IWS-051-02-09

ASBESTOS SURVEY OF

Federal Office Building #7
U.S. Court of Claims and Court of Customs
and Patent Appeals Building
Washington, D.C.

AND

George H. Fallon Office Building
Baltimore, Maryland

SURVEY DATE:

August 29-30, 1973

SURVEY CONDUCTED AND WRITTEN BY:

Ralph D. Zumwalde

DATE OF REPORT:

October 1, 1973

Environmental Investigations Branch
Division of Field Studies and Clinical Investigations
National Institute for Occupational Safety and Health
Cincinnati, Ohio

ATTENTION

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PURPOSE OF SURVEY

At the request of the General Services Administration (Attachment 1), two Federal Office Buildings in Washington, D.C. and one in Baltimore, Maryland were surveyed to determine if an airborne asbestos problem existed in any of the three buildings. The request was initiated because of the possible health hazards associated with the asbestos-containing material used for fireproofing in the buildings, and the possibility the material was dislodging from the ceilings and walls and becoming airborne.

SURVEY PROCEDURES

The sampling strategy involved the collection of eight air and one bulk sample to establish the extent of, if any, asbestos exposures. Air samples were collected in those areas of the buildings that had the greatest potential for airborne asbestos concentrations. Samples were collected in the: (1) return air plenum above the false ceilings; and (2) air collection room, where all the return air from the offices is collected. Samples also were collected in the clean air return plenum to determine the effectiveness of the air filtering system. All sample sites are illustrated in Figure 1. A sample was not collected above the false ceiling in the U.S. Court of Claims and Court of Customs and Patent Appeals Building. Unlike the open return air plenum above the false ceilings in the other two buildings, the return air in this building is transported by way of closed ducts.

The air samples were collected using small electric vacuum pumps fitted with a limiting air flow orfice. Flow rates ranged from 9.5 to 10.5 liters/min. The samples were collected on a cellulose ester membrane filter with an 0.8μ pore size and an effective sampling area of 346mm^2.

EVALUATION OF SAMPLES

The bulk sample was analyzed using dispersion staining with a polarizing light microscope[1] . To utilize this analytical method, portions of the sample were mounted on successive slides in a liquid medium having refractive indices the same as chrysotile, amosite and crocidolite asbestos. This technique helped differentiate asbestos from other forms of fibrous material and concurrently distinguish the type of asbestos present.

Air samples were prepared and fibers counted using phase contrast microscopy at 400X magnification. This technique is the same as that recommended by NIOSH for evaluating airborne asbestos exposures[2] . This technique of fiber counting makes no distinction between asbestos fibers and other types of fibrous particulates but only dictates a criteria for differentiating a fiber from a particulate. The criteria states that any particulate with a 3:1 or greater length to width ratio will be called a fiber and that only fibers greater than 5μm in length shall be counted. Since these samples were collected in an environment of mixed particulate contamination, it was necessary to re-evaluate each sample using dispersion staining to estimate what percent of the fiber counts were actually asbestos.

TABLE 1

Fiber Counts at 400X Phase Contrast Microscopy*

Sample Number	Location of Sample	Volume (1pm)	Av. Fibers/Field		Eff. Filter Area (mm^2)	Ctg. Field Area (mm^2)	Fibers/ml	
			Total	>5µm			Total	>5µm
1	Federal Office Bldg. #7--above false ceiling	692	.02	.01	346	0.0066	.002	.001
2	FOB #7--return air rm. before filtering	633	.10	.07	"	"	.008	.006
3	FOB #7--return air rm. after being filtered	577	.01	.01	"	"	.001	.001
4	Court of Claims Bldg. Return air rm. before filtering	288	.04	.02	"	"	.007	.003
5	CC Bldg--return air rm. after filtering	285	.02	.02	"	"	.004	.004
6	Geo. Fallon Bldg--above the false ceiling	1393	.05	.05	"	"	.002	.002
7	Geo. Fallon Bldg--return air rm. before filtering	1374	.02	.02	"	"	.008	.008
8	Geo. Fallon Bldg--return air rm. after filtering	1313	.01	.01	"	"	.004	.004

*Zeiss phase contrast microscope, with built in Kohler illumination, 40X 0.65 N.A. Phase objective, binocular head with KPL 10X eyepieces and an 0.90 N.A. condenser.

