons may participate in this rule making by submitting written comments in triplicate to the Environmental Protection Agency, Office of Air

Programs, Division of Compliance, Research Triangle Park, N.C. 27711. The Administrator will welcome comments on all aspects of the proposed regulations, including economic and technological issues and on the proposed test methods. All relevant comments received not later than 90 days after the date of publication of this notice will be considered. Receipt of comments will be acknowledged, but the Office of Air Programs will not provide substantive responses to individual comments.

Public hearings will be held as required by section 112(b)(1)(B) of the Clean Air Act. A notice of time, date, and place for these public hearings will be published in the FEDERAL REGISTER within 30 days of the publication date of these standards. Not later than 180 days after publication of the emission standards set forth below, the Administrator is required to promulgate such emission standards, unless he finds, on the basis of information presented at public hearings, that the pollutants in question clearly are not hazardous. Accordingly, all persons having scientific information pertinent either to the question of whether asbestos, beryllium, and/or mercury are in fact, hazardous within the meaning of section 112 of the Clean Air Act or to the question of the level of the various substances that constitute a risk to public health are urged to present such information either by testifying at the hearings or by submitting the data for the hearings record. In addition, all interested persons are specifically asked to present information on the extent to which promulgation of these emission standards for asbestos, beryllium, and mercury will be of benefit to the public health. In any testimony or written comments on the specific points mentioned herein or on other matters relevant to this proposed rule making, all assertions and claims should be fully substantiated by factual information.

Summaries of the pertinent data used in developing these standards are available free of charge from the Environmental Protection Agency, Office of Air Programs, Research Triangle Park, N.C. 27711.

This notice of proposed rule making is issued under the authority of sections 112 and 114 of the Clean Air Act, Public Law 91-604, 84 Stat. 1713.

WILLIAM D. RUCKELSHAUS,
Administrator,
Environmental Protection Agency.

NOVEMBER 30, 1971.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Subpart A—General Provisions

Sec.
61.01 Applicability.
61.02 Definitions.
61.03 Abbreviations.
61.04 Address.
61.05 Prohibited activities.
61.06 Determination of construction or modification.
61.07 Application for approval for construction or modification.
61.08 Approval by Administrator.
61.09 Source reporting.
61.10 Request for waiver of compliance.
61.11 Waiver.
61.12 Emission tests and monitoring.
61.13 Availability of information.
61.14 State authority.

Subpart B—National Emission Standards for Asbestos

61.20 Applicability.
61.21 Definitions.
61.22 Emission standards for asbestos.
61.23 Referenced equipment specifications.
61.24 Substitute devices for the attainment of equivalent emission control.

Subpart C—National Emission Standards for Beryllium

61.30 Applicability.
61.31 Definitions.
61.32 Emission standards for beryllium.
61.33 Test methods and procedures—stack sampling.
61.34 Periodic stack sampling and reports.
61.35 Waiver of periodic stack sampling and report requirements.
61.36 Test methods and procedures—air sampling.
61.37 Monitoring and reports—air sampling.
61.38 Election.

Subpart D—National Emission Standards for Beryllium—Rocket Motor Firing

61.40 Applicability.
61.41 Definitions.
61.42 Beryllium emission standards.
61.43 Test methods and procedures—air sampling.
61.44 Test method and procedures—stack sampling.
61.45 Monitoring and reports for air sampling.
61.46 Stack sampling and reports.

Subpart E—National Emission Standard for Mercury

61.50 Applicability.
61.51 Definitions.
61.52 Abbreviations.
61.53 Emission standard for mercury.
61.54 Test methods and procedures—mercury ore processing facility.
61.55 Periodic emission testing—mercury ore processing facility.
61.56 Recordkeeping—mercury ore processing facility.
61.57 Waiver of emission test requirements—mercury ore processing facility.
61.58 Test methods and procedures—mercury cell chlor-alkali plant.
61.59 Periodic emission testing—mercury cell chlor-alkali plants.
61.60 Recordkeeping—mercury cell chlor-alkali plant.
61.61 Waiver of emission test requirements—mercury cell chlor-alkali facility.

Subpart A—General Provisions

§ 61.01 Applicability.

The provisions of this part apply to the owner or operator of any source which is operated, or the construction or modification of which is commenced after the date of publication in the FEDERAL REGISTER of proposed emission standards for hazardous air pollutants which are applicable to such source.

§ 61.02 Definitions.

As used in this part, all terms not defined in these subparts shall have the meaning given them in the Act:

(a) "Act" means the Clean Air Act (42 U.S.C. 1857 et seq., as amended by Public Law 91-604, 84 Stat. 1676).

(b) "Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

(c) "Commenced" means that an owner or operator and a contractor to, or affiliate of, such owner or operator have entered into a binding agreement or contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

(d) "Construction" means fabrication, erection, or installation of a stationary source.

(e) "Emission test" means measurement and analysis of emissions or other procedures used for the purpose of determining compliance with a standard for hazardous air pollutants.

(f) "Existing source" means any stationary source which is not a "new source".

(g) "Modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any hazardous air pollutant emitted by such source or which results in the emission of any hazardous air pollutant not previously emitted, except that routine maintenance, repair, and replacement shall not be considered physical changes.

(h) "New source" means any stationary source, the construction or modification of which is commenced after the publication in the FEDERAL REGISTER of proposed national emission standards for hazardous air pollutants which will be applicable to such facility.

(i) "Owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

(j) "Start up of operation" means the beginning of routine operation of a stationary source.

(k) "Stationary source" means any building, structure, facility, or installation which emits or may emit any hazardous air pollutant.

§ 61.03 Abbreviations.

The abbreviations used in this part have the following meanings:

cfm—Cubic feet per minute.
ft²—Square feet.
ft³—Cubic feet.
°F—Degree Fahrenheit.
in.—Inch.
l—Liter.
mg—Milligram.
ml—Milliliter.
M—Molar.
nm—Nanometer.
v/v—Volume per volume.
w g.—Water gauge.
W/V—Weight per volume.
μg/m³—Micrograms per cubic meter.
%—Percent.

§ 61.04 Address.

All applications, requests, submissions and inquiries under this part shall be addressed to the Environmental Protection Agency, Office of Air Programs, Division of Compliance, Research Triangle Park, N.C. 27711.

§ 61.05 Prohibited activities.

(a) After the effective date of any emission standard prescribed under this part, no person shall construct or modify any stationary source subject to such standards without first obtaining written approval of the Administrator in accordance with this subpart, except under an exemption granted by the President under section 112(c)(2) of the Act.

(b) Ninety days after the effective date of any emission standard prescribed by this part, no person shall operate any stationary source in violation of such standard except under a waiver granted by the Administrator in accordance with this subpart or under any exemption granted by the President under section 112(c)(2) of the Act.

§ 61.06 Determination of construction or modification.

Upon written application therefor by an owner or operator, the Administrator will make a determination of whether actions taken or intended to be taken by such owner or operator constitute construction or modification or the commencement thereof within the meaning of this part.

§ 61.07 Application for approval for construction or modification.

(a) The owner or operator of any stationary source to which a standard prescribed under this part will be or is applicable shall, not less than 60 days prior to the date on which construction or modification is planned to commence, submit to the Administrator an application for approval of such construction or modification.

(b) A separate application shall be submitted for each stationary source.

(c) Each application shall include the following:

(1) Name and address of the applicant.

(2) Location or proposed location of the source.

(3) Technical information describing the proposed nature, size, design, and method of operation of the source, including a description of any equipment to be used for measurement or control of emissions.

§ 61.08 Approval by Administrator.

(a) The Administrator will, within 60 days of receipt of application, notify the owner or operator of approval or disapproval of construction or modification.

(b) If the Administrator determines, based on information included in an application submitted under § 61.05 or other information that a stationary source for which an application pursuant to § 61.06 was submitted will, if properly operated not cause emissions in violation of an applicable standard, he will approve the construction or modification of such source.

(c) Prior to denying any request for approval of construction or modification pursuant to this section, the Administrator will notify the person making such request of the Administrator's intention to issue such, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such person to present additional information or arguments, orally or in writing, to the Administrator prior to final action on such request.

(d) A final determination to deny any request for approval will be in writing and will set forth the specific grounds on which such denial is based.

(e) Neither the submission of an application for approval or the Administrator's granting of approval to construct or modify shall:

(1) Relieve an owner or operator of legal responsibility for compliance with any applicable provisions of this part or of any applicable State or local requirement, or

(2) Prevent the Administrator from implementing or enforcing this part or taking any other action under the Act.

§ 61.09 Source reporting.

(a) The owner or operator of any existing stationary source to which a standard prescribed in this part is applicable shall, within 30 days after the effective date of such standard, provide the Administrator the following information:

(1) Name and address of the owner or operator.

(2) Identification and location of the source.

(3) Brief description of the nature, size, design, and method of operation including description of any equipment used for the measurement or control of emissions.

(b) Changes in the information provided under paragraphs (a) (1) and (3) of this section shall be provided to the Administrator within 90 days of such change.

§ 61.10 Request for waiver of compliance.

(a) The owner or operator of an existing stationary source unable to operate in compliance with a standard or standards prescribed in this part may request a waiver of compliance with any applicable emission standard under this part for a period not exceeding 2 years.

(b) Any such request shall be in writing and shall include:

(1) The owner's or operator's name and address.

(2) Identification and location of the source.

(3) Technical information describing the nature, size, design, and method of operation of the source, including a description of any equipment used for measurement or control of emissions.

(4) Description of the controls necessary for compliance with the applicable standard and plans for installation of such controls.

(5) A time schedule for obtaining, producing, or installing such controls. The schedule should include interim measures to achieve compliance.

(6) Description of the emission control steps or other measures which will be taken by the owner during the waiver period to assure that the health of persons will be protected from imminent endangerment.

(c) As used in this subpart, "imminent endangerment" means an immediate risk of significant harm to the human body.

§ 61.11 Waiver.

(a) Based on the information provided in any request under § 61.09 and any other information, the Administrator may grant a waiver of compliance with the applicable emission standard for a period not exceeding 2 years.

(b) Any such waiver shall be in writing and shall:

(1) Identify the source covered.

(2) Specify the termination date of the waiver.

(3) Impose such reasonable conditions as the Administrator determines to be necessary to assure installation of the necessary controls within the waiver period and to assure protection of the health of persons from imminent endangerment during the waiver period.

(c) Prior to finally denying any request for a waiver pursuant to this section, the Administrator will notify the person making such request of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such person to present additional information or arguments, orally or in writing, to the Administrator prior to final action on such request.

(d) A final determination to deny any request for a waiver will be in writing and will set forth the specific grounds on which such denial is based.

§ 61.12 Emission tests and monitoring.

(a) Emission tests and monitoring shall be conducted and results reported in accordance with the test methods and reporting requirements set forth in this part.

(b) At the request of the Administrator, the owner or operator of a source subject to this part shall provide, or cause to be provided, emission testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to such source.

(2) Safe sampling platform(s).

(3) Safe access to sampling platform(s).

(4) Utilities for sampling and testing equipment.

§ 61.13 Availability of information.

(a) Emission data provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public.

(b) Any records, reports, or information provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that such records, reports, or information, or particular part thereof (other than emission data), if made public, would divulge methods or processes

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.

§ 61.11 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 ft^2. 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 airflow permeabilities not exceeding 40 cfm/ft^2.

(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 airflow permeabilities not exceeding 30 cfm/ft^2.

(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 airflow 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.

(e) 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 use 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 cobbed, 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 repitition, 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

standard shall be reported to the Administrator immediately following determination of such emission.

(c) A written test report shall be made as soon as the calculations are completed and shall be retained available for inspection by the Administrator for a period of at least 2 years after the date of such report.

(f) Test reports shall include, as a minimum, detailed information on testing and test calculations, records of operations, unusual occurrences that might affect emissions, and the calculations correlating operations with test results sufficient to show maximum 24-hour beryllium emissions.

§ 61.35 Waiver of periodic stack sampling and report requirements.

(a) After performance of initial emission tests, the requirements of § 61.34 may be waived upon written application to the Administrator if in his judgment the installed control systems and the operating procedures are deemed adequate to insure the standard will be met. This waiver in no way prohibits the Administrator from requiring one or more emission tests.

(b) Detailed information on necessary requirements for waiver qualification may be obtained by submitting a written request to the Environmental Protection Agency, Office of Air Programs, Division of Compliance, Research Triangle Park, N.C. 27711.

61.36 Test methods and procedures—air sampling.

Sources electing to comply with § 61.32 (b) shall comply with the requirements of this section and § 61.37.

(a) Air sampling sites shall be located in such a manner as is calculated to detect maximum ambient air concentrations of beryllium near ground level.

(b) Ambient air concentrations of beryllium shall be determined in accordance with a method approved by the Administrator.

