PLAINTIFF'S EXHIBIT

SWB-135

Bell Laboratories

subject: Evaluation of Employee Asbestos Exposure During Cable Placement in Transite Ducts
Case 48106-3

date: November 27, 1978

from: R. Deitchman

MEMORANDUM FOR RECORD

Underground telephone cable may be placed in transite ducts. Transite telephone ducts are composed of a mixture of portland cement or portland blast furnace slag cement or portland-pozzolana cement; silica; and asbestos fiber. Placement of cable in transite ducts raised the question of asbestos fiber release during the pulling operation caused by friction between the cable and the duct*. Personal samples taken during Southwestern Bell Telephone Company operations indicated low levels of exposure in this study completed in 1976. When a new job commenced this summer in the same transite duct system, employees noticed a great deal of dust during cable placement activities. Mr. Gene Regan, Engineering Construction Supervisor at Southwestern Bell Telephone Company, requested additional air sampling measurements be taken.

Summary

Asbestos levels were measured from October 4-6, 1978 at Southwestern Bel Telephone Company in Kansas City, Kansas during operations involving the placement of new cables in transite ducts. Personal samples were found to range from below detectable limits (less than 0.01 fibers per cubic centimeter) to 0.06 fibers per cubic centimeters. The Occupational Safety and Health Administration (OSHA) Standard for asbestos exposure is 2.0 fibers per cubic centimeter. These results are similar to samples taken two years earlier in the same general location. Wet conditions during this sampling period may reduce airborne asbestos levels and a recommendation for air sampling during the dry conditions found in the late summer is made.

Recommendations

The following are recommended:

1. Air samples need to be taken during the dry summer season when higher dust levels can be expected. Thus, if new cable placement is planned this summer in transite.ducts, industrial hygiene sampling is recommended.

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* Memorandum for File: "Asbestos Exposures for Pulling Cable", Case 48106-3, by G. D. Kenney, November 3, 1976.

2. A meeting was held on November 7, 1978 with the Southwestern Bell Telephone Company employees sampled in this study with Mr. Gene Regan and Mr. R. Deitchman from the Environmental Health and Safety Department at Bell Laboratories. The purpose of the meeting was to explain the results of this study. It is recommended that this report also serve as a permanent record of this meeting and the sample results.

Methods

The asbestos samples were collected using the procedures outlined both by the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA). The procedure involves collection of the airborne fibers on a small filter, with later analysis using phase contrast or electron microscopy.

The filters used for collection of the samples were 37 mm Millipore cellulose ester filters. The filter has a nominal pore diameter of 0.8 micrometers (μm). Air was pulled through the filters using battery powered sampling pumps manufactured by Bendix at 2.0 liters per minute. The pumps were calibrated using the soap bubble flowmeter technique.

A variety of analysis techniques have been used to identify asbestos fibers and determine their concentrations in air. These include optical microscopy, electron microscopy, and X-ray diffraction analysis. Asbestos fiber identification and quantitation in occupational and environmental air samples is difficult for a variety of reasons:

1. Asbestos fibers are generally present in low mass quantities even though fiber number concentrations may be high.

2. Many instrumental analytical techniques cannot differentiate asbestos fibers from their nonfibrous mineralogic polymorphs. This is the case with light microscopy and thus, electron microscopic methods are necessary to be certain fibers are truly asbestos.

3. Many airborne asbestos fibers are generally below resolution limits of the optical microscope (phase contrast). These fibers may only be detected by using electron microscopic methods.

4. For identification of the various asbestos fiber types by electron microscopy, electron diffraction and microchemical analyses must be performed which require extensive instrumentation and analysis time.

The cellulose filters in this study were analyzed using phase contrast microscopy and scanning electron microscopy.

Light microscopy was completed by Mr. C. P. Lichtenwalner of the Bell Laboratories Environmental Health and Safety Department. The Light microscope uses phase contrast to identify fibers greater than 5 μm in length and a greater than 3.1 aspect ratio.

Scanning electron microscopy was used for asbestos fiber identification and quantitation. In addition to morphologic observation, selected area electron diffraction was used. The scanning electron microscopy was performed by EMV Associates, Rockville, Maryland.

