I. H. WEAVER
CORPORATE DIRECTOR
ENVIRONMENTAL CONTROL

123 E. STIEGEL STREET, MANHEIM, PENN. 17545

Raybestos-Manhattan

November 24, 1976

Mr. R. H. Mereness
Executive Director
Asbestos Information Association/NA
1835 K Street, N.W., Suite 402
Washington D. C. 20006

SUBJECT: Draft for Proposed AIA Pamphlet on Brake and Clutch Service Hazards,

Dear Bob:

Attached is copy of draft of proposed AIA information pamphlet per your request.

Copies also have been forwarded to the other persons listed below. I should like to have them review and approve this or recommend changes before we release this for print or further circulation.

After your review and comment, I'll be glad to forward a copy to Mr. Nerlinger at ASIA if you would like me to handle this, or you may feel free to do so on your own, whichever you prefer. It may also be advisable to obtain comments from Automotive Parts and Accessories Association, who are practically your next door neighbors, at 1730 K Street, as they also have released an Action Bulletin regarding the NIOSH brake service industry alert. A copy of this bulletin also is attached.

Best regards,

I. H. Weaver

grb
att.
cc: Messrs. J. H. Marsh
E. W. Drislane
E. H. Feierabend
S. K. Christian

DRAFT

ASBESTOS DUST HAZARDS AND BRAKE LINING AND CLUTCH SERVICE OPERATIONS

Since December 1971, Federal asbestos standards have limited permissible exposure to airborne concentrations of asbestos fibers and have established procedures that must be followed when dust is created in the processing of asbestos containing materials. In 1975 the National Institute for Occupational Safety and Health (NIOSH) released preliminary results of an on going survey that indicated significant asbestos exposures occur during brake and clutch servicing operations. The NIOSH release warned of a potential health hazard for persons exposed to asbestos during servicing of motor vehicle brake and clutch assemblies. Operations studied included blow-out of automobile brake assemblies, grinding of used truck brake linings, and beveling of new truck brake linings.

The full extent of asbestos-related disease in brake servicing personnel is not known at present because this particular occupational group has not been systematically studied up to now. However, a review of the scientific literature on the association between asbestos exposure and mesothelial tumors of the pleura and peritoneium has revealed cases of these rare tumors in persons exposed in jobs involving automobile brake servicing.

Previous studies of asbestos emissions from automobile brake lining wear showed that only a small fraction of the original asbestos content of the brake lining is found in brake drum dust, [1, 2, ~~(Ref. 1)~~]. It was presumed this is due to thermal degradation of the fibers during braking. More recent findings indicate that enough asbestos is preserved to produce significant exposures during certain brake servicing procedures [3, ~~(Ref. 2)~~].

[redacted]

NIOSH is continuing research in this area and has recommended the following interim procedures designed to reduce asbestos exposure during performance of automotive service operations. The recommended procedures are meant to supplement, not replace, current asbestos regulations administered by the Occupational Safety and Health Administration (OSHA).

RECOMMENDED PROCEDURES FOR MINIMIZING ASBESTOS DUST DURING BRAKE AND CLUTCH SERVICING OPERATIONS

1. If possible, an area shall be designated for all brake and clutch repairs. Entrances into this area shall be posted with asbestos exposure warning signs as follows:

   Asbestos
   Dust Hazard
   Avoid Breathing Dust.
   Wear Assigned Protective Equipment
   Do Not Remain in Area Unless Your Work Requires It.
   Breathing Asbestos Dust May Cause Asbestosis and Cancer.

2. During brake servicing, an air purifying respirator, either single use or with replaceable particulate filter(s), as approved by the Mining Enforcement and Safety Administration (formerly Bureau of Mines) or NIOSH, shall be worn during all procedures starting with the removal of the wheels and including reassembly. During manual clutch servicing, such a respirator shall be worn during removal and cleaning of the clutch, pressure plate and housing assembly and during installation of the new clutch assembly.

3. Dust shall first be cleaned from brake drums, brake backing

plates, brake assemblies and clutch assemblies using an industrial type vacuum cleaner equipped with a high efficiency filter system (>99% efficiency for 0.3 um diameter aerosols). After vacuum cleaning, any remaining dust shall be removed using a rag soaked in water and wrung until nearly dry. Under no circumstances shall compressed air or dry brushing be used for cleaning.