§ 61.37 Monitoring and reports—air sampling.

(a) Ambient air shall be continuously monitored at all monitoring sites except for a reasonable time allowance for instrument maintenance and calibration, for changing filters, or for replacement of equipment needing major repair.

(b) Filters shall be changed at least every 4 days and shall be analyzed within 24 hours after collection.

(c) A written test report shall be made and shall be retained, available for inspection by the Administrator, for a period of at least 2 years after the date of such report.

(d) Test reports shall include, as a minimum, detailed information on testing and test calculations, records of operations, and unusual occurrences that might affect emissions.

(e) A test result on any sample of more than 0.03 $\mu g/m^3$ or the determination of an average 30 day concentration greater than 0.01 $\mu g/m^3$ shall immediately be reported to the Administrator.

§ 61.32 Election.

(a) Owners or operators electing to comply with the standard in § 61.32(b) shall so notify the Administrator within 30 days of the effective date of these standards. A report setting forth the information listed below shall be submitted to the Administrator for approval within 45 days of such effective date.

The information shall include:

(1) Description of sampling method.

(2) Method of sample analysis.

(3) Method and frequency of calibration.

(4) Averaging technique for determining 30-day average concentration.

(5) Identity and number of sampling sites. Whether the sites are existing or proposed shall be indicated.

(6) Sampling locations (address, coordinates, or distance and heading from plant).

(7) Ground elevation and height above ground of sampling inlet.

(8) Sampling location relative to obstructions.

(9) Meteorological and existing air sampling data used to determine relative distribution of ambient air concentrations surrounding the plant.

(10) Plant and sampling area plots showing emission points and sampling sites. Topographic features significantly affecting dispersion shall be indicated.

(11) Plant building heights.

(12) Stack parameters necessary for estimating dispersion (stack height, inside diameter, exit gas temperature, and exit velocity or flow rate).

If the election is not made, the report not submitted, or the Administrator disapproves any portion of the air sampling network, compliance with the standard will be determined under § 61.32(a).

(b) Prior to disapproving any report under paragraph (a) of this section, the Administrator will consult with representatives of the source for which the report is submitted.

(c) If the Administrator at any time has reason to believe an approved network may not be sampling at points of maximum concentration, he may request changes in, or expansion of, the sampling network.

Subpart D—National Emission Standards for Beryllium-Rocket Motor Firing

§ 61.40 Applicability.

The provisions of this subpart are applicable to rocket motor test sites.

§ 61.41 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) "Rocket motor test site" means any building, structure, or installation where the static test firing of a rocket motor is conducted.

(b) "Beryllium propellant" means any solid propellant incorporating beryllium particles as a fuel.

§ 61.42 Beryllium emission standards.

(a) Emissions to the atmosphere from sources subject to this subpart shall not cause atmospheric concentrations of beryllium to exceed 75 microgram minutes per cubic meter of air within 10 to 60 minutes, accumulated during any 2 consecutive weeks, measured anywhere beyond the property line of such source or at the nearest place of human habitation.

(b) If combustion products of motors containing beryllium propellant are fired into a closed tank, emissions from such tank shall not exceed 2 grams per hour and a maximum of 10 grams per day.

§ 61.43 Test methods and procedures—air sampling.

(a) Compliance with the standard in § 61.42(a) shall be determined in accordance with this section and § 61.46.

(b) Air sampling instruments and sites shall be selected to accurately reflect the effect of rocket motor firing on ambient air concentrations of beryllium near ground level. Such numbers and sites shall be approved by the Administrator.

(c) Ambient air concentrations of beryllium shall be determined according to a method approved by the Administrator.

§ 61.44 Test methods and procedures—stack sampling.

(a) Compliance with the standard in § 61.42(b) shall be determined in accordance with this section and § 61.46.

(b) Test methods and procedures for stack sampling in § 61.33 shall apply, with the exclusion of requirements in § 61.34.

§ 61.45 Monitoring and reports for air sampling.

(a) Ambient air concentrations shall be measured during and after firing of rocket motors and in such a manner that the effect of these emissions can be compared with the standard. Such sampling techniques shall be approved by the Administrator.

(b) Samples shall be analyzed and results shall be calculated before any subsequent rocket motor firing.

(c) A written test report shall be made and shall be retained for inspection by the Administrator for a period of at least 2 years after the date of the report.

(d) Test reports shall include, as a minimum, detailed information on testing and test calculations, a record of the rocket firing, and unusual occurrences that might affect emissions.

(e) A test result exceeding the standard shall be reported to the Administrator on the next business day following determination of such test result.

§ 61.46 Stack sampling and reports.

(a) The provisions of this section are applicable to monitoring and reporting beryllium emissions for determining compliance with the standard of § 61.42(b).

(b) Each release of combustion products to the atmosphere shall be monitored in such a manner as to show the maximum total emission during a 24-hour period.

(c) Samples shall be analyzed, and results shall be calculated before any subsequent rocket motor is fired.

(d) A written test report shall be made and shall be retained for inspection by the Administrator for a period of at least 2 years after the date of such report.

(e) Test reports shall include, as a minimum, detailed information on testing and test calculations, a record of the rocket firing, and unusual occurrences that might affect emissions.

(f) A test result exceeding the standard will be reported to the Administrator immediately following determination of such test result.

Subpart E—National Emission Standard for Mercury

§ 61.50 Applicability.

The provisions of this subpart are applicable to facilities processing ore to recover mercury and facilities using mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide.

§ 61.51 Definitions.

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

(a) "Total mercury" means the element mercury, excluding any associated elements, and includes mercury in particulates, vapors, aerosols, and compounds.

(b) "Mercury ore" means a mineral mined specifically for its mercury content.

(c) "Mercury ore processing facility" means a facility processing mercury ore to obtain mercury.

(d) "Mercury chlor-alkali cell" means any device utilizing mercury as a cathode in an electrolytic process to produce chlorine gas and alkali metal hydroxide.

(e) "Denuder" means a horizontal or vertical container which is part of a mercury chlor-alkali cell and in which water and alkali-metal amalgam is converted to alkali metal hydroxide, metallic mercury and hydrogen gas in a short-circuited, electrolytic reaction.

(f) "Hydrogen gas stream" means a hydrogen stream formed in the chlor-alkali cell denuder.

(g) "End box" means a container located on each end of a chlor-alkali cell which functions as a collection point for mercury, amalgam, and brine.

(h) "Cell room" means a structure housing one or more mercury electrolytic chlor-alkali cells.

§ 61.52 Abbreviations.

The abbreviations used in this subpart have the following meanings in both capital and lower case:

Hg—mercury.

§ 61.53 Emission standard for mercury.

Emissions to the atmosphere from sources subject to this subpart shall not exceed 2,300 grams of mercury per 24-hour period (5.0 pounds per 24-hour period), as measured in accordance with techniques set forth in the appendix.

§ 61.54 Test methods and procedures—mercury ore processing facility.

All facilities processing mercury ore shall be tested by Method 1 in the appendix. The minimum sampling time shall be 2 hours, and the minimum sampling volume shall be 50 ft³ as measured by the gas meter. For each repetition, mercury emission expressed in pounds per day shall be determined in accordance with Method 1.

§ 61.55 Periodic emission testing—mercury ore processing facility.

(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 operation 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 mercury emissions shall be calculated within 5 working days after collection of samples. A total emission exceeding the standard shall be reported to the Administrator immediately following determination of such emission.

§ 61.56 Record keeping—mercury ore processing facility.

Written records of information obtained in § 61.55 as well as other operating data which will allow determination or calculation of mercury emissions for a 24-hour period shall be established and made available for inspection by the Administrator. Such records shall be maintained for a period of at least two years from the date of the record.

§ 61.57 Waiver of emission test requirements—mercury ore processing facility.

(a) After performance of initial emission tests, the requirements of § 61.55 may be waived upon written application to the Administrator if in his judgment the installed control system and the operating techniques are deemed adequate to ensure the standard will be met. This waiver in no way prohibits the Administrator from requiring one or more emission tests.

(b) Detailed information on necessary requirements for waiver qualifications may be obtained by submitting a written request to the Environmental Protection Agency, Office of Air Programs, Division of Compliance, Research Triangle Park, N.C. 27711.

§ 61.58 Test methods and procedures—mercury cell chlor-alkali plant.

(a) All facilities operating mercury cell chlor-alkali plants shall test their process gases, which are hydrogen from the denuders and vent gases from the end boxes of the chlorine cells, for mercury particulates and vapors using Method 1 in the appendix. The minimum sampling time shall be 2 hours, and the minimum sampling volume shall be 50 ft³ as measured by the gas meter. For each repetition, mercury emission expressed in pounds per day shall be determined in accordance with Method 1.

(b) These facilities shall test their mercury emissions in the ventilation effluents from the cell room using Method 2 in the appendix. The average emissions of mercury as vapor from long, narrow ventilation ducts, square or rectangular openings or fans shall be determined as given below using Method 2.

(1) Long, narrow ventilation ducts of the cell room should be sampled at six equally spaced locations. Use the same sample train for all six samples which are taken consecutively. The samples should be extracted at a rate proportional to the gas velocity at each point. The minimum sampling time shall be 1½ hours, and the minimum sampling volume shall be 3.0 ft³ as measured by the gas meter. The sample shall be collected in a manner described in Method 2.

(2) Square or rectangular openings with an area greater than 16 ft² shall be split into eight sections. A sample from the center of each section shall be taken as described in subparagraph (1) of this paragraph. Openings with less than 16 ft² shall be split into four sections and a sample taken from the center of each section.

(3) Velocities of effluents out of ventilators shall be measured with a vane anemometer.

(4) Fans used for ventilation of cell room shall be sampled. Fans with uniform discharges out the fan housing shall be sampled in the center of air flow. Volume shall be determined from the fan curve. Sample at a rate proportional to the average gas flow rate. The minimum sample time shall be 1½ hours, and the minimum sampling volume shall be 3.0 ft³ as measured by the gas meter. Fans with gas discharges out of the periphery of the fan housing shall be sampled in the center of the gas flow in a manner similar to that described above.

(5) Total mercury emitted per 24-hour period from the cell room shall be the sum of emissions from all ventilators.

§ 61.59 Periodic emission testing—mercury cell chlor-alkali plant.

(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 operation 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 of the emissions which will occur over the duration of the cycle.

(d) All samples shall be analyzed and mercury emissions shall be calculated within 5 working days after collection of samples. A total emission exceeding the standard shall be reported to the Administrator immediately following determination of such emission.

§ 61.60 Record keeping—mercury cell chlor-alkali plant.

Written records of information obtained in § 61.59 as well as other operating data which will allow determination or calculation of mercury emissions for a 24-hour period shall be established and made available for inspection by the Administrator. Such records shall be maintained for a period of at least 2 years from the date of the record.

§ 61.61 Waiver of emission test requirements—mercury cell chlor-alkali facility.

(a) After performance of initial emission tests, the requirements of § 61.59 may be waived upon written application to the Administrator if in his judgment the installed control system and the operating techniques are deemed adequate to ensure the standard will be met. This waiver in no way prohibits the Administrator from requiring one or more emission tests.

(b) Detailed information on necessary requirements for waiver qualifications may be obtained by submitting a written request to the Environmental Protection Agency, Office of Air Programs, Division of Compliance, Research Triangle Park, N.C. 27711.

METHOD 1—DETERMINATION OF MERCURY IN PARTICULATE AND GASEOUS EMISSIONS FROM STATIONARY SOURCES

1. *Principle and applicability.*

1.1 Principle. Particulate and gaseous emissions are isokinetically sampled from the source and collected in acidic iodine monochloride solution. The mercury collected (in the mercuric state) is reduced to elemental mercury in basic solution by hydroxylamine sulfate. Mercury is vaporized from the solution using a zero grade air stream and analyzed using an atomic absorption spectrophotometer in the flameless mode.

1.2 Applicability. This method is applicable for the determination of mercury in particulate and gaseous emissions from stationary sources only when specified by the test procedures for determining compliance with the Clean Air Act.

2. *Apparatus.*

2.1 Sampling train. The design specifications of the particulate sampling train used by EPA (Figure 1-1) are described in APTD-0581. Commercial models of this train are available.