Results

Table I shows the description of cables placed in transite ducts on October 4-5, 1978 by a Southwestern Bell Telephone Company line crew in Kansas City, Kansas. Three duct runs were being used to provide enough wire pairs to connect the Kansas University Medical Center to a central office. The total job involved approximately 200 reels of cable.

Air sampling results during cable placement in transite ducts in Kansas City, Kansas on October 4, 1978 are presented in Table II. The personal samples indicate exposure levels at the employee's breathing zone. The results indicate low levels of asbestos exposure. Table III shows airborne asbestos levels measured on October 5, 1978 again during new cable placement in Kansas City, Kansas. Personal sampling results indicate low levels of asbestos exposure. The "dusty" conditions that were observed during the summer were not present during this sampling period. The major factor in changing the duct and manhole environment was water. During the summer the manholes and duct runs were dry and the potential for friction - caused dust was increased. The moist conditions observed in October 1978 would tend to keep dust levels down.

Table IV shows the results of samples collected one week after cable was placed in transite ducts. These samples were taken to determine asbestos exposure to craft employees required to work in these manholes to complete splicing work operations. The results indicate low levels of asbestos concentrations.

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Table I. Description of Cables Placed in Transite Ducts, Kansas City, Kansas, October 4-5, 1978

Date	Cable Description
October 4, 1978	(1) - 1200 pair 22 gauge PIC* (808 ft.)
	(2) - 1200 pair 24 gauge PIC (808 ft.)
	(1) - 1200 pair 22 gauge PIC (726 ft.)
	(2) - 1200 pair 24 gauge PIC (726 ft.)
October 5, 1978	(1) - 1200 pair 22 gauge PIC (726 ft.)
	(2) - 1200 pair 24 gauge PIC (726 ft.)
	(1) - 1200 pair 22 gauge PIC (1002 ft.)
	(2) - 1200 pair 24 gauge PIC (1002 ft.)

* PIC = Polyethylene Insulated Cable

Table II. Asbestos Samples Collected During New Cable Placement in Transite Ducts, Kansas City, Kansas October 4, 1978

Sample Description	Duration (minutes)	Concentration (fibers/cc)	Analytical Method
Personal Sample - Dave Huber feed manhole	379	0.05	LM*
	379	BDL*(0.01)	SEM*
Personal Sample - Robert Jochem feed manhole	377	0.02	LM
Personal Sample - Steve Phelan receive manhole	358	0.01	LM
	358	BDL (0.01)	SEM
Personal Sample - Ken Brown receive manhole	359	0.02	LM
	359	BDL (0.01)	SEM
Area Sample - Collar of manhole at 57th St. and Glenwood Avenue during cable placement	106	BDL (0.01)	LM
Area Sample - ambient conditions at 57th St. and Glenwood Avenue	126	BDL (0.01)	LM
OSHA Standard	480	2.00	LM

* BDL = Below Detection Limit (Limit of Detection)
LM = Light Microscopy
SEM = Scanning Electron Microscopy

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Table III. Asbestos Samples Collected During New Cable Placement in Transite Ducts, Kansas City, Kansas October 5, 1978

Sample Description	Duration (minutes)	Concentration (fibers/cc)	Analytical Method
Personal Sample - Robert Jochem feed manhole	481	0.02	LM*
Personal Sample - Steve Phelan receive manhole	485	0.01	LM
Personal Sample - Ken Brown receive manhole	484	0.06	LM
	484	BDL*(0.01)	SEM*
Area Sample - Collar of manhole at 57th St. and Beverly Avenue during cable placement	107	0.03	LM

* BDL = Below Detection Limit (Limit of Detection)
LM = Light Microscopy
SEM = Scanning Electron Microscopy

(Note - filter cassette worn by Bill Ballou was damaged with a hole during cable placement work)

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Table IV. Asbestos Samples Collected in a Ventilated Manhole One Week After Cable Placement in Transite Duct, 58th St. and Broadmoor, Kansas City, Kansas
October 6, 1978

Sample Description	Duration (minutes)	Concentration (fibers/cc)	Analytical Method
Area Sample - Splicer Breathing Zone in manhole	96	BDL*(0.01)	LM*
	96	BDL (0.01)	SEM*
Area Sample - collar of manhole	90	0.03	LM
Area Sample - ambient conditions	100	0.02	LM

* BDL = Below Detection Limit (Limit of Detection)
LM = Light Microscopy
SEM = Scanning Electron Microscopy