4. During arcing and riveting operations, an approved respirator, as described in (2) above, shall be worn. Grinding (arcing) machines shall be provided with local exhaust ventilation such that worker exposures are maintained at least below the 1976 OSHA asbestos standard (Ref. 3). At a minimum, the dust bag of the arcing machine shall be removed and replaced with the hose of a high efficiency industrial vacuum cleaner as described in (3) above.

5. Industrial vacuum cleaner bags containing asbestos dust and cloths used for wiping brake and clutch assemblies shall be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

Caution
Contains Asbestos Fibers.
Avoid Breathing Dust.
Breathing Asbestos Dust May Cause Asbestosis and Cancer.

All asbestos waste shall be disposed of in accordance with the OSHA asbestos regulation (Ref. 4). During removal of vacuum bags, an approved respirator, as described in (2) above, shall be worn.

6. All floor cleaning in areas where brakes and clutches are repaired shall be done with a high efficiency industrial vacuum cleaner as described in (3) above. Grinding (arcing) machines shall also be cleaned with such a vacuum cleaner or other suitable local exhaust ventilation system. Any remaining dust shall be wiped with a damp cloth. An approved respirator, as described in (2) above, shall be used during the cleaning.

7. Although adherence to the above procedures should minimize contamination of work clothing, it is required that the appropriate portions of the OSHA regulations on asbestos (Ref. 5) concerning special clothing, change rooms, etc. be followed.

Adherence to the above recommended procedures should minimize asbestos dust exposures to mechanics during brake and clutch servicing. These are interim recommendations and are subject to revision pending results of the on going NIOSH research program.

REFERENCES

1. "Brake Lining Decomposition Products," by Jeremiah R. Lynch, National Center for Urban and Industrial Health, U.S. Public Health Service, Journal of the Air Pollution Control Association, Volume 18, No. 12, pages 824-826, 1968.

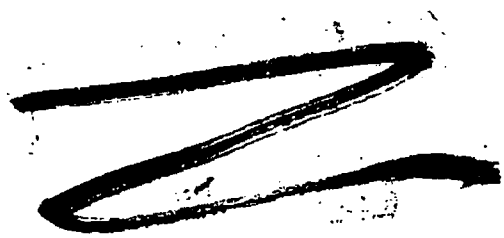
3. "Asbestos Exposure During Brake Lining Maintainence and Repair," by Arthur N. Rohl, Arthur M. Langer, Mary S. Wolff, and Irving Weisman, Environmental Science Laboratory, Mount Sinai School of Medicine, New York, Environmental Research, Volume 12, pages 110-128, 1976.

3. 29 CFR 1910.1001.

4. 29 CFR 1910.1001 (h).

5. 29 CFR 1910.1001 (d) (3 and 4).

NOTE: Section 1910.1001 of the Code of Federal Regulations was formerly Section 1910.93a. This change was noted in the Federal Register, May 28, 1975.



SURVEY AIA-14: DRILLING MUD ADDITIVES--OIL RIG

General air and worker breathing zone samples were collected at an oil rig during the operations involving the use of asbestos drilling mud additives. The sampling was performed outdoors where the weather was cloudy and cool and the winds were blowing from 5 to 10 mph.

Work consisted of those operations previously described, that is, one employee cutting open a 50-pound bag of additive, pouring the asbestos into the mudhopper, and at completion bringing the empty bags to a waste disposal pit. Five bags of additive were used during the survey. A diagram of the work area is shown in Figure 14.

Four samples were collected and the air sampling results are summarized as follows:

Sample No.	Description	Local Time	Fibers/Cubic Centimeter >5 Micron
BD-1	General air, 20 feet upwind of hopper	1116-1144 (28)(a)	0.027 (b)
BD-2	Worker exposure, dumping sacks and disposing of empties	1145-1202.5 (17.5)	0.13
BD-3	General air, 3 feet downwind of hopper during dumping	1146-1201 (15)	<0.052
BD-4	Observer, 10 feet from hopper	1152.5-1204 (11.5)	<0.067

Time-Weighted Averages

Worker Type	TWA
Hopper Operator	0.031

a. Numbers in parentheses are sample duration in minutes.
b. Computational results not intended to imply accuracy of counting.

