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CENTER FOR DISEASE CONTROL  
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH  
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION REPORT  
HE 80-114-737

POTOMAC PHOTO SUPPLY  
WASHINGTON, D.C.

AUGUST 1980

I. SUMMARY

On April 22, 1980 the National Institute for Occupational Safety and Health (NIOSH) received a request from the employees of the Potomac Photo Supply for a Health Hazard Evaluation. This request expressed concern that the employees were possibly being exposed to airborne asbestos from the building insulation. The Potomac Photo Supply is a retail distributor of cameras and accessories. General area air samples were obtained on May 18, 1980, in various parts of the stockroom and storage areas, in addition to a bulk sample of the insulation/fireproofing. None of the six air samples taken contained asbestos dust exposures that were over either the NIOSH recommended criteria<sup>1</sup> for asbestos of 0.1 fibers per cubic centimeter (Fibers/cc) or the Occupational Safety and Health Administration (OSHA) Level<sup>2</sup> of 2 fibers/cc. However, analysis of the bulk sample did indicate the presence of about 40% to 60% amosite asbestos.

On the basis of the data obtained in this investigation, NIOSH determined that no hazardous exposure to asbestos exists at the time of this survey. Recommendations on further control are incorporated in the main body of this report.

II. INTRODUCTION

Under the Occupational Safety and Health Act of 1970\*, NIOSH investigates the toxic effects of substances found in the workplace. An authorized employee of the Potomac Photo Supply requested such an

\*Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health and Human Services, following a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

investigation from NIOSH to determine the hazards presented from exposure to asbestos. Environmental air samples were taken and analyzed. On July 9, a preliminary report was sent to the requestor with some of the results of the environmental survey.

### III. BACKGROUND

The Potomac Photo Supply is a retail distributor of cameras and various camera accessories. The store is physically divided into three parts; the main showroom-sales area, a stockroom/office area (both of which are on the main floor), and a basement area for additional storage. A total of 18 people are employed at this facility. Employees have varying work schedules.

### IV. EVALUATION DESIGN AND METHODS

A bulk sample of the insulation and five area samples were taken. The area samples were obtained using DuPont P-4000\* sampling pumps operated at 1.5 liters per minute (LPM) with a 2-piece open-face filter cassette, containing a mixed cellulose ester fiber filter. The bulk sample was analyzed by electron and polarized light for the presence of asbestos. The General Area samples were analyzed according to the NIOSH Analytical Method<sup>3</sup> P & CAM 239 utilizing phase contrast microscopy. Results of the area sampling are shown in Table I.

### V. EVALUATION CRITERIA<sup>4</sup>, 5, 6, 7, 8

Asbestos is the name of naturally-occurring silicates with the property of great resistance to physical destruction. This material exists as fibers and is primarily used as an insulation material. Workers are exposed through inhalation of airborne asbestos particles. Asbestos fibers are able to penetrate deeply into lung parenchyma.

Prolonged exposures to airborne asbestos fibers can result in a type of pneumoconiosis referred to as asbestosis. However, even under severe dust conditions, the disease may take 5-10 years to appear. The onset is insidious with shortness of breath, chest pain on exertion, and a dry cough. Symptoms continue to progress and the cough becomes productive of sputum. Stiffening of the lung tissue occurs, causing the shortness of breath. Eventually, the heart is stressed and may fail. Tests of lung function show a "restrictive" functional pattern with reduced total lung capacity, lowered vital capacity without evidence of airways obstruction, a reduced lung compliance (stiff lung), and impaired transfer factor for carbon monoxide.

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\*Mention of a manufacturer's name does not constitute a NIOSH endorsement.

Asbestosis is characterized by diffuse interstitial fibrosis frequently associated with thickening of the pleura (fibrosis) and/or pleural calcification. The characteristic X-ray changes are small, irregular opacities in the lower and middle lung fields. Workers exposed to asbestos fibers incur a higher risk of bronchogenic carcinoma and mesothelioma. There is a marked enhancement of the risk of bronchogenic carcinoma (lung cancer) in those exposed to asbestos who also smoke cigarettes. Mesothelioma is a cancer of the lining of the lungs (pleura) or the abdominal cavity (peritoneum). Other types of cancer associated with asbestos exposure are those of the larynx and gastro-intestinal tract.

When the peritoneum is involved, pain, ascites (accumulation of serous fluid), and symptoms of obstruction occur. Progression is rapid and treatment is ineffective. However, it is not clear how asbestos reaches the peritoneal surface. Exposure criteria for asbestos can be found in Table II.

#### VI. RESULTS

The bulk sample of insulation was sent to the laboratory for determination of the presence or absence of asbestos fibers. The analysis, electron and polarized light microscopy, indicated that the insulation/fireproofing contained about 40-60% amosite asbestos held together with a spray-on plaster-type material. Since positive identification of asbestos in the insulation/fireproofing was made, the General Area samples were analyzed.