These same samples also were viewed at 1000X phase contrast and oil immersion to ascertain if any additional small fibers (less than 1μm) were present.

DISCUSSION OF RESULTS

1. The analysis of the bulk sample revealed that 90-95 percent of the material was fibrous glass, with the remaining being amosite asbestos.

2. The fiber concentrations of the air samples counted at 400X magnification were extremely low. The present Occupational Safety and Health Administration's daily time-weighted average health standard for asbestos is 5 fibers/ml for those fibers greater than 5μm in length. The standard applicable in July 1976 is 2 fibers/ml. As illustrated in Table 1, all measured levels were below 0.008 fibers/ml. As stated previously, these values represent all fibrous particulates with no distinction being made between asbestos and other fibrous material. The dispersion staining of the airborne samples indicated that less than five percent of the fibers collected on the filters were asbestos.

3. The re-evaluation of the airborne samples at the 1000X magnification showed that there were no additional fibers from that detected at 400X.

CONCLUSIONS AND RECOMMENDATIONS

1. The fireproofing material utilized in the buildings appears to contain from 5-10 percent amosite asbestos.

2. The air sampling results obtained during the survey indicated very low airborne levels of asbestos in comparison to present OSHA occupational health standards. This indicates that if the OSHA standards are protective of health, there appears to be no health hazard due to asbestos exposures under the conditions that existed during the survey. However, it should be remembered that the OSHA standards apply to occupational settings and are not meant to apply to the general public in a non-industrial setting.

3. Since there is asbestos present in the fireproofing material, there is a potential for future asbestos exposures due to flaking, etc. of the material. Therefore, it would be prudent to periodically conduct air sampling in the buildings to ascertain if a problem develops. Also, if feasible, it may be warranted to apply a sealant over the fireproofing material to prevent flaking, etc.

4. Worker protection and appropriate handling procedures for any future demolition concerning the fireproofing material should be utilized. Such procedures are mentioned in the OSHA occupational health asbestos standard (29CFR Part 1910.93a), the U.S. Environmental Protection Agency's National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61, Subpart B) and a Cincinnati, Ohio ordinance (see Attachment 2).

REFERENCES

1. McCrone, Walter and John Gustav Delly, The Particle Atlas, 2nd Edition, Volume I, Principles and Techniques, pp. 97-114, 1973.

2. "Criteria for a Recommended Standard: Occupational Exposure to Asbestos", USDHEW, Public Health Service, National Institute for Occupational Safety and Health, 1972.