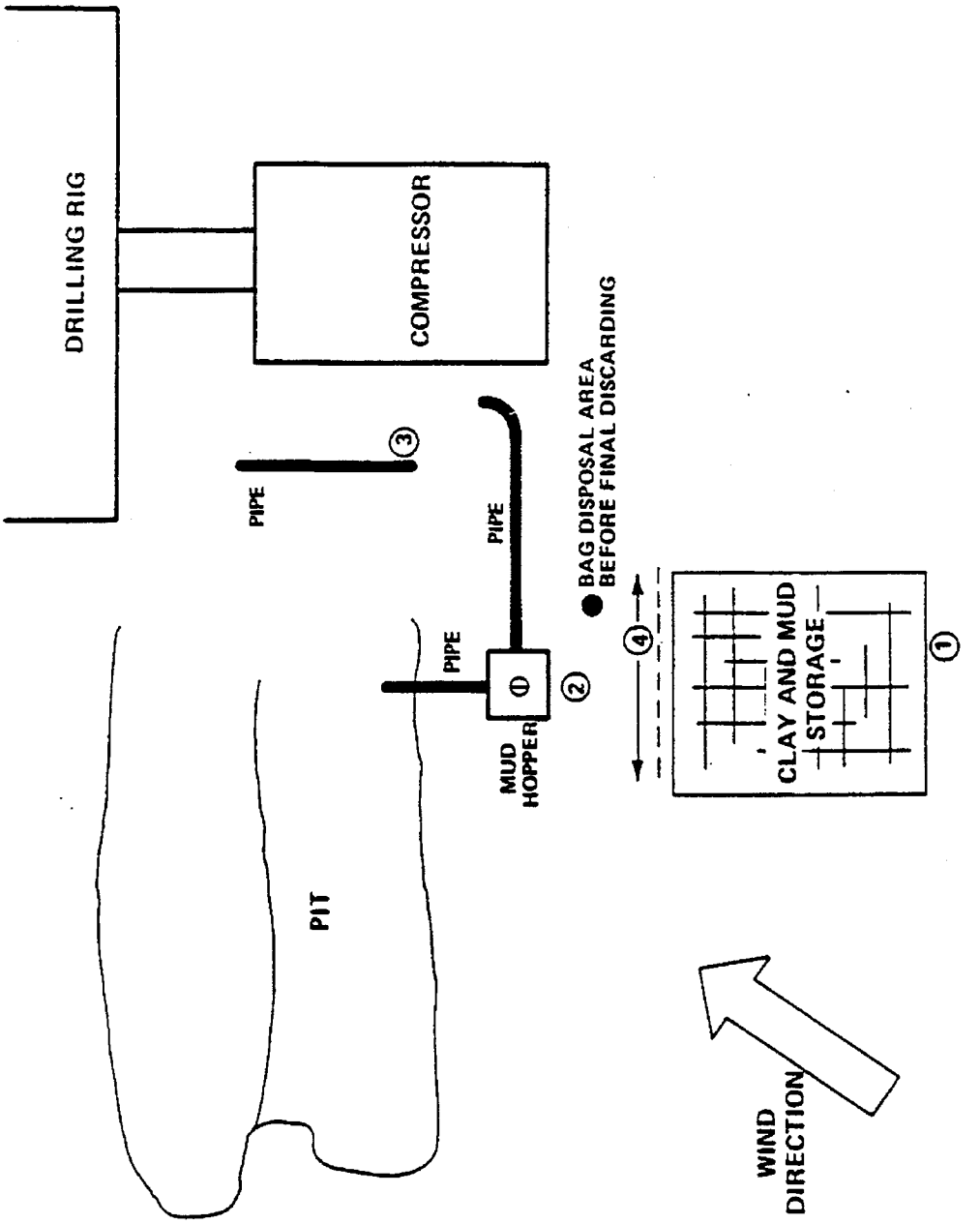


Figure 14. Diagram of work area with sampling locations for survey AIA-14.

SURVEY AIA-15: DRYWALL COMPOUNDS

Survey AIA-15 was conducted in a new annex to an existing building. The walls and ceiling of the annex had been sheet rocked and two coats of tape joint compound applied. The first coat was of a non-asbestos compound. The second coat used on one portion of the ceiling contained asbestos. The asbestos-containing compound was premixed by the manufacturer so that wet-out on the job site was unnecessary.