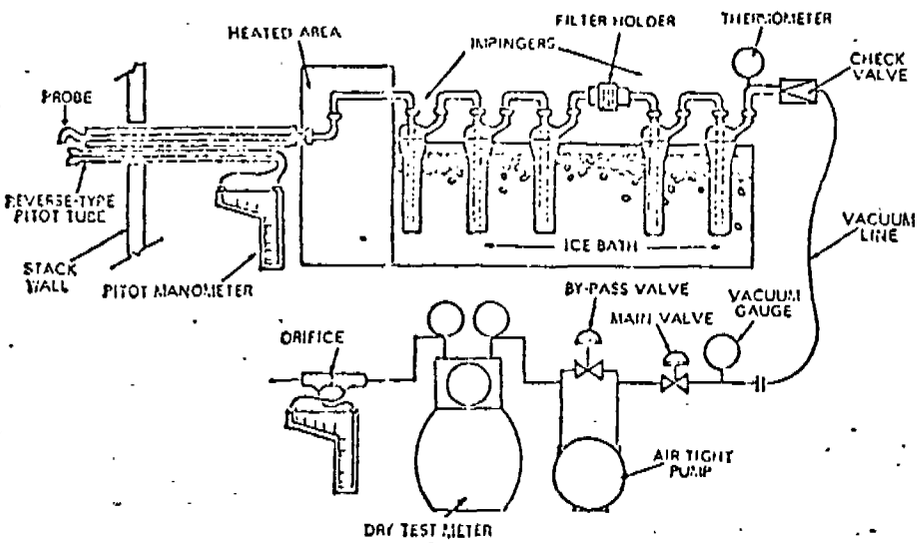

Figure 1-1. Particulate-sampling train.

2.1.1 Nozzle—Stainless steel (316) with sharp, tapered leading edge.

2.1.2 Probe—Pyrex[1] glass with a heating system capable of maintaining a minimum gas temperature of 250° F at the exit end during sampling to prevent condensation from occurring. Probes for sampling gas streams at temperatures in excess of 600° F and where length limitations are encountered are subject to approval by the Administrator.

2.1.3 Pitot tube—Type S, or equivalent, attached to probe to monitor stack gas velocity.

2.1.4 Filter Holder—Pyrex[1] glass.

2.1.5 Impingers—Five impingers connected in series with glass ball joint fittings. The first, third, fourth and fifth are of the Greenburg-Smith design, modified by replacing the tip with a ½-inch ID glass tube extending to ½ inch from the bottom of the flask. The second impinger is of the Greenburg-Smith design with the standard tip.

2.1.6 Metering system—Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2% accuracy, and related equipment, or equivalent, as required to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 Barometer—To measure atmospheric pressure to ±0.1 inches Hg.

2.2 Measurement of stack conditions (stack pressure, temperature, moisture and velocity).

2.2.1 Pitot tube—Type S (Figure 1-2), or equivalent, with a coefficient within ±5% over the working range.

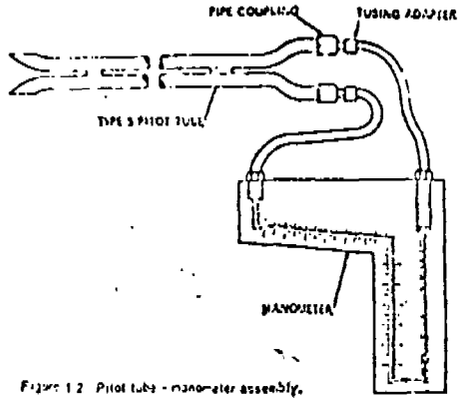

Figure 1-2. Pitot tube - manometer assembly.

2.2.2 Differential pressure gauge—Inclined manometer, or equivalent, to measure velocity head to within 10% of the minimum value.

2.2.3 Temperature gauge—Thermocouple, or equivalent, attached to the pitot tube to measure stack temperature to within 1.5% of the minimum absolute stack temperature.

2.2.4 Pressure gauge—Mercury-filled U-tube manometer, or equivalent, to measure stack pressure to within 0.1 in. Hg.

2.2.5 Barometer—To measure atmospheric pressure to within 0.1 in. Hg.

2.2.6 Thermometers—Wet and dry bulb.

2.3 Sample Recovery.

2.3.1 Leakless glass sample bottles—(one) 500 ml. and (two) 100 ml. with Teflon[1] lined tops.

2.3.2 Graduated cylinder—250 ml.

2.3.3 Plastic jar—one, approximately 300 ml.

2.4 Analysis.

2.4.1 Atomic absorption spectrophotometer (A.A.S.)—Perkin Elmer Model 303, or equivalent, with a cylindrical gas cell (approximately 1.5 in. O.D. x 7 in.) with quartz glass windows.

2.4.2 Analysis tube—100 ml., glass, bulb type, "Mae West", with ground glass fittings.

2.4.3 Light source—Mercury vapor lamp.

2.4.4 Recorder—(one) to match output of atomic absorption spectrophotometer.

2.4.5 Trip balance—300 g. capacity, to measure to ±0.05 g.

3. *Reagents.*

3.1 Stock Reagent.

3.1.1 Potassium Iodide (KI) 25% W/V (weight/volume)—Dissolve 250 grams of KI in distilled water and dilute to 1 liter.

3.1.2 Hydrochloric acid (HCl)—concentrated.

3.1.3 Potassium Iodate—reagent grade.

3.1.4 Distilled water.

3.1.5 Iodine monochloride (ICl)—1.0M—to 800 ml. of 25% potassium iodide solution (reagent 3.1.1), add 800 ml of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 135 grams of potassium iodate and continue stirring until all free iodine has dissolved to give a clear orange-red solution. Cool to room temperature and dilute to 1,800 ml.

3.2 Sampling.

3.2.1 Filter—Glass fiber, Mine Safety Appliances 1.23 LII[1], or equivalent, numbered for identification and preweighed.

[1] Disclaimer—Mention of trade names or commercial products does not constitute endorsement by the Environmental Protection Agency.

3.2.2 Absorbing solution, iodine monochloride (ICl) 0.1M—Dilute 100 ml. of the 1.0M ICl stock solution (reagent 3.1.5) to 1 liter with distilled water. This reagent is stable for at least 2 months.

3.2.3 Wash acid—1:1 v/v nitric acid—water.

3.2.4 Distilled and deionized water.

3.2.5 Silica gel—Indicating type, 6 to 16 mesh, dried at 175° C (350° F) for 2 hours.

3.2.6 Soda lime—6 to 16 mesh.

3.3 Analysis.

3.3.1 Sodium Hydroxide (NaOH) 10 N.

3.3.2 Reducing agent, 12% W/V hydroxylamine sulfate ($NH_2OH.1/2\ H_2SO_4$), 12% W/V sodium chloride (NaCl)—to 60 ml. of distilled water, add 12 grams of hydroxylamine sulfate and 12 grams of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 20 analyses.

3.3.3 Aeration gas—zero grade air.

3.4 Mercury Standard Solutions.

3.4.1 Stock solution—Add 0.1354 grams of mercuric chloride ($HgCl_2$) to 60 ml. of 0.3N hydrochloric acid (HCl). After the mercuric chloride has dissolved, add 0.3N HCl to adjust the volume of 100 ml. One ml. of this solution is equivalent to 1 mg. of free mercury.

3.4.2 Standard solutions—Prepare calibration solutions of 0.1 μg/ml, 0.4 μg/ml, 0.6 μg/ml, 1.0 μg/ml, and 2.0 μg/ml, by serially diluting the stock solution (3.4.1) with 0.3N HCl. Store in glass-stoppered, glass bottles. These solutions are stable for at least 2 months.

4. Procedure.

4.1 Selection of a sampling site and minimum number of traverse points.

4.1.1 Select a sampling site that is at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion, contraction, or visible flame. For rectangular cross section, determine an equivalent diameter from the following equation:

$$\text{equivalent diameter} = 2\left(\frac{(\text{length})(\text{width})}{\text{length}+\text{width}}\right) \quad \text{eq. 1-1}$$

4.1.2 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks above 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.1.3 Some sampling situations render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use Figure 1-3 to determine the minimum number of traverse points.

4.1.4 To use Figure 1-3 first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Determine the corresponding number of traverse points for each distance from Figure 1-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.2.

4.1.5 Under no conditions should a sampling point be selected within 1 inch of the stack wall.

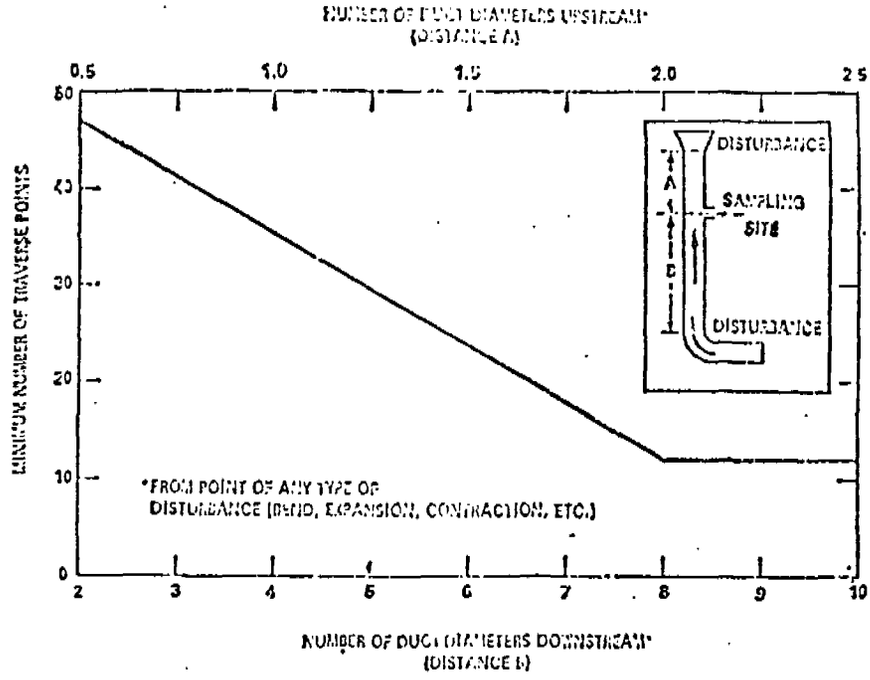

Figure 1-3. Minimum number of traverse points.

4.2 Cross-sectional layout and location of traverse points.

4.2.1 For circular stacks locate the traverse points on at least two diameters according to Figure 1-4 and Table 1-1. The traverse axes shall divide the stack cross section into equal parts.

4.2.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to Figure 1-5.

Figure 1-4. Cross section of circular stack showing location of traverse points on two diameters.

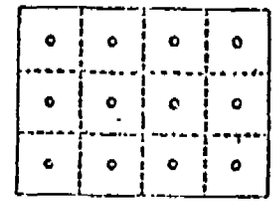

Figure 1-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

Table 1-1. Location of traverse points in circular stacks

(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	65.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

4.3 Measurement of stack conditions.

4.3.1 Set up the apparatus as shown in Figure 1-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by sections 4.1 and 4.2.

4.3.2 Measure the static pressure in the stack.

4.3.3 Determine the stack gas moisture using wet and dry bulb thermometers and available psychrometric charts.

4.3.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition.

4.4 Preparation of sampling train.

4.4.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by rinsing with the acid wash solution (reagent 3.2.3), tap water, 0.1M ICl, tap water, and finally distilled water. Place a filter in the filter assembly. Place 100 ml of 0.1 molar (0.1M) iodine monochloride in each of the first three impingers, and place approximately 200 g. of preweighed silica gel in the fourth impinger. Save 80 ml of the ICl for use as a blank in the sample analysis. Set up the train and the probe as in Figure 1-1.

4.4.2 Leak check the sampling train at the sampling site by plugging up the probe tip and pulling a 15 in. Hg. vacuum. A leakage rate not in excess of 0.02 cfm at a vacuum of 15 in. Hg. is acceptable. Release the vacuum on the train, and then turn off the pump. Adjust the heater to provide a gas temperature of about 250°F at the probe outlet. Place crushed ice around the impingers. Add more ice during the run to keep the temperature of the gases leaving the last impinger at 70°F or less.

4.5 Particulate train operation.

4.5.1 For each run, record the data required on the example sheet shown in Figure 1-6. Take readings at each sampling point, at least every 5 minutes, and when significant changes in stack conditions necessitate additional adjustments in flow rate. To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 6 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs are available which aid in the rapid adjustment of the sampling rate without other computations. APTD-0576 details the procedure for using these nomographs. Turn off the pump at the conclusion of each run and record the final readings. Remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.6.

PLANT _____
LOCATION _____
OPERATOR _____
DATE _____
RUN NO. _____
SAMPLE BOX NO. _____
METER BOX NO. _____
METER $\Delta H_@$ _____
C FACTOR _____

SCHEMATIC OF STACK CROSS SECTION

TRAVERSE POINT NUMBER	SAMPLING TIME (Θ), min.	STATIC PRESSURE (P_s), in. Hg	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP),	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH), in. H_2O	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER		SAMPLE BOX TEMPERATURE, °F	TEMPERATURE, °F
							INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F		
TOTAL								Avg.		
AVERAGE								Avg.		

Figure 1-6. Particulate field data.

