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TECHNICAL ASSISTANCE
REPORT NO. 79-17

SAINT ELIZABETHS HOSPITAL
WASHINGTON, D.C. 20032

June 1979

Study Requested By:
Safety Manager
Saint Elizabeths Hospital
Washington, D.C.

Study Conducted By:
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16. Abstracts <p>ABSTRACTS: A total of six area and breathing zone air samples were collected on March 19, 1979 at Saint Elizabeth's Hospital, Washington, D. C. to determine if dust emitted during the installation of fire alarms and smoke detectors could present an asbestos (1332214) exposure potential. Bulk samples of ceiling and wall boards also were collected for qualitative analysis. Sampling was prompted by a request from the safety manager at the hospital. Air samples were analyzed using phase contrast microscopy, and bulk samples were analyzed using electron microscopy. All sample analyses resulted in fiber counts below detectable limits, and, consequently, less than OSHA standards (2.0 fibers greater than 5 microns in length per cubic centimeters of air). It is recommended that eye protection equipment be used to prevent injury from flying particles, chips, and other debris. Helmets should be used in situations in which workers are subjected to impact from falling or flying objects. The OSHA noise standard should be adhered to when using power drills and pneumatic drills. NIOSH approved respiratory protection also should be provided when this equipment is used.</p>			
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I. SUMMARY

An environmental survey was conducted March 19, 1979, at Saint Elizabeths Hospital, Washington, D.C. to determine if there was a potential for asbestos exposure during the installation of smoke detectors and fire alarms. During the survey a total of six area and breathing zone air samples were collected for asbestos exposure analysis. In addition bulk samples of the ceiling and wall board were collected and submitted to the laboratory for qualitative analysis. Although asbestos fibers were not detected in either the air or bulk samples, recommendations have been offered in this report for the control of other potential exposure hazards which may be present during installation procedures.

II. INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH), by request from the Safety Manager, Saint Elizabeths Hospital, conducted an industrial hygiene investigation on March 19, 1979, to determine if dust emitted during the installation of fire alarms and smoke detectors could present an asbestos exposure potential. Prior to the investigation an opening conference was held with the safety officers to discuss the strategy of the environmental study. During this conference it was mentioned that the ceilings and walls of each building were composed of similar materials. Therefore, it would be necessary to evaluate exposures from only one building. Accordingly the John Howard Pavilion was selected for the evaluation. The sample results collected at this site are presented in Table I and explained in the body of the report.

III. EVALUATION

A. Description of Facility

Saint Elizabeth's Hospital, a psychiatric institution located in Washington, D.C., centers on a 300 acre site. A staff of 4200 employees are assigned throughout the institution to provide care and attention to the hospital's 2200 patients. Included in the hospital's staff is an active multi-disciplinary safety committee responsible for quality assurance and hospital safety.

As part of the hospital's ongoing plans to improve safety practices a construction project was implemented to install fire-detection units and alarm systems in each of 19 patient occupied buildings. Since the project involved drilling into walls and ceilings the safety manager was concerned about dust exposures, particularly that of asbestos.

B. Environmental Methods

The purpose of this HHE project was to determine if a significant asbestos dust exposure problem existed during the installation of fire alarm safety equipment. Therefore, both personal BZ as well as general area air samples were collected at the alarm installation site. The results of these samples have been tabulated and are recorded in Table I. Also presented below this table are the current Occupational Safety and Health Administration (OSHA) and NIOSH recommended standards for the control of asbestos dust.

All air samples were collected on 37 mm diameter Millipore Type AA* cellulose membrane filters with an 0.8 micrometer pore size, held open-faced in plastic monitoring cassettes. Personal sampling pumps calibrated at 2.0 liters per minute (l/m) were used to draw air through the filtered cassettes. The monitoring cassettes attached to the lapel of the worker, as well as area sample cassettes were connected to the sampling pumps via tygon tubing. Sampling depended on the job being performed.

All samples collected were analyzed according to NIOSH P&CAM #239, which utilizes phase contrast microscopy techniques. In addition, qualitative analyses were performed on bulk samples of the ceiling and wall boards by electron microscopy. The sample results recorded in Table I are reported in fibers greater than 5 microns in length per cubic centimeter of air (fibers/cc).

C. Environmental Standards

The NIOSH Revised Recommended limit for asbestos fibers (Table I) is 0.1 fiber greater than 5 μm in length per cc of air (fiber/cc) based on an eight-hour time weighted average (TWA) with a peak concentration not to exceed 0.5 fibers/cc based on a 15-minute sample period.①

The current U.S. Department of Labor (OSHA) standard is 2.0 fibers/cc based on TWA sample and a peak concentration of 10.0 fibers/cc.②

A threshold limit of 10 mg/M^3 or 30 mppcf, of total dust less than 1% quartz, or, 5 mg/M^3 respirable dust is recommended by the American Conference of Governmental Industrial Hygienists for substance in the "nuisance dust" categories and for which no specific threshold limits have been assigned.③

D. Physiological Effects

It is well accepted today that asbestos is a hazardous material. Breathing asbestos fibers can directly cause asbestosis and is a contributory cause of lung cancer. Lung cancer is more frequently found in workers who are exposed to asbestos and smoke cigarettes than in nonsmokers.