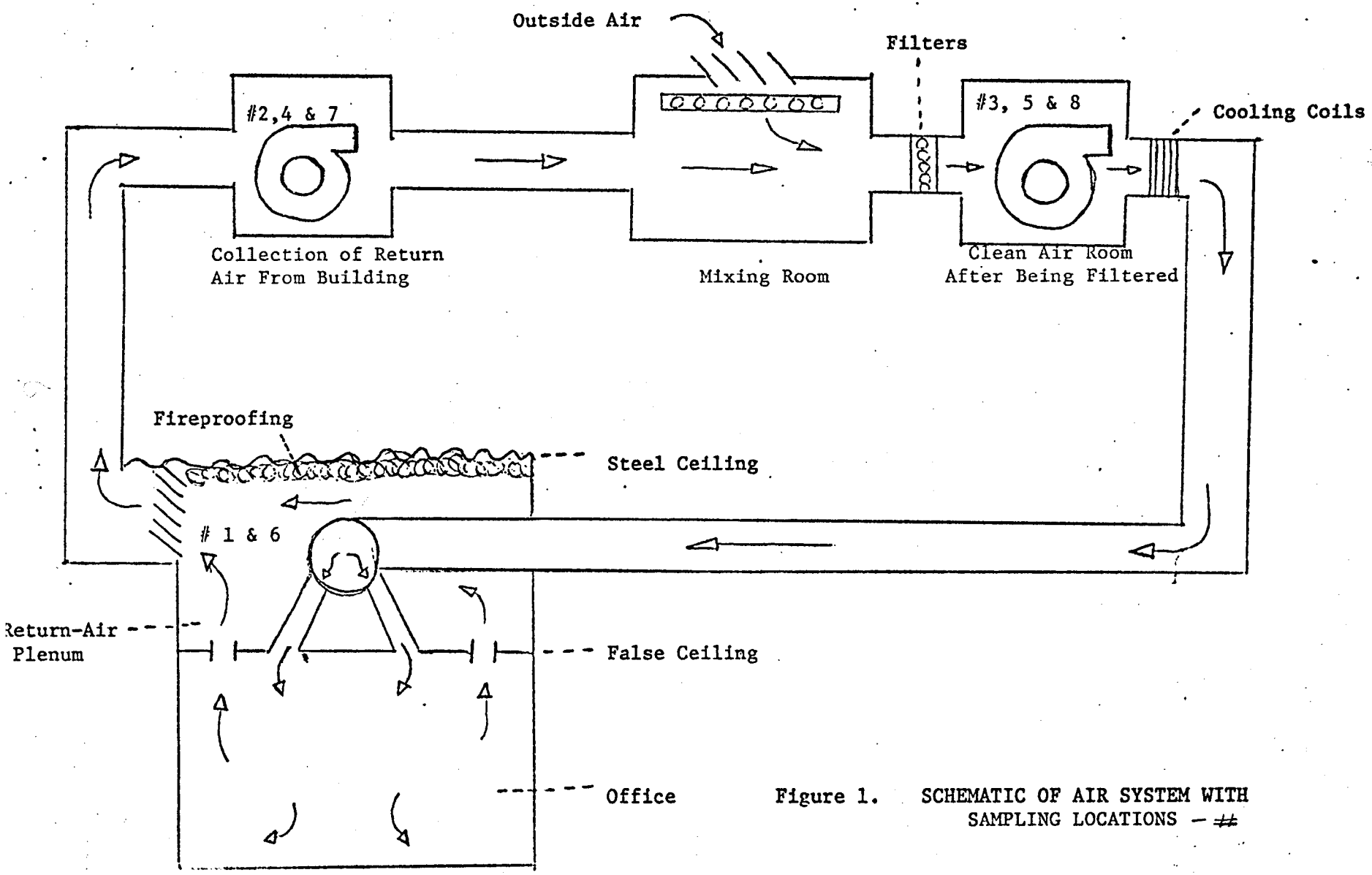

Figure 1. SCHEMATIC OF AIR SYSTEM WITH SAMPLING LOCATIONS – ##

Attachment 1

UNITED STATES OF AMERICA

GENERAL SERVICES ADMINISTRATION

Public Buildings Service
Washington, DC 20405

JUN 8 1973

Dr. Joseph K. Wagoner
Director, Division of Field Studies
and Clinical Investigations, NIOSH
Department of Health, Education,
and Welfare
Cincinnati, Ohio 45202

Dear Dr. Wagoner:

In a telephone conversation with Rolf E. Hamstrom of this office, Dr. William M. Johnson of your staff suggested we confirm in writing a request for technical assistance by your office.

In 1969 members of your predecessor organization in the Department of Health, Education, and Welfare responded to a request for assistance and conducted an investigation of possible health hazards associated with the dusting of sprayed mineral fiber fireproofing in two buildings in Washington, DC. For your information a copy of the report submitted on this investigation is attached.