4.6 Sample recovery.

4.6.1 (All glass storage bottles and graduated cylinder must be precleaned as in section 4.4.1). This operation should be performed in an area free of possible mercury contamination. Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into storage bottle No. 1. Rinse the probe and all glassware between it and the back half of the filter assembly with two 50 ml portions of 0.1M ICl solution. Add these rinses to storage bottle No. 1. For a blank, place 80 ml of the 0.1M ICl in storage bottle No. 2. Place the filter and 100 ml of the 0.1M ICl in storage bottle No. 2 and the silica gel in the plastic jar. Seal and secure all storage containers for shipment. If an additional test is desired, the glassware can be rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.7 Analysis.

4.7.1 Apparatus preparation—Clean all glassware according to the procedure of section 4.4.1. Turn on the A.A.S mercury lamp and allow to warm up for 30 minutes prior

to analysis. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.7.2 Analysis preparation—Adjust the air delivery pressure and the needle valve to obtain an air flow of 1.3 l/min. The analysis tube should be bypassed at this time. Purge the equipment for 2 minutes. Prepare a sample of mercury standard solution (3.4.2) according to section 4.7.3. Place the analysis tube in the line, and continue aerating until a maximum peak height is reached on the recorder. Remove the analysis tube, flush the lines, and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purge and analysis cycle is to be repeated until peak heights are reproducible.

4.7.3 Sample preparation—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M ICl if required. Add 5 ml of ION NaOH, cap tube with a clean glass stopper and shake vigorously. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately place in sample line.

4.7.4 Mercury determination—After the system has been stabilized, prepare samples from each storage bottle according to section 4.7.3. The mercury content is read by comparing the peak heights of the samples to the peak heights of the calibration solutions. If collected samples are out of the linear range, the samples should be diluted. Prepare a blank from storage bottle No. 3 according to section 4.7.3 and analyze to determine the reagent blank mercury level.

5. *Calibration.*

5.1 Sampling Train.

5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter, and probe heater. Recalibrate after each test series.

5.2 Analysis.

5.2.1 Prepare a calibration curve for the atomic absorption spectrophotometer by analyzing the standard mercury solutions. Plot the peak heights read on the recorder versus the weight of mercury in the standard solutions. Standards should be interspersed with the sample analyses since the calibration can change slightly with time.

6. *Calculations.*

6.1 Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop. See data sheet (Figure 1-6).

6.2 Dry gas volume. Correct the sample volume measured by the dry gas meter to stack conditions by using equation 1-2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{P_{bar} + \frac{\Delta H}{13.6}}{P_s} \quad \text{eq. 1-2}$$

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), cu. ft.

V_m = Volume of gas sample through the dry gas meter (meter conditions), cu. ft.

T_s = Average absolute temperature of stack gas, °R.

P_{bar} = Barometric pressure at the orifice meter, inches Hg.

ΔH = Average pressure drop across the orifice meter, inches H_2O.

13.6 = Specific gravity of mercury.

P_s = Average absolute pressure of stack gas, inches Hg.

6.3 Volume of water vapor.

$$V_{w_s} = V_l \frac{\rho_{H_2O}}{M_{H_2O}} \frac{RT_s}{P_s} \quad \text{eq. 1-3}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), cu. ft.

V_l = Total volume of liquid collected in impingers and silica gel (see Figure 1-7), ml.

ρ_{H_2O} = Density of water, 1 g/ml.

M_{H_2O} = Molecular weight of water, 18 lb./lb.-mole.

R = Ideal gas constant, 21.83 inches Hg-cu. ft./lb.

T_s = Absolute stack gas temperature, °R.

P_s = Absolute stack gas pressure, inches Hg.

	VOLUME OF LIQUID WATER COLLECTED	
	IMPINGER VOLUME (ml)	SILICA GEL WEIGHT (g)
FINAL		
INITIAL		
LIQUID COLLECTED		
TOTAL VOLUME COLLECTED		g = ml

CONVERT WEIGHT OF WATER TO VOLUME BY DIVIDING TOTAL WEIGHT INCREASE BY DENSITY OF WATER. 1 g/ml

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 1-7. Analytical data.

6.4 Total gas volume.

$$V_{Total} = V_{m_s} + V_{w_s} \quad \text{eq. 1-4}$$

where: V_{Total} = Total volume of gas sample (stack conditions), cu. ft.

V_{m_s} = Volume of gas through dry gas meter (stack conditions), cu. ft.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), cu. ft.

6.5 Stack gas velocity.

Use equation 1-5 to calculate the stack gas velocity.

$$V_s = K_p C_p \sqrt{\frac{T_s \Delta p}{P_s M_s}} \quad \text{eq. 1-5}$$

where:

V_s = Stack gas velocity, feet per second (f.p.s.).

$K_p = 85.48 \ \frac{\text{ft.}}{\text{sec.}} \left(\frac{\text{lb.}}{\text{lb. mole-°R}}\right)^{1/2}$

when these units are used.

C_p = Pitot tube coefficient, dimensionless.

T_s = Average absolute stack gas temperature, °R.

Δ_p = Average velocity head of stack gas, inches H_2O (see Fig. 1-8).

P_s = Average absolute stack gas pressure, inches Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb./lb.-mole.

Figure 1-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of Figure 1-8 to determine the average stack gas velocity from equation 1-5.

6.6 Mercury collected. Calculate the total weight of mercury collected by using eq. 1-6.

PLANT _____
DATE _____
RUN NO. _____
OPERATOR _____
AMBIENT TEMPERATURE, °F _____
BAROMETRIC PRESSURE, in. Hg _____
CROSS SECTION _____

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta p}$	Stack temperature (°F)
	AVERAGE:		

Figure 1-8. Velocity traverse data.

$$W_t = V_1 \left(\frac{W_1}{V_1}\right) + V_2 \left(\frac{W_2}{V_2}\right) - V_b(C_b) \quad \text{eq. 1-6}$$

where:

W_t = Total weight of mercury collected, μg.

V_1 = Total volume of condensed moisture and ICl in sample bottle No. 1, ml.

W_1 = Weight mercury found in sample aliquot from sample bottle No. 1, μg.

v_1 = Size of aliquot from sample bottle No. 1, ml.

V_2 = Total volume of absorbing solution in ICl in sample bottle No. 2, ml.

W_2 = Weight of mercury found in aliquot from sample bottle No. 2, μg.

v_2 = Aliquot size from sample bottle No. 2, ml.

V_b = Total volume of ICl used in sampling, (impinger contents + all wash amounts) ml.

C_b = Concentration of mercury in 0.1M ICl solution from sample bottle No. 3, μg./ml.

6.7 Total mercury emission. Calculate the total amount of mercury emitted per day by eq. 1-7.

$$R = 0.00019 \frac{W_t}{V_{total}} V_s A_s \quad \text{eq. 1-7}$$

where:

R = Rate of emission, lbs./day.

W_t = Total weight of mercury collected, μg.

V_{total} = Total volume of gas sample (stack conditions), cu. ft.

V_s = Stack gas velocity, feet per second.

A_s = Stack area, ft.²

6.8 Isokinetic variation (comparison of velocity of gas in sample train to stack velocity).

$$I = \frac{100 \frac{V_{total}}{A_n \theta}}{V_s} \quad \text{eq. 1-8}$$

where:

I = Percent of isokinetic sampling.

V_{total} = Total volume of gas sample (stack conditions), cu. ft.

A_n = Sample probe tip area, ft.²

θ = Sample time, sec.

V_s = Stack gas velocity, feet per second.

6.6.1 Acceptable results. The following range sets the limit on acceptable isokinetic sampling results:

If $90\% \leq I \leq 110\%$, the results are acceptable; otherwise, reject the results and repeat the test.

7. *References.*

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METHOD 2—DETERMINATION OF MERCURY IN GASEOUS EMISSIONS FROM STATIONARY SOURCES

1. *Principle and applicability.*

1.1 Principle. Gaseous samples are collected in impingers containing acidic iodine monochloride solutions. The collected mercury (in the mercuric state) is reduced to elemental mercury in basic solution by hydroxylamine sulfate. Mercury is vaporized from the solution using zero grade air stream and analyzed using an atomic absorption spectrophotometer in the flameless mode.

1.2 Applicability. This method is applicable for the determination of mercury in gaseous emissions from stationary sources only when specified by the test procedures for determining compliance with the Clean Air Act.

2. *Apparatus.*

2.1 Sampling. See Figure 2-1. (Note: All surfaces that come into contact with the iodine monochloride solution must be glass.)

2.1.1 Probe—Pyrex® glass, approximately 5–6 mm. I.D.

2.1.2 Impingers—Four midget type.

2.1.3 Drying tube—One, packed with silica gel.

2.1.4 Acid absorbing tube—One, packed with soda lime.

2.1.5 Vacuum pump—Leakless, with capacity to reduce pressure to 3 in. Hg. abs.

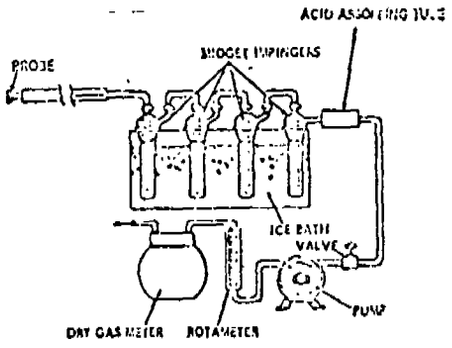

Figure 2-1. Hg sampling train.

2.1.6 Rate meter—Rotameter, or equivalent, to measure 0–10 scfh. (standard cubic feet per hour) flow range.

2.1.7 Dry gas meter—With capacity to measure gas sample volume to ±1%.

2.2 Measurement of exit gas conditions (temperature, velocity, and pressure).

2.2.1 Vane anemometer, commercial.

2.2.2 Temperature gauge, to measure exit gas temperature to within 1.5% of minimum absolute exit gas temperature.

2.2.3 Barometer, to measure atmospheric pressure to within 0.1 in. Hg.

2.3 Sample recovery.

2.3.1 Leakless glass sample storage bottles—Two (2), approximately 200 ml. with Teflon lined tops.

2.3.2 Graduated cylinder—100 ml.

2.4 Analysis.

2.4.1 Atomic absorption spectrophotometer (A.A.S.), Perkin-Elmer Model 303, or equivalent, with a cylindrical gas cell (approximately 1.5 in. O. D. x 7 in.) with quartz glass windows.

2.4.2 Analysis tube—100 ml., glass, bulb type, "Mae West," with ground glass fittings.

2.4.3 Light source—Mercury vapor lamp.

2.4.4 Recorder—(One) to match output of atomic absorption spectrophotometer.

3. *Reagents.*

3.1 Stock reagent.

3.1.1 Potassium Iodide (KI) 25% W/V (weight/volume)—Dissolve 250 grams of KI in distilled water and dilute to 1 liter.

3.1.2 Hydrochloric acid (HCl)—Concentrated.

3.1.3 Potassium Iodate—Reagent grade.

3.1.4 Distilled water.

3.1.5 Iodine monochloride (ICl) 1.0M—To 800 ml of 25% potassium iodide solution (reagent 3.1.1), add 600 ml of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 135 grams of potassium iodate and continue stirring until all free iodine has dissolved to give a clear orange-red solution. Cool to room temperature and dilute to 1,800 ml.

3.2 Sampling.

3.2.1 Absorbing solution, Iodine monochloride (ICl) 0.1M—Dilute 100 ml of the 1.0M ICl stock solution (reagent 3.1.5) to 1 liter with distilled water. This reagent is stable for at least 2 months.

3.2.2 Wash acid—1:1 v/v nitric acid—water.

3.2.3 Distilled and deionized water.

3.3 Analysis.

3.3.1 Sodium hydroxide (NaOH) 10 N.

3.3.2 Reducing agent, 12% W/V hydroxylamine sulfate ($NH_2OH \cdot 1/2\ H_2SO_4$) 12% W/V sodium chloride (NaCl)—To 60 ml of distilled water, add 12 grams of hydroxylamine sulfate and 12 grams of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 20 analyses.

3.3.3 Aeration gas—Zero grade air.

3.4 Mercury standard solutions.

3.4.1 Stock solution—Add 0.1354 grams of mercuric chloride ($HgCl_2$) to 80 ml of 0.3N hydrochloric acid (HCl). After the mercuric chloride has dissolved, add 0.3N HCl to adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

3.4.2 Standard solutions—Prepare calibration solutions of 0.1 μg/ml, 0.4 μg/ml, 0.6 μg/ml, 1.0 μg/ml, and 2.0 μg/ml by serially diluting the stock solution (3.4.1) with 0.3N HCl. Store in glass-stoppered, glass bottles. These solutions are stable for at least 2 months.

4. *Procedures.*

4.1 Selection of sampling sites.

4.1.1 Long, narrow ventilation ducts of the cell room shall be sampled at six equally spaced locations.

4.1.2 Square or rectangular openings with an area greater than 16 ft² shall be split into eight equal sections. A sample from the center of each section shall be taken as described in section 4.1.1. Openings with less than 16 ft² shall be split into four sections and a sample taken from the center of each section.