The operation observed was pole sanding of the ceiling. The worker performing this operation wore work clothes, including a head covering and glasses. A disposable respirator approved for toxic dust was worn during sanding. A 100 grit paper was used. The worker, using stilts, moved about freely, sanding along joints as he went. Heavy visible dusting occurred throughout the 25-minute sanding operation. At the completion of sanding, the worker's clothing was covered with dust.

After a short break, the worker proceeded to another area of the annex and sanded the ceiling joints. The compound used was a non-asbestos type. Sanding of this portion of the ceiling took approximately 30 minutes.

Seven samples were taken during the survey. Two background samples were obtained prior to sanding of the ceiling. Dry-sweeping was being performed at this time. During sanding of the ceiling having asbestos compounds, a personal sample and two area or environmental samples were obtained. Sample locations are shown in Figure 15. Additional area samples were obtained after sanding was completed and during sanding of the non-asbestos compound. A personal sample was also obtained during the second sanding operation.

Results of fiber counts are summarized as follows:

Sample No.	Description	Local Time	Fibers/Cubic Centimeter >5 Micron
CB-1	General air, center of area	0820-0835 (15)(a)	0.15 (b)
CB-2	General air, on side wall	0814-0834 (20)	0.42 (c)
CB-3	Worker exposure, operator during sanding	0837-0903 (25.5)	0.15
CB-4	General air, center of area during sanding	0837-0904 (27.33)	0.082
CB-5	General air, center of area after sanding	0910-0949 (39)	0.077
CB-7	General air, on side wall non-asbestos mud being sanded	0917-0947 (29.33)	0.13
CB-8	Worker exposure, during sanding of non-asbestos mud	0917-0946 (29)	0.13

Time-Weighted Averages

Worker Type	TWA
Finisher: Area where asbestos was used	0.13
Finisher: Area where no asbestos used	0.16
Sander (excludes protection afforded by respirator)	<0.15

---

a. Numbers in parentheses are sample duration in minutes.
b. Computational results not intended to imply accuracy of counting.
c. Note: Ceiling concentration. Dry sweeping was being performed during sampling prior to sanding. Results appears anomalous since non-asbestos compound was used on previous day.