At this time we are interested in having a resurvey made of the two structures originally checked and surveys made of one additional building in Boston, Massachusetts; Pittsburg, Pennsylvania; Baltimore, Maryland; and New York, New York. We would appreciate knowing if the services of one or more members of your staff could be made available for such surveys and, if so, under what conditions.

In the event you are able to proceed with this project, you may contact Mr. Hamstrom (202 962-6271) for specifics on the buildings involved, contact personnel, scheduling, etc.

Thank you for your assistance in this matter.

Sincerely,

A. W. INNAMORATI
Assistant Commissioner
for Buildings Management

Enclosure

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Consumer Protection and Environmental Health Service
Environmental Control Administration

1014 BROADWAY
CINCINNATI, OHIO 45202

REFER TO:

March 6, 1969

Mr. Henry S. Huntt, Jr.
General Services Administration
Region III
Accident and Fire Prevention Branch
7th and D Streets, S.W.
Washington, D.C. 20407

Dear Mr. Hunt:

On February 24, 25 and 26, the Bureau of Occupational Safety and Health conducted an investigation of possible health hazards associated with the dusting of sprayed mineral fiber fireproofing in office buildings. This investigation was in response to a request from Mr. W. A. Schmidt, Commissioner, General Services Administration, dated January 14, 1969.

The buildings included in the investigation were FOB #7, and the Court of Claims, both of which used sprayed on mineral fibers (including asbestos) for fire protection of beams, girders, and steel roof decks. This $2\frac{1}{2}$ foot space between the false ceiling and the roof deck is used as a return air plenum for the ventilation system in FOB #7.

Since the return air is moving over the fireproofing material, the question arises as to whether or not the fireproofing material is dusting, thus contaminating the building air supply. Samples were taken during an 8-hour work day on February 25, 1969 and the results are shown on the accompanying data table (see enclosed table for sampling locations).

On February 25, fiber concentrations were more than 100 times below the threshold limit value. The threshold limit value (TLV) refers to conditions under which it is believed nearly all workers may be repeatedly exposed, day after day, without adverse effect. The TLV for exposure to asbestos fibers is listed in the ACGIH TLV booklet for 1968 and is 12 fibers/ml $>5\mu$ in length.

From the Results Table, note that while some fibers >5μ in length are found in the return air system, no fibers >5μ in length were found in the supply air or in the actual room air.

Although no apparent health hazard existed on February 25, this technique (using the space between the ceiling and the door for a return-air plenum, and using sprayed asbestos-bearing fireproofing in this plenum) is a new technique and should be closely watched. The fireproofing material in FOB #7 is still sound but several locations were noted in which the mineral fiber material was beginning to fall from the structures. It is impossible to say whether or not the fireproofing will begin to dust more heavily as time goes by. It is therefore recommended that:

1. Periodic samples of the air be taken to determine the rate of dusting.
2. An investigation should be undertaken to determine the feasibility of requiring that fireproofing sprayed in return-air plenums be "sealed" by use of some type of fire resistant polyester coating as was done in San Francisco. This should greatly retard dusting.
3. In buildings already built using this type of ventilating system, special care should be taken in the selection and maintenance of adequate filters, especially in the case where dusting becomes an increasing problem.

If we can be of further assistance please feel free to call. You can contact me by calling area code 513, 684-2391.

