PLAINTIFF'S EXHIBIT

CAP-555

A/C Pipe
Producers Association

Internal Correspondence

TO Executive Committee, IPS Committee,
A. Kahn, P. Kotin, G. Wright

FROM J. C. Jackson, President

DATE June 15, 1977

SUBJECT Pre-publication Copy "Exposure to Asbestos Fiber in Water Distribution Systems" by G. F. Craun, et al

Attached is a copy of the paper delivered by EPA during the recent AWWA Conference in Anaheim, California. It is important to point out *"this report is primarily to define the methodology used to determine the extent of exposure of Connecticut's population to A/C pipe and to serve as a progress report of the initial findings of the epidemiological study which will be described in detail elsewhere."* (See Report Reference 17).

Until Dr. Kotin has had a chance to review the latter manuscript, it is recommended the preliminary findings of the epidemiology study not be taken out of context nor blown out of proportion.

By copy of this transmittal, I am requesting Dr. Kotin to intercede with Dr. J. Wister Meigs, Director, Connecticut Cancer Epidemiology Unit, Yale University School of Medicine, New Haven, Connecticut, to determine the availability of the full report which is being submitted to the American Journal of Epidemiology and the significance of the results therein. Further, I would ask Dr. Kotin to provide AACPP staff with copies of any information which he secures so it may be promptly circulated within the industry. I plan to meet with Gordon Robeck in Cincinnati and will determine what additional information he may have available on this study.

JCJ:mcm
Enclosure

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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☑ ED ☐
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☐ G.A. ☐

Mr. Joseph C. Jackson
Executive Director
A/C Pipe Procedures Association
Suite 1113
1875 Connecticut Avenue, N.W.
Washington, DC 20009

Dear Joe:

Attached is a copy of our paper on the study of asbestos-cement pipe distribution systems in Connecticut which will appear in the Proceedings of the 97th Annual American Water Works Association Conference held May 8-13 in Anaheim, California. The paper should be viewed as a progress report since the study will be ongoing for several more months. Questions about the significance of the epidemiology results should be directed to Dr. J. Wister Meigs, Director, Connecticut Cancer Epidemiology Unit, Yale University School of Medicine, New Haven, Connecticut, as he agreed at the beginning of the study to act as the spokesman in this area.

Sincerely,

Jim Millette

James R. Millette
Exposure Evaluation Branch
Field Studies Division

Enclosure

EXPOSURE TO ASBESTOS FIBERS IN WATER DISTRIBUTION SYSTEMS

Gunther F. Craun[1]
James R. Millette[1]
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Pre-Publication Copy

Presented at the 97th AWWA Conference
American Water Works Association
Anaheim, California
May 8 - 13, 1977

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CAPCO JEN 0026046

EXPOSURE TO ASBESTOS FIBERS IN WATER DISTRIBUTION SYSTEMS

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Serious health hazards can exist if asbestos fibers are inhaled. Asbestos-related lung cancer, mesothelioma, and fibrotic pulmonary disease have been documented in occupationally exposed populations (1-4). Ingesting such material may also be dangerous, as indicated by increased rates of gastrointestinal cancer among some asbestos worker groups (5,6,7). Animal studies in which asbestos fibers have been injected or implanted (8,9,10) indicate that the fibers may penetrate the mucosa of the stomach and intestine. Although there is no proof that drinking water containing asbestos will cause cancer, the long term health effects of ingesting asbestos fibers are uncertain.