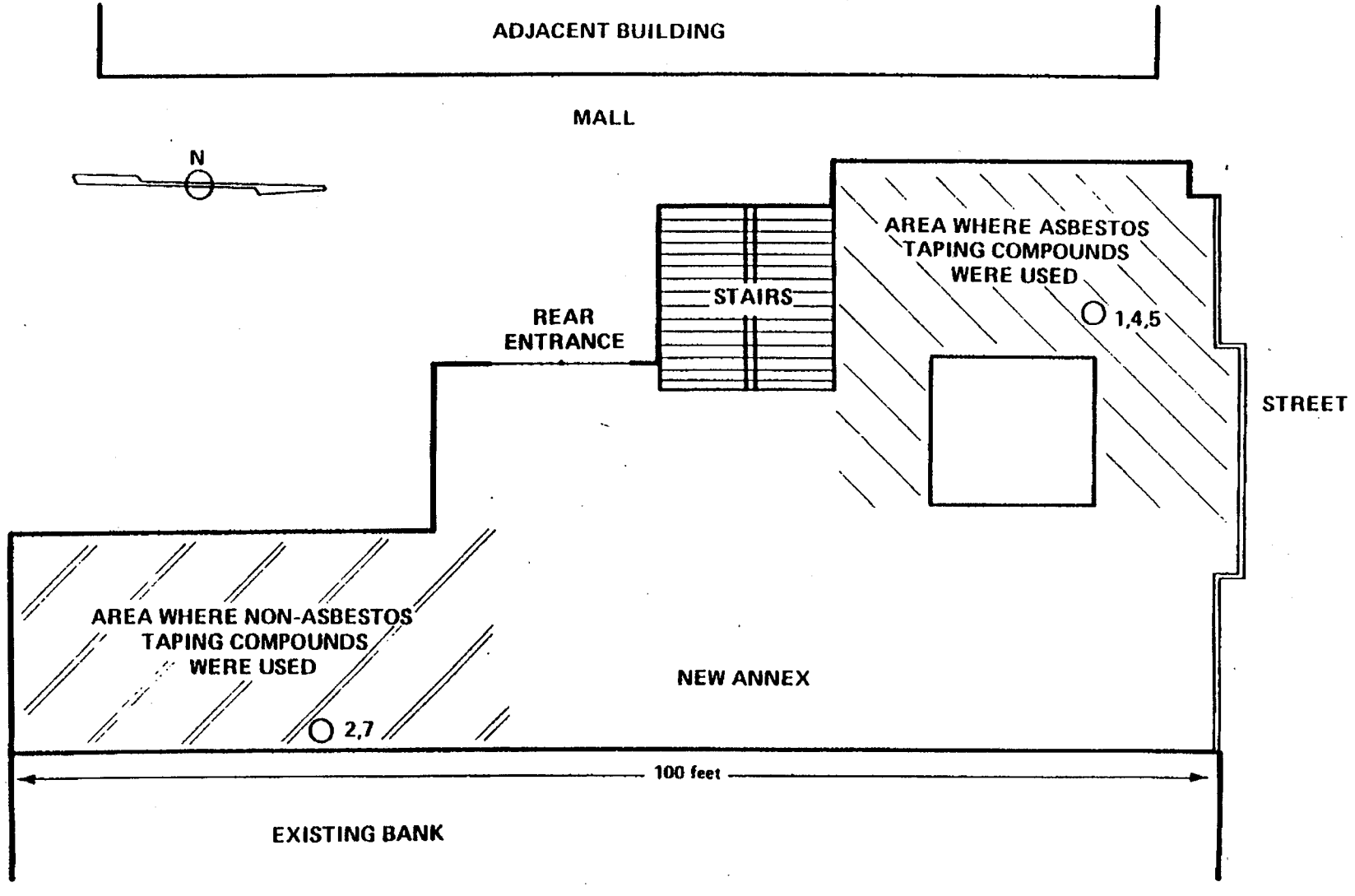


Figure 15. Diagram of working area for survey AIA-15.

SURVEY AIA-16: VINYL ASBESTOS TILE AND FELT-BACKED SHEET FLOORING

Survey AIA-16 consisted of monitoring asbestos exposure levels during the sanding of a vinyl asbestos tile floor, tear-off of an asbestos felt-backed sheet floor, and sanding of felt-backing remaining on a floor after tear-off was performed. The tests were simulations performed at a training school for apprentice floor layers. Work was performed in a warehouse-type building 50-by-50 feet, with a 20-foot ceiling. The area was ventilated by two roof fans.

Simulation 1: Sanding Vinyl Asbestos Tile

A section of the concrete floor was covered with vinyl asbestos tiles 4 days prior to the survey. These tiles were sanded using an electric circular sander with a built-in vacuum. The sander was a small portable unit and the operator had to stoop or kneel in order to operate it. The floor area was 38 feet square. A personal sample was obtained during sanding.

Simulation 2: Tear-off of Sheet Flooring

A personal sample was obtained on a floor worker while he removed the wear surface from an asbestos-felt backed sheet floor. The type of sheet goods used had a backing that was supposed to separate and remain on the floor when the vinyl surface was removed. The condition of this floor was poor and the vinyl had numerous cuts in it such that it could not be torn up in large pieces. Tear-off was accomplished by making long

cuts in the sheet to form a strip. Then the edge of the strip was lifted and the strip pulled up. In this case, a 4-by-6-foot section was removed and the backing did not separate cleanly.

Simulation 3: Sanding of Adhered Backing Material

The felt backing remaining on the 4-by-6-foot floor after tear-off was then sanded. A personal sample on the operator sanding the floor was collected.

The air sampling data are summarized as follows:

Sample No.	Description	Time (minutes)	Fibers/Cubic Centimeter >5 Micron
FL-1	Worker exposure during sanding of tile	25	0.35 (a)
FL-2	Worker exposure during tear-off of sheet material	30	0.16
FL-3	Worker exposure during sanding of sheet backing	15	84

a. Computational results not intended to imply accuracy of counting.