Sincerely yours,

David J. Burton

David J. Burton
Technical Services
Bureau of Occupational Safety
and Health

Attachment

SAMPLING LOCATIONS

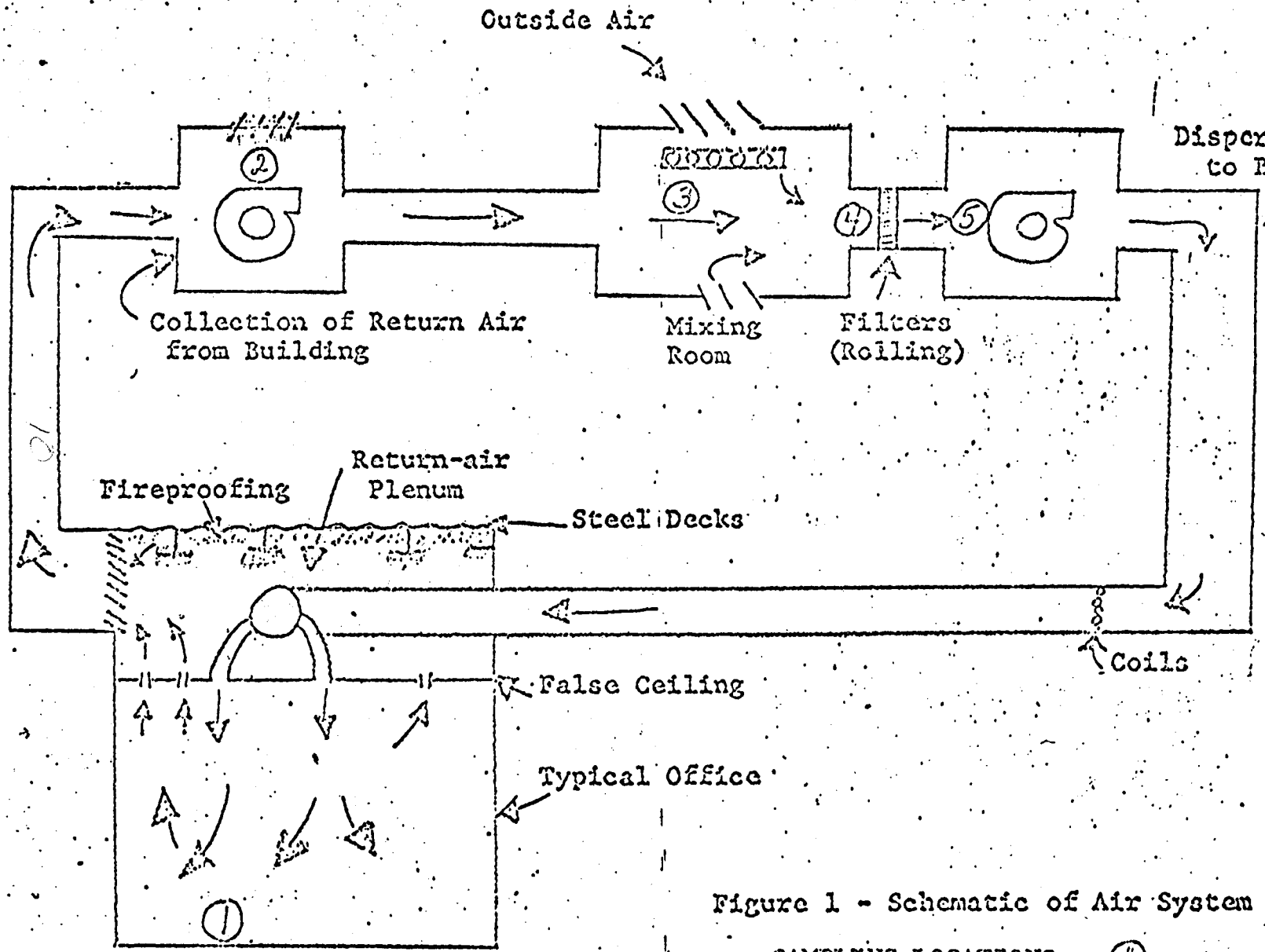

Figure 1 - Schematic of Air System

SAMPLING LOCATIONS - (#)

RESULTS

Sample Location	Area Description	Concentration of Fibers per 100 ml of Air: Total Fibers	Fibers > 5 Microns	Fibers > 10 Microns
(1)	Room on Floor 7	7	0	0
(2)	Return Air Collection Area	16	4	2
(3)	Mixing Room Before Filters	6	2	0
(4)	Mixing Room Before Filters	12	5	0
(5)	After Filters in Supply Room	10	0	0

NOTE: TLV = 1200 Fibers/100 ml
or
12 Fibers/ml

NOTE: Air velocity in return-air plenum above the ceiling varied from 2 fpm to 150 fpm at the return duct register.