4.1.3 Fans with uniform discharges out the fan housing shall be sampled in the center of air flow. Fans with gas discharges out of the periphery of the fan housing shall be sampled in the center of the gas flow.

4.2 Measurement of exit gas conditions.

4.2.1 Measure the exit gas temperature at each sample site. Determine the average temperature.

4.2.2 Measure the barometric pressure at the time of the test.

4.2.3 Velocities of effluents out of ventilators shall be measured with a vane anemometer.

4.2.4 Fan volumes shall be determined from the fan curve.

4.3 Preparation of sampling train.

4.3.1 Prior to assembly, clean all glassware (probe, impingers and connectors) by rinsing with the acid wash solution (reagent 3.2.2), tap water, and finally distilled water. Place 15 ml of 0.1M iodine monochloride in each of the first three midget impingers. The fourth impinger is filled with silica gel. Assemble the sampling train as shown in Figure 2-1.

4.3.2 Place a plug in the probe inlet and leak check the sampling train by applying a vacuum of 10 in. Hg. to the system. If the leakage, as observed on the dry gas meter, exceeds 1% of the desired sampling rate, locate and correct the leaks. Release the vacuum on the train by carefully removing the plug from the probe inlet, then turn off the pump. Place crushed ice around the impingers.

4.4 Sample collection.

4.4.1 Use the same sample train for all samples which are taken consecutively. The samples should be extracted at a rate proportional to the gas velocity at each point. The minimum sampling time and sample volume shall be, respectively, 1½ hours and 3.0 ft³ as measured by the gas meter.

4.4.2 Position the probe tip at the desired sampling point; record the initial reading on the dry gas meter, and additional data required. Start the pump. Establish the initial sampling rate at 2 scfh. Maintain constant flow rate and maintain the ice level in the impinger bath throughout the run. At the end of the run, turn off the pump and record the final reading on the dry gas meter. Place a plug in the probe inlet, and remove sampling train to sample recovery area.

4.5 Sample recovery. (All glass storage bottles must be precleaned as in section 4.3.1).

® Trade name.

4.5.1 This operation should be performed in an area free of possible mercury contamination. Disconnect the probe from the impinger train. Place the contents (measured to ±1ml) of the first three impingers into storage bottle No. 1. Rinse the probe and all glassware up to and including the third impinger with 50 ml of 0.1M ICl. Place this rinse portion in storage bottle No. 1. For a blank, place 80 ml of the 0.1M ICl in sample jar No. 2. Seal and secure both storage bottles for shipment. If an additional test is desired, the glassware can be rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.6 Analysis.

4.6.1 Apparatus preparation—Clean all glassware according to the procedure of section 4.3.1. Turn on the A.A.S. mercury lamp and allow to warm up for 30 minutes prior to analysis. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.6.2 Analysis preparation—Adjust the air delivery pressure and the needle valve to obtain an air flow of 1.3 l/min. The analysis tube should be bypassed at this time. Purge the equipment for 2 minutes. Prepare a sample of a mercury standard solution (3.4.2) according to section 4.6.3. Place the analysis tube in the line, and continue aerating until a maximum peak height is reached on the recorder. Remove the analysis tube, flush the lines and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purge and analyses cycle is to be repeated until peak heights are reproducible.

4.6.3 Sample preparation—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M ICl if required. Add 5 ml of 10N NaOH, cap tube with a clean glass stopper and shake vigorously. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately place in sample line.

4.6.4 Mercury determination—After the system has been stabilized, prepare samples from each storage bottle according to section 4.6.3. The mercury content is read by comparing the sample peak heights to the peak heights for the calibration solutions. Prepare a blank from storage bottle No. 2 according to section 4.5.3 and analyze to determine the reagent blank mercury level.

5. *Calibration.*

5.1 Sampling train.

5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter and the dry gas meter.

5.2 Analytical train.

5.2.1 Prepare a calibration curve for the atomic absorption spectrophotometer by analyzing the standard mercury solutions. Plot the peak heights read on the recorder versus the weight of mercury in the standard solutions. Standards should be interspersed with the sample analyses since the calibration can change slightly with time.

6. *Calculations.*

6.1 Gas sample volume at standard conditions. Correct the sample volume measured by the dry gas meter to exit gas conditions by using equation 2-1.

$$V_{m_s} = V_m \frac{T_s}{T_m} \qquad \text{eq. 2-1}$$

where:

V_{m_s} = Total volume of gas sampled at exit gas conditions, ft³.

V_m = Volume of gas sampled through the dry gas meter at meter conditions, ft³.

T_m = Average absolute dry gas meter temperature, °R.

T_s = Average absolute exit gas temperature, °R.

6.2 Volume of water vapor.

$$V_{w_s} = V_{l_c} \frac{\rho_{H_2O}}{M_{H_2O}} R \frac{T_s}{P_{bar}} \qquad \text{eq. 2-2}$$

where:

V_{w_s} = Volume of water vapor in gas sample (exit gas conditions), cu. ft.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see Figure 2-2), ml.

ρ_{H_2O} = Density of water, 1 g./ml.

M_{H_2O} = Molecular weight of water, 18 lb./lb. mol.

R = Ideal gas constant, 21.83 inches Hg. cu. ft./lb. mole-°R.

T_s = Average absolute exit gas temperature, °R.

P_{bar} = Barometric pressure, inches Hg.

6.3 Total gas volume.

$$V_{total} = V_{m_s} + V_{w_s}$$

where:

V_{total} = Total volume of gas sample (exit gas conditions), cu. ft.

V_{m_s} = Volume of gas through gas meter (exit gas conditions), cu. ft.

V_{w_s} = Volume of water vapor in gas sample (exit gas conditions), cu. ft.

6.4 Mercury collected. Calculate the total weight of mercury collected by using equation 2-3.

$$W_t = V_t \frac{W_l}{V_l} - V_b(C_b) \qquad \text{eq. 2-3}$$

where:

W_t = Total weight of mercury collected, μg.

V_t = Total volume of absorbing solution and ICl wash in sample bottle No. 1, ml.

W_l = Weight of mercury found in aliquot from sample bottle No. 1, μg.

V_l = Aliquot size from sample bottle No. 1, ml.

V_b = Total volume of ICl used in sampling (impinger contents + all wash amounts) ml.

C_b = Concentration of mercury in 0.1M ICl solution from sample bottle No. 2, μg./ml.

6.5 Total mercury emission. Calculate the total amount of mercury emitted per day by equation 2-4.

$$R = 0.00019 \frac{W_t}{V_{total}} V_s A_s \qquad \text{eq. 2-4}$$

where:

R = Rate of emission, lb./day.

W_t = Total weight of mercury collected, μg.

V_{total} = Total volume of gas sample (exit gas conditions), cu. ft.

V_s = Gas velocity at exit, ft per second.

A_s = Cross-sectional area through which emission occurs, ft².

7. *References.*

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Rom, Jerome J., Maintenance, Calibration and Operation of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0576.

Method 3—Determination of Beryllium From Stationary Sources

1. *Principle and applicability.*

1.1 Principle. Beryllium laden gases are withdrawn isokinetically from the source, and the collected sample is digested in an acid solution and analyzed by the atomic absorption procedure.

1.2 Applicability. This method is applicable for the determination of beryllium emissions only when specified by the test procedures for determining compliance with the Clean Air Act.

2. *Apparatus.*

2.1 Sampling train. The design specifications of the particulate sampling train used by EPA (Figure 3-1) are described in APTD-0581. Commercial models of this train are available.

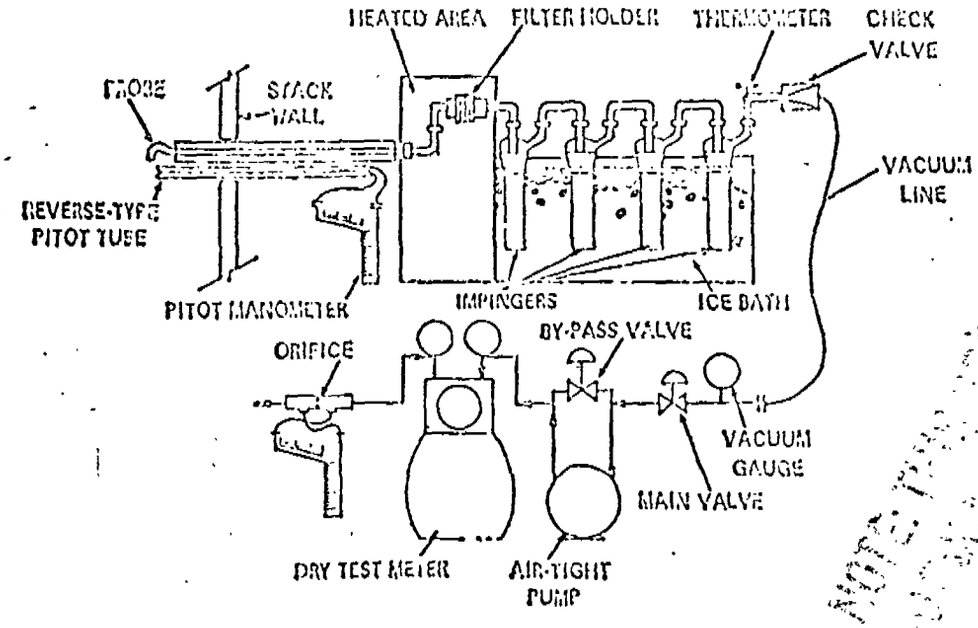

Figure 3-1. Particulate-sampling train.

2.1.1 Nozzle—Stainless steel (316) with sharp, tapered leading edge.

2.1.2 Probe—Pyrex* glass with a heating system capable of maintaining a minimum gas temperature of 250°F at the exit end during sampling to prevent condensation from occurring. When length limitations (greater than about 3 ft) are encountered at temperatures less than 600°F, Incoloy 825*, or equivalent, may be used. Probes for sampling gas streams at temperatures in excess of 600°F are subject to approval by the Administrator.

2.1.3 Pitot tube—Type S, or equivalent, attached to probe to monitor stack gas velocity.

2.1.4 Filter holder—Pyrex* glass with heating system capable of maintaining a minimum temperature of 225°F.

2.1.5 Impingers—Four impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers are of the Greenburg-Smith design, modified by replacing the tip with a ½-inch ID glass tube extending to ½ inch from the bottom of the flask. The second impinger is of the Greenburg-Smith design with the standard tip.

2.1.6 Metering system—Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2% accuracy, and related equipment, or equivalent, as required to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 Barometer—To measure atmospheric pressure to ± 0.1 inch Hg.

2.2 Measurement of stack conditions (stack pressure, temperature, moisture and velocity).

2.2.1 Pitot tube—Type S (Figure 3-2), or equivalent, with a coefficient within ±5% over the working range.

*Trade name.

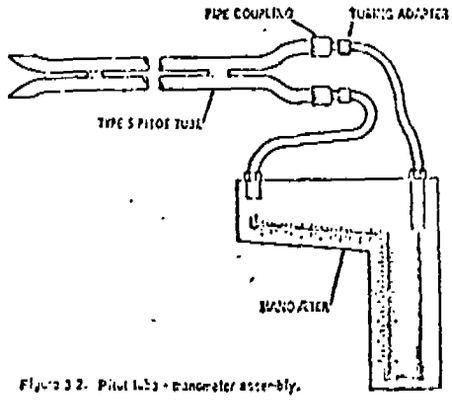

Figure 3-2. Pitot tube-manometer assembly.

2.2.2 Differential pressure gauge—Inclined manometer, or equivalent, to measure velocity head to within 10% of the minimum value.

2.2.3 Temperature gauge—Thermocouple or equivalent, attached to the pitot tube to measure stack temperature to within 1.5% of the minimum absolute stack temperature.

2.2.4 Pressure gauge—Mercury-filled U-tube manometer, or equivalent, to measure stack pressure to within 0.1 in. Hg.

2.2.5 Barometer—To measure atmospheric pressure to within 0.1 in. Hg.

2.2.6 Thermometers—Wet and dry bulb.

2.3 Sample recovery.

2.3.1 Probe brush—At least as long as probe.

2.3.2 Glass wash bottles—Two.

2.3.3 Glass sample storage containers.

2.3.4 Graduated cylinder—250 ml.

2.4 Analysis.

2.4.1 Atomic absorption spectrophotometer (A.A.S.), Perkin Elmer Model 303, or equivalent, with N_2O/acetylene burner.

2.4.2 Beakers—150 ml, 400 ml.

2.4.3 Pipette—Volumetric, 10 ml.

2.4.4 Volumetric flasks—1 liter.

2.4.5 Hot plate.

2.4.6 Perchloric acid fume hood.

3. *Reagents.*

3.1 Sampling.

3.1.1 Filters—Millipore AA*, or equivalent, numbered for identification and preweighted. It is suggested that a Whatman 41 filter be placed immediately against the back side of the Millipore filter as a guard against breaking the Millipore filter. In the analysis of the filter, the Whatman 41 filter should be included with the Millipore filter.