SURVEY AIA-17: BUILDING DEMOLITION, REMOVAL OF ASBESTOS INSULATION

A 6-man crew, including the foreman, removed asbestos insulation from an estimated 95 feet of 4-inch piping and from a horizontal boiler roughly 30 inches in diameter and 8 feet in length. The removal was from the basement of a building prior to demolition. In both work areas, air movement was generally negligible, giving undisturbed exposures. The building layout is shown in Figure 16.

The piping insulation had been well soaked by water from a heavy hose stream. The pipe was about 10 feet from floor, necessitating work from a rolling scaffold. Two men worked on the scaffold, cutting and bagging; two men were on the floor, bagging and picking up any fallen chunks of insulation; and two men, including the foreman, assisted in various duties, i.e., moving the scaffold, clearing the path of the scaffold, and taking filled bags to a central repository space in the center of floor. There was relatively little visible dust except for one section of insulation removed from a vertical length of pipe that had apparently not been well wetted. The pipe covering was of gauze and thus easily dislodged and cut. The entire pipe removal was accomplished within one hour. Five air samples were taken of the operations of pipe insulation removal: AD-1 to AD-5, with AD-1 and AD-2 representing general air and AD-3 to 5 representing workers' exposures.

The boiler room in the basement, approximately 20 by 25 feet in area and 10 feet high, contained two boilers. Boiler size was 2-1/2 inches in diameter and 8 feet long. Five men were involved in the removal of the insulation from one boiler with the sixth man, the foreman, in the

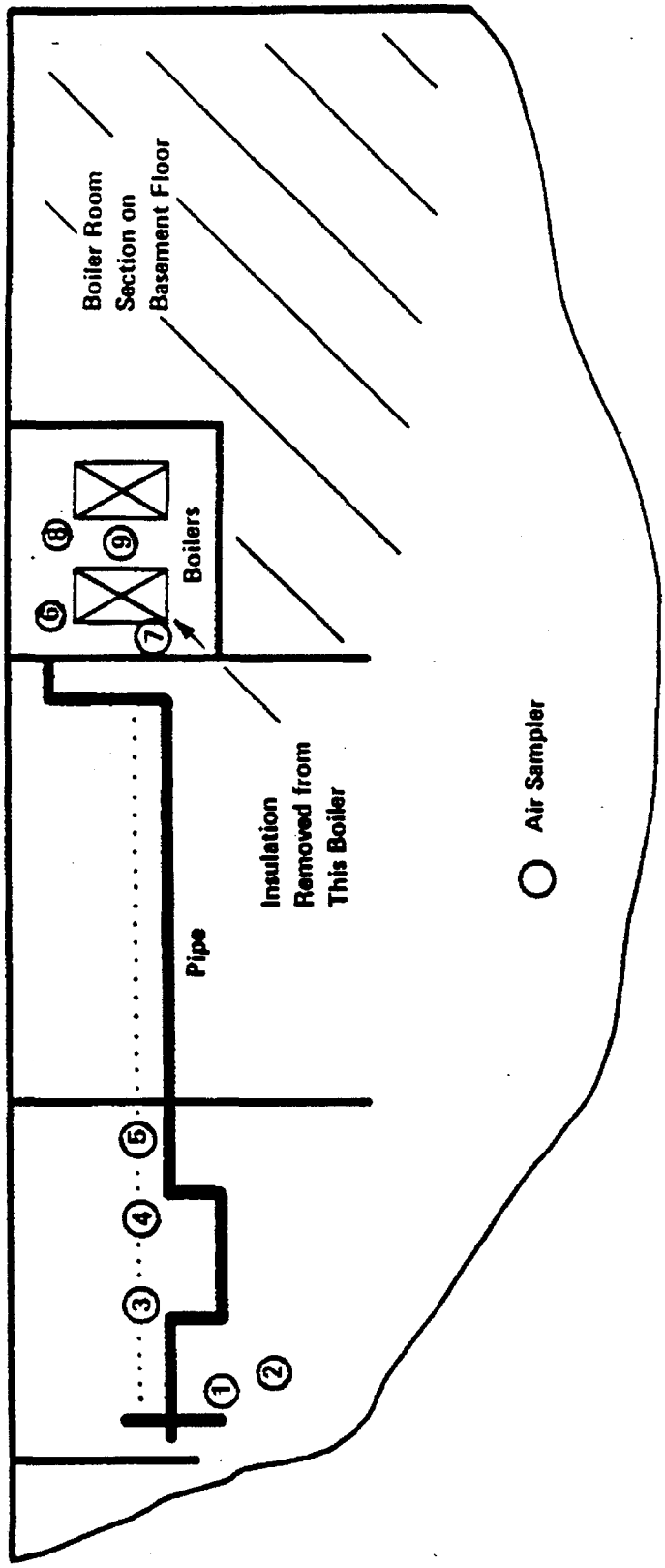


Figure 16. Diagram showing work area and sample locations for survey AIA-17.