Section 2. Supplementary Section 1007-26 of Title X of the Cincinnati Municipal Code, Approval of Demolition Permits for Buildings or Structures Containing Asbestos Insulation or Fireproofing, is hereby ordained to read as follows:

Sec. 1007-26. Approval of Demolition Permits for Buildings or Structures Containing Asbestos Insulation or Fireproofing.

Before the superintendent approves the issuance of a demolition permit he shall determine:

(a) There is no asbestos insulation or fireproofing present in the building or structure or no significant risk of exposure to asbestos fibers from the dislodging of asbestos during demolition; or

(b) The building or structure will be demolished with the following safeguards in effect:

(1) Demolition by toppling of walls shall not occur except when specifically approved by the superintendent.

(2) Boilers and pipes and steel members insulated or fireproofed with asbestos containing material shall be wetted and stripped before toppling of walls is begun. This procedure shall be followed where practicable as to all asbestos lined surfaces. Such asbestos waste shall immediately be bagged and disposed of in the manner described in paragraph (6) of this section.

Should remain wetted throughout all handling operations

(3) When demolition by toppling occurs such reasonable enclosure for dust emission control as is compatible with the character of the structure shall be employed.

(4) Before and during the demolition or toppling of any section or wall of the structure, adequate wetting to suppress the dust, shall be employed.

(5) Asbestos containing debris shall not be dropped or thrown from any floor but shall be transported by dust-tight chutes or buckets. Asbestos containing debris in chutes or buckets shall be sufficiently wetted to preclude dust dispersion at the point of discharge.

Attachment 2

City of Cincinnati

E.M.T.R.

An Ordinance No. 172 - 1973

Modifying the provisions of Title X of the Cincinnati Municipal Code, Air Pollution Control, by amending Sections 1007-21 and 1007-25, by ordaining supplementary Section 1007-26, by modifying the provisions of Chapter CC-3 of the Cincinnati-Ohio Building Code, Administration by ordaining supplementary Section CC-3-20.03, and by repealing existing Sections 1007-21 and 1007-25 of Title X of the Cincinnati Municipal Code, Air Pollution Control.

WHEREAS, if adequate precautions are not taken during the spray application of materials containing mineral fibers, such spraying operations may release a significant quantity of particulate matter into the ambient air; and

WHEREAS, the council of the city of Cincinnati finds that the use of sprayed asbestos insulation constitutes a significant threat to the health of both asbestos workers and the community as a whole; and

WHEREAS, demolition of structures containing asbestos insulation, if they continue unregulated, threaten to release into the ambient air respirable asbestos fibers, endangering the health of the community; now, therefore,

BE IT ORDAINED by the council of the city of Cincinnati, state of Ohio:

Section 1. That Sections 1007-21 and 1007-25 of the Cincinnati Municipal Code are hereby amended to read as follows:

Sec. 1007-21. Spray Application of Fiberated **1** Products.

2

Whenever a fiberated product or compound is applied to a surface utilizing a spray or pneumatic means of application, the operation shall meet the following requirements:

(a) One person shall be assigned full time supervisory authority for all aspects of the operations. The name of the individual responsible for the operation shall be submitted to the superintendent.

(b) Such operations shall be subject to the other appropriate requirements of this Chapter, particularly Sections 1007-13 and 1007-15.

Sec. 1007-25. Asbestos Sprays Prohibited.

The use of asbestos-containing spray products **3** on any portion of a building or structure shall be prohibited.

(6) All asbestos containing debris shall be thoroughly wetted before loading into trucks, other vehicles or containers. During transport such waste shall be enclosed or covered so as to prevent dust dispersion. Asbestos containing debris shall be disposed by burial at a sanitary landfill. The sanitary landfill site shall not be used for any construction that would disturb the waste material.