3.1.2 Silica gel—Indicating type, 6 to 16 mesh, dried at 175°C (350°F) for 2 hours.

3.1.3 Water—Deionized doubly distilled.

3.1.4 Crushed ice.

3.2 Sample recovery.

3.2.1 Water—Deionized, double distilled.

3.2.2 Acetone—Reagents grade.

3.3 Analysis.

3.3.1 Water—Deionized double distilled.

3.3.2 Hydrochloric acid (HCl)—Concentrated.

3.3.3 Perchloric acid—Concentrated, 70%.

3.3.4 Nitric acid (HNO_3)—Concentrated.

3.3.5 Sulfuric acid (H_2SO_4)—Concentrated.

3.3.6 Standard 1.0 ppm (by weight) beryllium solution. Dissolve 100.0 mg of beryllium in 700 ml of 50% (by weight) H_2SO_4 and dilute to a volume of 1,000 ml with double distilled water. Dilute a 10 ml aliquot to 1,000 ml with double distilled water, giving a concentration of 1.0 ppm.

3.3.7 Nitrous oxide (N_2O)—98% minimum purity.

3.3.8 Acetylene.

3.3.9 Compressed air.

4. *Procedure.*

4.1 Selection of a sampling site and minimum number of traverse points.

4.1.1 Select a sampling site that is at least eight stack or duct diameters downstream and two diameters upstream from

any flow disturbance such as a bend, expansion, contraction, or visible flame. For rectangular cross section, determine an equivalent diameter from the following equation:

$$\text{equivalent diameter} = 2\left(\frac{(\text{length})}{\text{length}} + \frac{(\text{width})}{\text{width}}\right) \quad \text{eq. 3-1}$$

4.1.2 When the above sampling site criteria can be met, the minimum number of points.

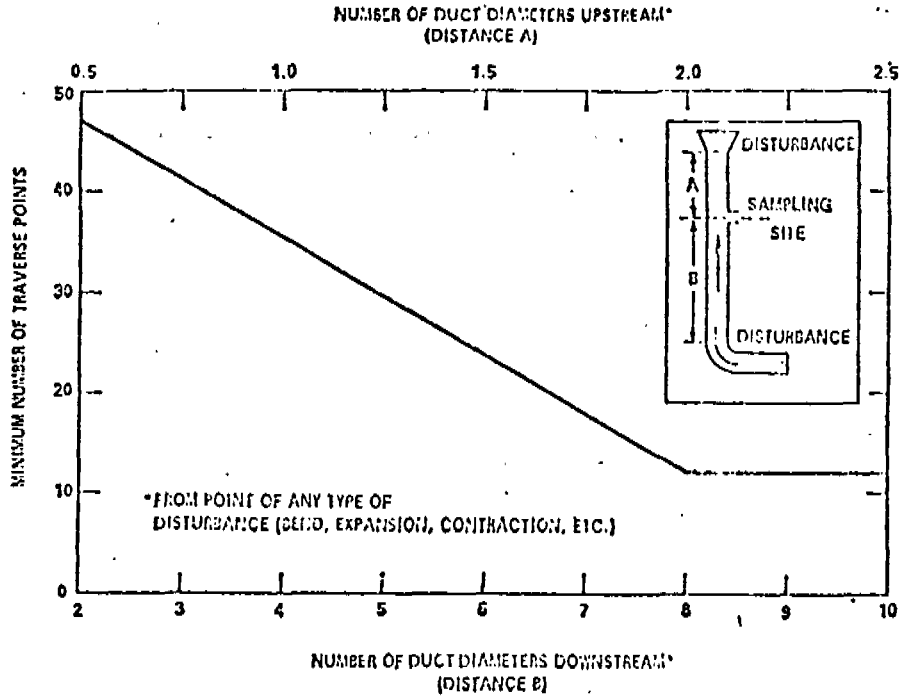

Figure 3-3. Minimum number of traverse points.

4.1.3 Some sampling situations render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use Figure 3-3 to determine the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks above 1 foot but 2 feet in diameter or less and twelve (12) for stacks larger than 2 feet.

4.1.4 To use Figure 3-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Determine the corresponding number of traverse points for each distance from Figure 3-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.2.

4.1.5 Under no conditions should a sampling point be selected within one inch of the stack wall.

4.2 Cross-sectional layout and location of traverse points.

4.2.1 For circular stacks locate the traverse points on at least two diameters according to Figure 3-1 and Table 3-1. The traverse axes shall divide the stack cross section into equal parts.

4.2.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to Figure 3-5.

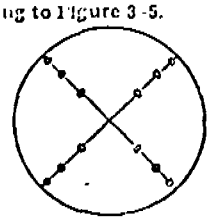

Figure 3-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

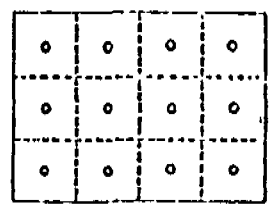

Figure 3-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

Table 3-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	65.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	39.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						--	94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

4.3 Measurement of stack conditions.

4.3.1 Set up the apparatus as shown in Figure 3-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by sections 4.1 and 4.2.

4.3.2 Measure the static pressure in the stack.

4.3.3 Determine the stack gas moisture using wet and dry bulb thermometers and available psychrometric charts.

4.3.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition.

4.4 Preparation of collection train.

4.4.1 Weigh to the nearest gram approximately 200 g. of silica gel. Label a filter of proper diameter, desiccate[4] for at least 24 hours and weigh to the nearest 0.5 mg in a room where the relative humidity is less than 50%. Place 100 ml of distilled water in each of the first two impingers, leave the third impinger empty, and place approximately 200 g. of preweighed silica gel in the fourth impinger. Save a portion of the distilled water for use as a blank in the sample analysis. Set up the train without the probe as in Figure 3-1.

4.4.2 Leak check the sampling train at the sampling site by plugging up the probe tip and pulling a 15 in. Hg. vacuum. A leakage rate not in excess of 0.02 cfm at a vacuum of 15 in. Hg. is acceptable. Adjust the heater to provide a gas temperature of about 250°F at the probe outlet. Turn on the filter heating system. Place crushed ice around the impingers. Add more ice during the run to keep the temperature of the gases leaving the last impinger as low as possible and preferably at 70°F, or less.

4.5 Particulate train operation.

4.5.1 For each run, record the data required on the example sheet shown in Figure 3-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate. To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs are available which aid in the rapid adjustment of the sampling rate without other computations. APTD 0576 details the procedure for using these nomographs. Turn off the pump at the conclusion of each run and record the final readings. Remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.6.

[4] Dry using "Drierite" at 70°F ± 10°F.

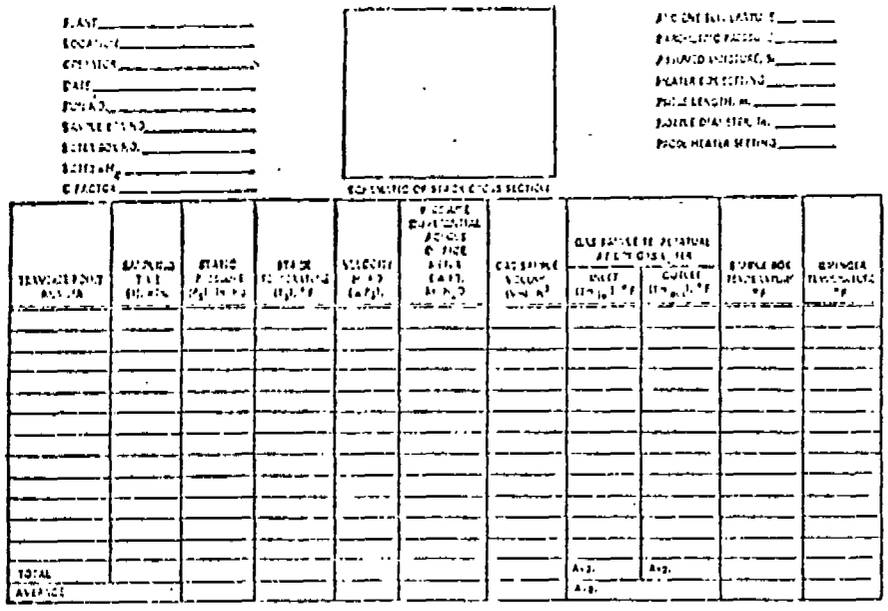

Figure 3-6. Particulate field data.

4.6 Sample recovery.

4.6.1 Exercise care in moving the collection train from the test site to the sample recovery area to minimize the loss of collected sample or the gain of extraneous particulate matter. Set aside portions of the water and acetone used in the sample recovery as blanks for analysis. Place the samples in containers as follows:

Container No. 1. Remove the filter and any loose particulate matter from the filter holder and place in this container and seal.

Container No. 2. Measure the volume of water from the first three impingers (to ±1 ml) and place the water in this container. Place water and acetone rinsings of all sample-exposed surfaces between the filter and the fourth impinger in this container. Place acetone washings from all sample-exposed surfaces prior to the filter in this container also.

Container No. 3. Transfer the silica gel from the fourth impinger to the original container and seal. Use a rubber policeman as an aid in removing silica gel from the impinger.

4.7 Analysis (All glassware used in the analyses must be acid cleaned by soaking in 50%, by volume, HNO_3 for 2 hours).

4.7.1 Handle each sample container as follows:

Container No. 1. Transfer the filter and any loose particulate matter from the sample container to a 150 ml beaker. Add 35 ml concentrated nitric acid. Heat on a hotplate for 5 to 10 min. to destroy any organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid and 5 ml concentrated perchloric acid. Then proceed with step 4.7.2.

Container No. 2. Place a portion of the water and acetone sample into a 150 ml beaker and put on a hotplate. Add portions of the remainder as evaporation proceeds and evaporate to dryness. Cool the residue and add 35 ml concentrated nitric acid, 5 ml concentrated sulfuric acid, and 5 ml concentrated perchloric acid. Then proceed with step 4.7.2.

Container No. 3. Weigh the spent silica gel and report to the nearest gram.

4.7.2 Replace on a hot plate and evaporate to dryness in a perchloric acid hood. Cool and dissolve the residue in 10 ml. of 25%, by volume, HCl. Samples are now ready for the atomic adsorption unit. The beryllium concentration of the sample must be within the calibration range of the A.A.S. If necessary, further dilution of sample with 25%, by volume, HCl must be performed to bring the sample within the calibration range.

4.7.3 Standardize the A.A.S. per section 5 of this method and analyze the samples at 2318 nm using a nitrous oxide/acetylene flame.

5. *Calibration and standards.*

5.1 Sampling train.

5.1.1 Use standard methods and equipment as detailed in APTD 0576 to calibrate the rate meter, pitot tube, dry gas meter and probe heater. Recalibrate after each test series.

5.2 Analysis.

5.2.1 Standardization is made with procedure as suggested by the A.A.S. manufacturer with standard beryllium solution. The linearity of working range should be established with a series of standard solutions. If collected samples are out of the linear range, the samples should be diluted.

6. *Calculations.*

6.1 Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop. See data sheet (Figure 3-6).

6.2 Dry gas volume. Correct the sample volume measured by the dry gas meter to stack conditions by using equation 3-2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{P_{bar} + \frac{\Delta H}{13.6}}{P_s} \qquad \text{eq. 3-2}$$

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), cu. ft.

V_m = Volume of gas sample through the dry gas meter (meter conditions), cu. ft.

T_s = Average absolute temperature of stack gas, °R.

T_m = Average absolute dry gas meter temperature, °R.

P_{bar} = Barometric pressure at the orifice meter, inches Hg.

ΔH = Average pressure drop across the orifice meter, inches H_2O.

13.6 = Specific gravity of mercury.

P_s = Average absolute pressure of stack gas, inches Hg.

6.3 Volume of water vapor.

$$V_{w_s} = V_{l_c} \frac{\rho_{H_2O}}{M_{H_2O}} \frac{RT_s}{P_s}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), cu. ft.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see Figure 3-7), ml.

ρ_{H_2O} = Density of water, 1 g/ml.

M_{H_2O} = Molecular weight of water, 18 lb/lb-mole.

R = Ideal gas constant, 21.83 inches Hg-cu. ft/lb-mole-°R.

T_s = Absolute stack gas temperature, °R.

P_s = Absolute stack gas pressure, inches Hg.