* Mention of commercial names or products does not constitute endorsement by NIOSH.

Asbestosis is a lung disease characterized by scarring or thickening of the lung walls. Breathing becomes difficult, thus causing a strain on the heart. Carcinoma associated with asbestos exposures include cancer of the lungs-the most prevalent, cancer of the chest or abdominal lining, cancer of the trachea, and cancer of the gastro-intestinal track. There is a latency period of 20-25 years between exposures to asbestos and development of a tumor with the exposure/disease relationship not being well defined. The NIOSH recommendations were designed primarily to decrease the chance of developing cancer as well as preventing asbestosis among workers exposed to asbestos fibers.

E. Results and Discussion

On the basis of the sample results (Table 1) it does not appear that asbestos fibers presented a hazard at Saint Elizabeths during the installation of smoke detectors and fire alarm units. All sample analyses resulted in fiber counts below detectable limits. Average fiber size could not be measured since so few fiber like materials were collected on the filters. The ceiling tile was found containing mineral wool, a nuisance dust consisting of calcium, silicon, magnesium, and aluminum. No asbestos fibers were observed by analyses. Additionally, the wall board contained no asbestos, only titanium, silicon, iron, quartz, and gypsum.

Since it is not possible to specify a safe exposure level for a carcinogen, only the continued use of such non asbestos materials as those presently being used by the hospital can help ensure protection against the carcinogenic effect of asbestos.

IV. RECOMMENDATIONS^④

Although asbestos was not present in the samples collected at the John Howard Pavilion, procedures for installing the alarm system were observed needing additional work practice guidelines. Therefore, the following recommendations are submitted to management for consideration to help insure a safe and healthful work environment.

1. Eye protection is required where there is a possibility of an eye injury from flying particles, chips, and other debris. The employees using power drills and pneumatic chisels were exposed to flying particles without having proper protection (i.e., face shields, goggles, etc.)

2. Helmets are required in situations where workers are subjected to impact from falling or flying objects. Helmets are normally mandatory for construction operations. Since materials were being removed from the ceilings and walls during the alarm installations head protection should be required.

3. There may be a potential noise hazard while using power drills and pneumatic tools. If so, the current OSHA noise standard should be implemented which allows 90 decibels (dBA), for an 8-hour exposure. As noise levels increase, the maximum permissible exposure time decreases (e.g., if the noise level is 95 dBA the permissible exposure time is 4-hours). At greater than 90 dBA exposure (8-hours per day) a continuing effective hearing conservation program should be administered.

4. When the work place air is contaminated with excessive concentrations of harmful dusts, fumes, mists, gasses, or vapors from the use of power drills and pneumatic tools NIOSH approved respiratory protection should be provided by the employer.

V. REFERENCES

1. NIOSH Revised Recommended Asbestos Standard DHEW Publication No. 77-169, December 1976.
2. OSHA 2206 - Safety and Health Standards 29 CFR 1910, U.S. Department of Labor, January 1976.
3. American Conference of Governmental Industrial Hygienists, TLV's Threshold Limit Values for Chemical Substance and Physical Agents in the Workroom Environment with Intended Changes, 1978.
4. NIOSH Manual for Insulation Installers, DHEW Publication No. 77-188, August 1977.
5. Federal Register, Department of Labor, Occupational Safety and Health Standards, Vol 39, Number 125, Part II, June 27, 1974.
6. NIOSH Manual of Analytical Methods, HEW Publication No. 75-121, P&CAM. 239.

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Table I

Results of the Industrial Hygiene Investigation Conducted
at Saint Elizabeth's Hospital, Washington, D.C.

March 19, 1979

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<u>Job Title (location)</u>	<u>Sample #</u>	<u>Sample Type</u>	<u>Sample Time (minutes)</u>	<u>Sample Volume (liters)</u>	<u>Concentration* (fibers/cc)</u>
Electronic App.	AA-12	Personal	75	150	<0.01
Construction Laborer	AA-11	Personal	110	220	<0.01
Next to Laborer	AA-17	G Area	150	300	<0.01
On Scaffold	AA-18	G Area	190	380	<0.01
-----	AA-5B	-----	Reference - Blank	-----	0.01 fl
10" off floor	AA-1	G Area	50	100	<0.01
On Scaffold	AA-9	G Area	190	380	<0.01
Present OSHA Standard				Recommended NIOSH Standard	
2.0 f/cc - 8 hour TWA				0.1 f/cc - 8 hour TWA	
10.0 f/cc - 15 minute ceiling				0.5 f/cc - 15 minute ceiling	

Bulk ceiling sample - Composed of 40% to 70% mineral wool, traces of calcium, silicon, magnesium, and aluminum. No asbestos fibers were detected.

Bulk wall board - This sample was found to contain calcium sulfur laths and particles of gypsum and quartz; traces of af tin, silicon and iron were also found. No asbestos fibers were detected in this sample.

* The above numbered samples were analyzed according to NIOSH P&CAM #239 using phase contrast microscopy.

** Concentrations of asbestos are given in fibers per cubic centimeter of air (f/cc). Limits of detection used by the laboratory are based on the lowest concentrations that can be detected which was 0.01 f/cc.