(7) Signs shall be posted in conspicuous locations around the structure being demolished warning persons to take proper precautions against exposure to asbestos fibers before entering the area.

Section 3. Supplementary Section CC-3-20.03 of the Cincinnati-Ohio Building Code, Demolition of Buildings or Structures Containing Asbestos Insulation or Fireproofing, is hereby ordained to read as follows:

Sec. CC-3-20.03. Demolition of Buildings or Structures Containing Asbestos Insulation or Fireproofing.

No permit for the wrecking of any building or structure shall be issued by the commissioner of buildings except where approved by the superintendent of air pollution control.

When a permit is granted for the demolition of a building or structure found to contain a significant risk of exposure to asbestos fibers from the dislodging of asbestos during demolition, the building division shall notify the fire division in order that local fire stations may be alerted to the danger of exposure to asbestos involved in fighting a possible fire at that location.

Section 4. Existing Sections 1007-21 and 1007-25 of Title X of the Cincinnati Municipal Code are hereby repealed.

Section 5. This ordinance is hereby declared to be an emergency measure necessary for the immediate preservation of the public peace, health and safety and it shall go into effect forthwith. The reason for said emergency is the immediate necessity of putting into effect Sections 1, 2, 3, and 4 hereof so as to protect the residents of Cincinnati from the hazards of asbestos and other fibers in the ambient air.

Passed April 18 A.D., 1973

I HEREBY CERTIFY THAT ORDINANCE NO. 172 1973 WAS PUBLISHED IN THE CITY BULLETIN IN ACCORDANCE WITH THE CHARTER ON 5/4/73

Robert P. Litt
Clerk of Council

Mayor

New language underscored.

Language which has been deleted is indicated by asterisks as follows:

1 Cementitious

2 Whenever a fiberated cementitious product or compound is applied to a surface, utilizing a spray or pneumatic means of application, the operation shall meet the following requirements:

(a) One person shall be assigned full time supervisory authority for all aspects of the operations. The name of the individual responsible for the operation shall be included on the permit application.

(b) All regulations included in the recommended code of practices for Application of Sprayed Fireproofing Materials as published by the Sprayed Mineral Fiber Manufacturers Association and listed under the following titles are adopted by reference:

(1) Reducing dust, overspray and fallout during spraying.

(2) Containment of dust and overspray.

(3) Clean-up and housekeeping.

(4) Protective respiratory devices and clothing.

3 for outside application to surfaces

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	PB89-216063

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Asbestos Survey of Federal Office Building #7, U.S. Court of Claims and Court of Customs and Patent Appeals Building, Washington, DC, and George H. Fallon Office Bldg., Baltimore, MD.

5. Report Date
October 1973

6.

7. Author(s)

8. Performing Organization Rept. No.
IWS-051-02-09

9. Performing Organization Name and Address
NIOSH
4676 Columbia Parkway
Cincinnati, OH 45226

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address
NIOSH
4676 Columbia Parkway
Cincinnati, OH 45226

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

At the request of the General Services Administration, two Federal Office Buildings in Washington, D.C., and one in Baltimore, Maryland were surveyed to determine if an airborne asbestos problem existed in any of the buildings which have asbestos containing material used for fireproofing. The sampling strategy involved the collection of eight air and one bulk sample to establish the extent of asbestos exposures. The analysis of the bulk sample revealed that 90-95% of the material was fibrous glass, with the remaining being amosite asbestos. All measured fiber concentrations of the air samples were below 0.008 fibers per milliliter, and dispersion staining of the airborne samples indicated that less than 5% of the fibers collected were asbestos. The airborne levels were very low in comparison to OSHA occupational health standards. It is recommended that worker protection and appropriate handling procedures for any future demolition concerning the fireproofing material should be utilized.

17. Document Analysis a. Descriptors
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b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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