	VOLUME OF LIQUID WATER COLLECTED	
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT g
FINAL		
INITIAL		
LIQUID COLLECTED		
TOTAL VOLUME COLLECTED		ml*

*CONVERT WEIGHT OF WATER TO VOLUME BY DIVIDING TOTAL WEIGHT INCREASE BY DENSITY OF WATER. (1 g/ml)

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 3-7. Analytical data.

6.4 Total gas volume.

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 3-4}$$

where:

V_{total} = Total volume of gas sample (stack conditions), cu. ft.

V_{m_s} = Volume of gas through dry gas meter (stack conditions), cu. ft.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), cu. ft.

6.5 Stack gas velocity.

Use equation 3-5 to calculate the stack gas velocity.

$$V_s = K_p C_p \sqrt{\frac{T_s \Delta_p}{P_s M_s}} \qquad \text{eq. 3-5}$$

where:

V_s = Stack gas velocity, feet per second (f.p.s.).

$K_p = 85.48 \frac{\text{ft.}}{\text{sec.}} \left(\frac{\text{lb.}}{\text{lb. mole-°R}}\right)^{\frac{1}{2}}$ when these units are used.

C_p = Pitot tube coefficient, dimensionless

T_s = Average absolute stack gas temperature, °R.

Δ_p = Average velocity head of stack gas, inches H_2O (see Figure 3-8).

P_s = Average absolute stack gas pressure, inches Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb/lb-mole.

PLANT _____
DATE _____
RUN NO. _____
STACK DIA. (in.) _____
AMBIENT TEMP. (°F) _____
BAROMETRIC PRESS. (P_b) (in. Hg) _____
OPERATOR _____

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta p}$	Stack temperature (°F)
	Average		

Figure 3-8. Velocity traverse data.

Figure 3-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of Figure 3-8 to determine the average stack gas velocity from equation 3-5.

6.6 Beryllium collected. Calculate the total weight of beryllium collected by using equation 3-6.

$$W_s = V_1\frac{W_1}{v_1} + V_2\frac{W_2}{v_2} - V_w C_w - V_a C_a \qquad \text{eq. 3-6}$$

where:
W_s = Total weight of beryllium collected, μg.
V_1 = Total volume of HCl in sample bottle No. 1, ml.
W_1 = Weight beryllium found in sample aliquot from sample bottle No. 1, μg.
v_1 = Size of aliquot from sample bottle No. 1, ml.
V_2 = Total volume of HCl in sample bottle No. 2, ml.
W_2 = Weight beryllium found in sample aliquot from sample bottle No. 2, μg.
v_2 = Size of aliquot from sample bottle No. 2, ml.
V_w = Total volume of water used in sampling (impinger contents plus all wash amounts), ml.
C_w = Concentration of beryllium in water, μg/ml.
V_a = Total volume of acetone used in sampling (all wash amounts), ml.
C_a = Concentration of beryllium in acetone, μg./ml.

6.7 Total beryllium emission. Calculate the total amount of beryllium emitted per day by equation 3-7.

$$R = 0.00006\frac{W_s}{V_{total}} V_s A_s T \qquad \text{eq. 3-7}$$

where:
R = Rate of emission, gms./day.
W_s = Total weight of beryllium collected, μg.
V_{total} = Total volume of gas sample (stack conditions), cu. ft.
V_s = Stack velocity, feet per second.
A_s = Stack area, ft.²
T = Total time of stack operation, minutes/day.

6.8 Isokinetic variation (comparison of velocity of gas in sample train to stack velocity).

$$I = \frac{100\,V_{total}}{V_s A_n \theta} \qquad \text{eq. 3-8}$$

where:
I = Percent of isokinetic sampling.
V_{total} = Total volume of gas sample (stack conditions), cu. ft.
A_n = Sample probe tip area, ft².
θ = Sampling time, sec.
V_s = Stack gas velocity, feet per second.

6.8.1 Acceptable results. The following range sets the limit on acceptable isokinetic sampling results:

If $90\% \leq I \leq 100\%$, the results are acceptable; otherwise, reject the results and repeat the test.

7. *References.*

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[FR Doc.71-17678 Filed 12-6-71;8:45 am]

FEDERAL RESERVE SYSTEM

[12 CFR Part 222]

BANK HOLDING COMPANIES

Delay of Hearing Regarding Armored Car and Courier Services

On November 10, 1971, the Board of Governors announced that it would conduct a hearing December 10, 1971, on the issues involved in bank holding companies engaging in armored car and courier services (36 F.R. 21897, Nov. 17, 1971).

In response to a "Motion for Extension of Time and Institution of Formal Rulemaking Proceedings" filed by counsel for the National Courier Association and the National Armored Car Association, the Board has postponed the hearing date to January 19, 1972. All views expressed in written comments on the proposal that are received by February 11, 1972, will be given consideration.

The Board has denied the request by the Associations that the hearing be conducted under sections 556 and 557 of title 5, United States Code. The Board explored the question of the nature of hearings under section 4(c)(8) of the Bank Holding Company Act in January 1971 before its original proposal to implement that section. It concluded that the law does not require a formal hearing in connection with the issuance of regulations under that section. The Board reaffirms that conclusion.

By order of the Board of Governors, November 30, 1971.

[SEAL] TYNAN SMITH,
Secretary of the Board.

[FR Doc.71-17804 Filed 12-6-71;8:47 am]

SECURITIES AND EXCHANGE COMMISSION

[17 CFR Part 239]

[Release No. 33-5212]

REGISTRATION OF CERTAIN SECURITIES

Use of Optional Form S-16

Notice is hereby given that the Securities and Exchange Commission has

[redacted] RECORD

NOTE: THIS DOCUMENT DID NOT COME FROM PPG FILES

[redacted] Ira B. Grant, M.D.

DATE: November 29, 1965

SUBJECT: Medical Staff Visit to Port Allegany, October 25 - 28, 1965

1. This is really five plants in one. The following is a breakdown of each of these operations.

Plant No. One is a glass block plant. When in operation this is a 24-hour-a-day, 7-day-a-week operation and there are 90 employees. Jack Binder is the superintendent and his assistant is Glen Turner. This plant, however, is usually shut down 4 to 6 months each year. It will not now start up again until March 1, 1966.

Plant No. Two is the foam glass plant. It is a 24-hour-a-day, 7-day-a-week operation and there are 125 employees in this plant. Mr. H. L. Weaver, nicknamed "Buckey," is the plant manager. Plant No. Five is a fabricating plant for the foam glass. This is a one-shift, five-day-a-week operation in which there are 35 employees. Fred DeVries is the manager. He also is the manager of Plant No. Six which is a ureafoam plant with 10 employees. Plant No. Eight is a unibestos plant with 40 employees. This is a two-shift, five-day operation. Mr. C. W. Dolaney, nicknamed "Checky," is the plant manager. During the time that Plant No. One is not making the glass block they usually have an off season glass brick decorating operation which consists of spraying a lead pigment glaze on the glass brick which is then fired into the brick.

2. Plant No. 8 started up just about a year ago. Shortly after its start up, an industrial hygiene survey was conducted in June to evaluate the employees' exposure to asbestos and silica dust. This survey was don by the State of Pennsylvania. A number of the employees in this plant, namely, the conveyerloader, building operator and some of the saw operators were exposed to asbestos dust exceeding the TLV of five million particles per cubic foot of air. In addition to the 40 regular employees in this department, there are about 6 service department employees who spend all of their time in the asbestos department. Others exposed to asbestos are unloaders who about once every 4 or 5 months spend 4 to 5 days unloading burlap bags containing asbestos from box cars. These unloaders are usually from the work gang and are not the same people used each time. The ingredients are scrap, DX and DX-11 which are two forms of asbestos (incidentally, this asbestos comes from Africa and is amosite type. It has a relatively high specific gravity and it is not shredded as much as the asbestos in the textile industry is shredded, both of which increase its settling rate from the air. Dicalite Grade 185 is a diatomaceous earth that is supplied by Great Lakes Carbon Corporation and is shipped from California. About 2 to 3 bags of this material are used per eight-hour shift as a filler material. These ingredients are chopped up and mixed and pneumatically conveyed to a building machine where they are laid down on a conveyer. They are then sprayed with a liquid solution of sodium silicate which is about 80% water and 20% silicate. This material is received from Dupont or Philadelphia Quartz. The ratio of fiber to sodium silicate and water is about 1:1 for the larger pip and it is 1 to less than 1 for the

[redacted]ter pipe. The material is then rolled on a steel drum, smoothed, [redacted] the steel drum is removed and the pipe is then put unto a conveyer which carries it through a drying oven, the temperatures of which begin at 250 and then to 350 and then to 450 in three different parts of the drying oven. The day I visited the plant, it was a relatively cold day outside and all the windows and doors were closed. There was no make-up air for the ventilating system and therefore they were operating at a much reduced capacity and there was a noticably heavy concentration of asbestos dust particularly around the loading machine and the building machines although there was some noted in the saw areas as well. Only pre-employment X-rays have been done on any f the employees in this area.

3. The Port Allegany Plant was started up in 1937 as a glass block plant. In 1942, foam glass was added - in 1955, fabrication of foam glass was added - in 1961, the urethane foam was added - in 1964, unibestos was added.

4. Urethane Foam Department. Shortly after the start up of this operation, the Industrial Hygiene Foundation did a survey of this area and generally found conditions well-controlled with no significant exposure to TDI. In the operation, a prepolymer prepared by the Chase Chemical Company consisting of a polyall resin and TDI are combined with a premix which is made up on site and consists of polyall resins and some silicones and a catalyst and other materials. When these materials are combined, there is a levining effect and a hardening effect which produces the bun. This is all done under what appeared to be adequate exhaust ventilation, however, the exhaust fumes are ventilated to the outside and are not scrubbed out. There have been a number of people who have been sensitized by the TDI including the plant manager, Mr. Larry Griffith. Therefore, it is doubtful whether the controls are entirely adequate. Further fabrication of the bun takes place in a temporary like loose plastic hood area where the buns are cut with hot steel wires of various sizes. Recently, in addition to the exhaust ventilation of this temporary like hood, they have also placed local exhaust ventilation on each of the cutting arms where the wires are attached. This seems to be quite effective in fume capture.

5. Glass Foam. One batch house provides batch for both the foam glass tank which is tank no. 2 and the glass block tank which is Tank No. 1. The basic batch for the two tanks varies only in the cullet. The glass block uses glass block cullet and the foam glass uses foam glass scrap. The batch consists of a Mapleton sand, a Barberton soda ash, rascrite which is a borax material, limestone and a methylene cyanide. The batch house is a three-shift operation in which there is an unloader, batch house operator and two mixing and melting maintenance people. An additional batch house operator is added when they are on two tanks. A five-gallon pail of levining is added to the foam glass in addition to the normal batch. This consists of sodium nitrate, sodium sulfate and fluorospar. The batch is fed into the tank with a fraser simplex screw type charger. This is a completely sealed operation as opposed to the usual open feeding in other glass tanks. Tank No. 1 which is only used about half the time is kept in heat between production runs. About 80 tons of foam glass is made per day - maximum capacity is about 85.

There are six calbalating furnaces. It takes a loaf about an hour to travel through the furnaces. One batch loader will need feed two furnaces. The running of the stripping operation is similar to that at Sedalia. The following were notable differences between the Sedalia and Port Allegany operations in stripping. There was no scrubbing box at Port Allegany which removed excess from glass from the edges of the loaf. One half of the furnaces did side or horizontal loading of the lehr whereas at Sedalia, all of them used the side loading operation. The side loading op furnaces were 4, 5 and 6. The air turbulance pattern at fornaces 1 through 4 were also different than at Sedalia in that the dust was blown away from the operator, whereas at furnaces 4, 5 and 6 like at Sedalia, the dust was blown toward the operator. It had been reported that there were many more foreign bodies in eyes at the Sedalia operation than at the Port Allegany operation. In fact, the Port Allegany operations are not required to wear the side shields on their safety glasses as are the Sedalia operators. This safety glass bit is apparently related to Russ Brittingham's interest in 1960 in the large number of eye injuries that were occurring in Sedalia. He recommended something be done so Larry Griffith went to this side shield type glass even though he really didn't believe it was effective. He was the plant manager at Sedalia at that time.