Results of the General Area samples, Table I, indicate that very small quantities of asbestos were found in the basement storage area which ranged from non-detectable to 0.04 fibers/cc. The samples taken in the stockroom/office area were below the limit of detection which is 0.03 fibers per field. The three samples obtained in the basement storage were all less than 40% of NIOSH's recommended revised criteria for asbestos and less than 2% of OSHA's enforceable standard.

#### VII. RECOMMENDATIONS

Since the exposure to asbestos was, at the time of the survey, minimal and as long as nothing disturbs the insulation, that periodic monitoring would be sufficient. However, if the environmental findings indicated a potential hazard, the following recommendations are proposed. There are three possible solutions to insure, as adequately possible, that an overexposure to asbestos does not occur. These are 1) removal, 2) encapsulation, and 3) enclosure.

These three possible approaches are best outlined in the Environmental Protection Agency (EPA) Publication - Asbestos - Containing Materials in School Buildings: A Guidance Document.<sup>9,10</sup> These two publications give advantages and disadvantages associated with each approach. A thorough review of these documents should be performed before any action is taken, in order to insure that the most advantageous actions are taken for both the workers and management.

VIII. AUTHORSHIP AND ACKNOWLEDGEMENTS

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IX. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this report are currently available, upon request, from NIOSH, Division of Technical Services, Publications Dissemination, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia 22161.

Copies of this report have been sent to:

- 1) U.S. Department of Labor, OSHA, Region III
- 2) NIOSH, Region III
- 3) Potomac Photo Supply, Washington, D.C.

X. REFERENCES

1. NIOSH "Criteria for a Recommended Standard ... Occupational Exposure to Asbestos." Revised Standard - 1977. DHEW (NIOSH) Publication No. 77-169 pgs. 92-94.
2. OSHA Safety and Health Standards for General Industry, 29 CFR 1910.1001(b)(2).
3. NIOSH Manual of Analytical Methods, 2nd Edition, P & CAM No. 239. DHHS (NIOSH) 77-15A, Vol. I, April 1977.
4. Encyclopedia of Occupational Health and Safety, Vol. I, McGraw-Hill (1974), pgs. 120-124.
5. Occupational Diseases - A Guide to Their Recognition (Revised Edition), U.S. Dept. of Health and Human Services (NIOSH), 1977; Publication No. 77-181, pgs. 112-121.
6. Dangerous Properties of Industrial Materials, 3rd Edition, N. Irving Sax. Van Nostrand-Reinhold. (1968) pg. 440.
7. NIOSH "Criteria for a Recommended Standard ... Occupational Exposure to Asbestos." Revised Standard 1977. DHHS (NIOSH) Publication No. 77-169, pgs. 26-37.
8. Industrial Hygiene and Toxicology - Second Revised Edition, Volume II, Ed. Frank A. Patty (1967), pgs. 2243-2244.
9. EPA "Asbestos-Containing Materials in School Buildings: A Guidance Document." Part 1, Publication No. EPA-450/1-78-014, pgs. 15-19.
10. Ibid. Part 2, Pg. II-3-1 - II-4-4.
11. "Threshold Limit Values for Chemical Substances and Physical Agents in Workroom Environment with Intended Changes." American Conference of Governmental Industrial Hygienists. Cincinnati, Ohio 1979.

TABLE I  
AIR SAMPLING RESULTS FOR ASBESTOS

POTOMAC PHOTO SUPPLY  
WASHINGTON, D.C.  
JULY, 1980

Sample No.	Sampling No. (1) <sup>(1)</sup> Volume	Sample Type	Location	Results (Fibers/cc) <sup>(2)</sup>
PPS-2	684	AREA	Main Floor Top Shelf in Cage	N.D. <sup>(3)</sup>
PPS-3	689	AREA	Main Floor Top Shelf in Film Office	N.D.
PPS-4	690	AREA	Basement By I-Beam Support	0.04
PPS-5	689	AREA	Basement By Lens Section	0.01
PPS-6	687	AREA	Basement By Steps	0.03

① Sample volume in liters of air.

② Approximate fibers of asbestos per cubic centimeter of air.

③ Non-detectable - below the limits of detection.

TABLE II  
EXPOSURE CRITERIA FOR ASBESTOS

NIOSH<sup>①</sup> - 0.1 Fibers/cc<sup>④</sup>  
OSHA<sup>②</sup> - 2 Fibers/cc  
ACGIH<sup>③</sup> - 0.5 Fibers/cc

- ① National Institute for Occupational Safety and Health. Criteria for a Recommended Standard ... Occupational Exposure to Asbestos.
- ② Occupational Safety and Health Administration. Safety and Health Standards, 29 CFR 1910.
- ③ American Conference of Governmental Industrial Hygienists. Threshold Limit Values (Intended Change).<sup>11</sup>
- ④ Approximate Fibers of Asbestos Per Cubic Centimeter Values Are 8-Hour Time-Weighted Averages.