01-020504

immediate area assisting in various duties and directing the procedures. One man was assigned to the top of the boiler in cutting the wire frame and loosening the insulation. This man had a co-worker to lift off the blocks of insulation, which were about 1-1/2 inches thick, 4 inches wide, and varying from 2 to 24 inches in length depending on breakage lengths, and bagging the chunks in plastic bags. Two men were in similar work from the floor on the right (east) side, while a fifth man assisted both groups by removing bags, providing new bags, or picking up dropped chunks. This operation appeared somewhat dusty at times, apparently because the wetting did not satisfactorily penetrate the insulation, which had an external covering of 1/4-inch cement material. Four air samples were taken: one of general air at the middle of the room on the west side of boiler, and three of workers' exposure, AD-6 to AD-9. The work was completed in about one-half hour.

The results of sample analyses for asbestos are:

Sample No.	Description	Local Time	Fibers/Cubic Centimeter <5 Micron
AD-1	General air, side of room before start of pipe insulation removal	0854.5-0918 (23.5)(a)	0.033 (b)
AD-2	General air, side of room during pipe insulation removal	0939.5-1028 (48.5)	0.047
AD-3	Personal air sample on first worker; cutting pipe insulation from scaffold	0937-1019 (42)	0.096
AD-4	Personal air sample on second worker; bagging debris on scaffold	0937.25-1018 (40.75)	0.22
AD-5	Personal air sample on third worker; bagging and carting debris	0939-1022 (43)	0.09
AD-6	Personal air sample; worker cutting on top of boiler	1415-1441 (26)	4.5
AD-7	Personal air sample; second worker on top of boiler, left side	1415-1440 (25)	4.1
AD-8	Personal air sample; third worker on floor bagging debris on right side of boiler	1416-1441.5 (25.5)	5.4
AD-9	General air sample; center of boiler room between two boilers (east side of boiler being stripped)	1413-1438 (25)	1.4

a. Numbers in parentheses are sample duration in minutes.
b. Computational results not intended to imply accuracy of counting.

SURVEY AIA-18: VINYL ASBESTOS TILE AND FELT-BACKED SHEET FLOORING

Survey AIA-18 consisted of monitoring asbestos exposure levels during the sanding of a vinyl asbestos tile floor, cleanup after sanding, tear-off of sheet flooring, and removal of sheet backing using solvent rather than mechanical means. The measurements, as with survey AIA-16, were performed at a training school for apprentice floor layers. Work was performed in a room 20-by-20 feet with a 9-foot ceiling. There was no mechanical ventilation in the area.

Simulation 1: Sanding vinyl asbestos tile and cleanup. A 5-by-3-foot section of floor covered with vinyl asbestos tile was repeatedly sanded for 15 minutes. The electric sander was vacuum equipped and the operator was standing during sanding. The worker then proceeded to clean the area using a duster broom. Working on hands and knees, the worker also checked the smoothness of the floor while sweeping. Six minutes were spent on cleanup.

Simulation 2: An 8-by-8-foot area of asbestos-felt-backed sheet was removed in 14 minutes by one worker. Backing material that had adhered to the floor was removed with a 50 percent solution of isopropyl-alcohol in water using a scraper.

The results of these two simulations are:

Sample No.	Description	Time (minutes)	Fibers/Cubic Centimeter <5 Micron
FA-1	Personal sample. Worker sanding vinyl asbestos tile with electric sander, vacuum equipped	15	0.4[a]
FA-2	Personal sample. Worker clean-up of floor after sanding	6	0.7
FA-3	Personal sample during tear-off of sheet flooring	14	0.4
FA-4	Personal sample during stripping of backing material using solvent and scraper	14	0.9

a. Computational results not intended to imply accuracy of counting.

AMBIENT AIR