6. Glass Brick. This production operation is reminiscent of the optical tank operation at Works 6. The molten glass is extruded like tooth-paste into these molds which are on a rotating disc, The molds of the two halves of the final glass brick. These molds are then welding together much like in the glassweld operation at Lincoln following which they are put into a lehr and slowly cooled following a heating up to close to melting temperatures. After taking them off the lehr, they are sprayed off with a prime coat which is a hydrolyzed ethyl silicate and then a vinyl coat which is vinyl mersol. These coats are to provide a bond layer or an expansion layer between the glass and the mortar used to hold the glass bricks in place much as the mortar used in regular house bricks. The coat is then allowed to air dry and then packed and shipped. Mr. Roy Thompson is an employee who is suspected of having lead poisoning by his personal physician, Dr. Herman Moush. Dr. Moush is a friend of the plant industrial relations director, so I called Dr. Moush to discuss his findings. I also talked with Mr. Thompson about his complaints. The complaints and findings seem to be more closely related to hypertensive cardiovascular disease with the exception of a cramping and soreness of the stomach that Mr. Thompson has complained of within the last year. This, of course, could be caused by the pathology of the gastro-intestinal tract not related to lead intoxication. No gastro-intestinal studies have been made. Mr. Thompson complained of the dry paint causing his fingers to peel and crack. He said that while he was paint spraying, he kept his hands in rubber gloves and perspired a good deal under this and this caused his hands to be wet a good bit of the time. He had been working on this operation for about 3 years and it was only one year ago that he began to notice this fingernail infection which resembled very strongly a fungus infection. In discussion with Dr. Moush about Mr. Thompson, I suggested that I would obtain a lead urine analysis in not only Mr. Thompson but also other employees doing the same type of work and if these indicated an exposure, I'd have further industrial hygiene studies done to determine the source of the exposure.

7. Port [redacted] Community Hospital. This is a very adequate hospital which was built about four years ago. There is a new part to the hospital which was just opened just this year. They are right now in the process of getting a new hospital administrator who will replace the present hospital administrator that they had had up to the present time. He wishes to retire. All four doctors who provide services to the plant are members of the staff of this hospital.

8. Fabricating. A similar condition was noted with reference to make-up air for the ventilating systems in the fabricating department that was noted in the asbestos department. This lack of make-up air significantly reduced the efficiency of local exhaust. [redacted] also noticed that the saw operators and other people working in the fabricating operation were not wearing safety eyewear. One of the things that is fabricated in addition to pipe insulation in this department is the OC acoustics material which is the glass foam with many holes punctured into it and it is painted. This OC acoustic material is a sound-absorbing material which is placed on walls to reduce sound reflections.

December 21, 1965

TO: Mr. L. O. Griffith, Plant Manager
Pittsburgh Corning Corporation
Port Allegany, Pennsylvania

FROM: Lee B. Grant, M.D., Medical Director
Pittsburgh Plate Glass Company
Pittsburgh, Pennsylvania

SUBJECT: Initial Medical Plant Visit, October 25-26, 1965

1. Purpose

This visit was made at the request of Mr. Byrl Stout, Vice President of Manufacturing, Pittsburgh Corning Corporation. The principal purpose of this initial visit was to become acquainted with personnel, operations and facilities of the Port Allegany Plant and to consult with and advise plant management on occupational and medical problem areas.

2. Scope

The entry interview was held with Mr. Larry Griffith, Plant Manager, following which each of the plant areas was visited with the superintendent of that area. Plant No. 1, Glass Block, was visited with Mr. Glen Turner; Plant No. 2, Foam Glass, with Mr. H. L. Weaver; Plant No. 5, Fabricating of Foam Glass and Plant No. 6, Foamthane, with Mr. Fred DeVries; Plant No. 8, Unibestos, with Mr. J. M. Holway. Following the plant visits, discussions were held with Mr. H. J. Baker, Personnel Manager, on the Medical and Safety Programs. Mr. Baker accompanied Dr. Grant on a visit to the Port Allegany Community Hospital. The exit interview was held with Mr. Larry Griffith, and the following comments and/or recommendations were made.

3. Comments and/or Recommendations

A. Alleged Lead Intoxication - Glass Block Plant. Mr. Roy Thompson had been employed in the glass decoration operation within this plant for about three years. During the past year, he has been under treatment by his personal physician, Dr. Herman Hosch, from Coudersport, a town of about 18 miles from Port Allegany. His principal complaints were related to a dermatitis of his hands and fingernails, a cramping and soreness of his abdomen, intermittent chest pain, weakness, dizziness and loss of balance. When his physician found he worked in an area in which he was potentially exposed to lead paint, he suspected a relationship between the symptoms and a potential lead exposure. He called Mr. Baker,

the Personnel Director, who is a friend of his and advised him of his suspicions. This call was about three weeks before the undersigned's visit. Mr. Thompson was removed from his exposure at that time and placed at the foam glass finishing area. His doctor had placed him on EDTA, a chelating agent. The employee has noted an improvement in some of his symptoms since the beginning of this treatment.

The glass decorating operation consists of spraying a base enamel on the glass block, allowing this to air dry and then firing the enamel into the glass block. The spraying is done in a makeshift, but enclosed, ventilated box which is completely enclosed at the time the spraying is done. The spraying is activated by a foot lever outside this box. The wet sprayed block is then removed and placed on a pallet where it is allowed to air dry. The spraying operator wears rubber gloves during this phase of the operation. A fairly large number of blocks are allowed to accumulate in this manner before they are taken into the next room and placed on a conveyer line which carries them through a firing furnace. The firing furnace is exhaust ventilated. Prior to firing, the dried enamel is powdery and can easily be wiped off the glass bricks.

The Technical Director of Pittsburgh Corning, Mr. George Gregory, advised that the base enamel contained between 45 and 51 percent of lead oxide. Mr. Thompson has a history of hypertensive cardiovascular disease. He also has a fungus infection of the fingernails. No special study has been made of his gastrointestinal complaints.

Recommendation

While there is a potential lead hazard, my initial observations of the operation as it was being done at the time of my visit, lead me to believe that it is probable no lead hazard actually exists. However, in view of the question that has been raised in regard to potential lead intoxication, I would strongly suggest obtaining lead urine studies not only on Mr. Thompson but on all of the employees who have recently worked at this operation for significant periods of time. Since these lead urine studies cannot be done in the usual hospital laboratory, upon request, I will make the necessary arrangements to have these studies be accomplished. The studies consist of each employee collecting a 24-hour urine sample in a specially provided lead free flask and analyzing the urine for its lead content. If these lead urine studies show evidence of increased absorption of lead in the employees, an industrial hygiene engineering evaluation of the operation should be accomplished in order to detect and control significant lead sources. Here again, upon request, I will also make arrangements for this survey.

B. Foam Glass Plant Stripping Operation. The problem discussed in my Sedalia report, of which you have a copy, are similar to the problems noted at Port Allegany, namely, eye hazards from foreign bodies, heat, particularly during the summer months, and noise. My recommendations are basically the same. A phase of the operation which in part seemed significantly different was the eye hazards from foreign bodies. Mr. Griffith, who had been the plant manager at Sedalia, felt that there were significantly fewer eye injuries at Port Allegany than at Sedalia. There were some differences in the stripping operation at the two plants. At Port Allegany,

Furnaces 4, 5 and 6 [illegible] lehrs which allowed only a horizontal loading of the glass foam loaf into the lehr. Furnaces 1, 2 and 3 were high enough to allow vertical loading into the lehr. All lehr loading at Sedalia was of the horizontal type. Another difference between the two operations was that Port Allegany did not use the edge leveling operation that was used at Sedalia. Apparently, this was not required at Port Allegany to allow the foam glass loaves to remain level within the lehr. This scrubber appeared to be a significant contributor to the foam glass dust at Sedalia. The air turbulence pattern at Furnaces 5 and 6 were similar to that seen at Sedalia, in that the foam glass dust blew up past the face of the operator; however, Furnaces 1 through 4 had air turbulence patterns which seemed to blow the dust away from the face of the operator. The only differences noted which could account for this difference in air pattern between these furnaces was the relative location of the man cooler. At Furnaces 5 and 6, it seemed to blow from above and slightly from the back of the operator which may have caused a relative vacuum in front of the operator which would suck the dust up past his face. At Furnaces 1 through 4, the man air cooler air current was coming directly down on top of and slightly from in front of the operator, and the dust was blown away from the face of the operator.

Recommendation

The air current effect should be studied further to see if, in fact, there are fewer eye cases among the strippers working on Furnaces 1 through 4 as compared with Furnaces 5 and 6. Also, an industrial hygiene survey should be made of the potentially hazardous noise to which the stripping operators and the mold filling operators are subject. The purpose of this survey would be to determine whether a noise hazardous exposure existed and, if it did, the principal sources of noise contributing to this hazard along with recommendations, if feasible, for the control of this noise. If the noise hazard exists and could not be controlled, a hearing conservation for the employees subject to this noise should be initiated. Upon request, the undersigned will make arrangements for this survey.

C. Foamthane Plant. Potential toluene diisocyanate (TDI) exposure. Shortly after the initiation of this plant in 1961, the Industrial Hygiene Foundation performed an industrial hygiene survey and found that the control of TDI vapors was adequate at that time. However, since then, several employees have apparently become sensitized to TDI and have had to be taken out of the area to control their symptoms. TDI is a strong sensitizer and concentrations above the threshold limit value of one-tenth part per million (.1 ppm) will cause allergic sensitization in a significant percentage of the exposed population. Basically, the operation has not changed significantly since the Industrial Hygiene Foundation Survey in 1961 with the exception that within the past few weeks, additional local exhaust ventilation has been installed within the hot wire cutting operation so that the fumes are being drawn off closer to their source in addition to being captured by the plastic ventilated hood covering the operation. This should significantly reduce the potential for TDI exposure.

Comment and Recommendation

Pre-employment evaluation of employees who will work with TDI should include a careful history of allergic disease. These persons should be excluded from work with TDI. Furthermore, periodic physical examinations should be made of all employees potentially exposed to TDI to detect earliest evidence of allergic manifestations. A reevaluation of the potential environmental exposures should be made. This could be done during the industrial hygiene engineering survey of other operations as discussed in this report.

D. Unibestos Plant. Asbestos Dust Exposure. In June of 1964, shortly after the beginning of operation of the unibestos plant, the Department of Health of the State of Pennsylvania performed an industrial hygiene survey. They reported that a hazardous asbestos dust condition existed at several locations throughout the plant. They made a number of recommendations as to how this dust exposure could be controlled. Following this survey, a number of steps were taken to improve dust control. During the present visit, the outside temperatures were low so that all of the windows and doors were closed. No provision, apparently, had been made to provide the rather large amount of make-up air required by the dust collection systems throughout the plant. As a result, the effectiveness of these systems was materially reduced. This resulted in some dustiness of the air in the general area of the loading and building operations. Less general air contamination was noted at the sewing operation. There are 48 employees who come directly under the unibestos operation supervisor. In addition, there are six maintenance employees who spend most of their time in the unibestos area. All of these employees were provided a pre-employment x-ray examination. None of them, however, as yet have had a periodic chest X-ray. While all of the employees in the area were provided with dust respirators, the only person observed to be wearing the dust respirator was the employee working in the loading area.

Recommendation

Prolonged exposure over a number of years to hazardous amounts of asbestos dust will produce the pulmonary disease - asbestosis. Since the Pennsylvania State studies in 1964 indicated certain areas of the plant where a hazardous dust condition existed, it is imperative to determine the effectiveness of corrective action taken since that time and to show, if possible, that a hazardous dust condition does not exist. This industrial hygiene engineering survey should be done other than by the State of Pennsylvania. Further, it should be done by a group universally recognized as competent to perform such a survey. Upon request, I will arrange to have such a survey accomplished. Pre-employment medical examinations of asbestos workers should include a thorough history of previous chest disease as well as a chest x-ray examination. Any history of chest disease, however benign, or x-ray evidence of such disease should exclude that individual working in an asbestos exposure. Periodic chest X-rays should be taken at least every two years on all asbestos workers. These X-rays should be read by a Board certified roentgenologist. These recommendations are important to prevent the development of asbestosis among your employees at some future time.

E. Eye Safety Program. Several sawing and grinding operations were observed in the foam glass fabricating plant in which the operators were not utilizing safety glasses.

Comment: A continuing effort is required to educate employees of the importance of protecting their eyes and the necessity of wearing appropriate eye protection when performing eye hazardous tasks.

F. In-Plant Medical Program. The in-plant medical program consists of foremen or supervisors treating illness or injury from a number of first-aid kits scattered throughout the plant. This is not adequate for a plant of this size particularly with the number of potential hazards that exist within the plant.

Recommendation

An in-plant medical program should be established. An adequately equipped dispensary, staffed with a nurse and/or trained first-aid attendants under the professional direction of a licensed physician is needed. The physician must visit the plant on a regular basis and maintain a thorough knowledge of plant and dispensary operations so that he can provide professional guidance to the dispensary staff and professional consultations to plant management on industrial medical problems. The purposes of this in-plant medical program would be to provide proper treatment of work related illness and injury, and to provide a preventive medical program which, in view of the many potential hazards in the plant, can significantly contribute to the maintenance of a healthy and effective work force. Assistance will be provided as required to establish an in-plant medical program.

Lee B. Grant, M.D.

lms
cc: Mr. B. M. Stout
Mr. H. C. Underwood