Several surveys of domestic water supplies have noted the presence of asbestos fibers in drinking water (11,12,13). Contamination of surface water occurs because of industrial activity or from the erosion and weathering of fiber bearing rocks. Asbestos fibers can also be found in wells where the ground water originates in serpentine rock. Asbestos-cement pipe used as water mains may also contribute fibers to the drinking water if the asbestos is leached from the interior walls of the pipe. Samples collected from 64 water systems in the U.S. prior to distribution through water mains showed 29 of the systems with asbestos fiber concentrations above 50,000 fibers per liter. Systems in San Francisco, Seattle and Duluth had concentrations over 1 million fibers per liter (14). The chrysotile fibers found in the surface water sources used by Seattle and San Francisco were attributed to erosion of asbestos-bearing rock in the water shed. Duluth also uses surface water, Lake Superior, and the source of amphibole asbestiform fibers here has been related to industrial contamination. Considerable amounts of asbestos-cement pipe convey potable water in North America, Europe and other parts of the world. According to a recent survey by the Asbestos-Cement Pipe Industry, of U. S. cities with a population of 1,000 or more, 38% (65 million people) specify, purchase or have in service A/C pipe. Over 200,000 miles of

CAPCO JEN 0026047

A/C pipe are now in use in the U.S. (15). Chrysotile comprises 80% or more of the asbestos used in asbestos-cement pipe manufactured in the U.S. (16). These facts have raised a question with respect to the possible health hazard that may be associated with drinking water which has flowed through this type of pipe.

In 1974, a committee on asbestos in water chaired by George M. Wright, M.D. prepared a report for the American Water Works Association (16) which summarized the information available on asbestos in water from A/C pipe and recommended several study areas where research was needed to answer the health questions raised by the use of such pipe. Included in the research suggestions were:

a. the need for data on fiber quantities and sizes as found in A/C pipe water systems.

b. the need to conduct epidemiology studies of human population groups exposed to asbestos-cement distribution systems.

An investigation of the use of asbestos-cement pipe for public water supplies and the incidence of gastrointestinal cancer in Connecticut was initiated in 1974 by the Health Effects Research Laboratory (HERL) in response to these needs. A multidisciplinary team of water supply officials, public health engineers, epidemiologists, scientists, and statistians from HERL, The Connecticut Tumor Registry, and the Center for Disease Control collaborated in the design, field work, and analysis of data in this study. This report is primarily to define the methodology used to determine the extent of exposure of Connecticut's population to A/C pipe and to serve as a progress report of the initial findings of the epidemiologic study which will be described in detail elsewhere (17). Selected water samples collected in conjunction with this study were analyzed by electron microscopy techniques (18). These provided some data as to fiber quantities and sizes as found in a number of different water distribution systems containing A/C pipe. The size of asbestos fibers leached from the interior of asbestos-cement pipe may differ from those found in source waters.

The State of Connecticut was chosen as the site of the study because of the reliable cancer incidence data over a 38 year period available through the Connecticut Tumor Registry. Registration of cases during life now exceeds 98% and histological confirmation approaches 100% (19). Preliminary surveys of the use of A/C pipe in Connecticut showed that some A/C pipe had been in use for a number of years but that a major effort would have to be undertaken to document this usage by town so it would be compatible with the tumor registry data which is recorded by township.

CAPCO JEN 0026048

The Connecticut Study

Public water supplies, available in 148 of Connecticut's 169 towns, provided water to 82% of the state's population in 1975. The total population served by public water supplies in each town varied from 10% or less in 36 towns to 95% or more in 30 towns. Because asbestos-cement pipe is unlikely to be used in individual water systems, only public water supplies were included in this study.

A list of public water supplies using asbestos-cement pipe was compiled after surveying each public water supply and cross referencing the data with information available from the Public Utilities Commission and the Water Supplies Section, State Department of Health. Public water supplies are not developed according to town boundaries. Some towns are served by several different water supplies and a single water supply may serve areas in several towns. Because the Tumor Registry collects data on a town basis, it was necessary to compile the asbestos-cement pipe data in a similar manner. Each public water supply using asbestos-cement pipe was then contacted in order to document the location of the pipe and collect the following data felt to be of epidemiologic importance: (a) date(s) of installation of the asbestos-cement pipe, (b) length of asbestos-cement pipe compared to other types of pipe, and (c) population served by asbestos-cement pipe compared to other types of pipe. The data were then grouped by town.

Asbestos-cement pipe is used totally or partially by 149 public water supplies in 82 towns. Approximately 576,800 people in Connecticut received water which has passed through asbestos-cement pipe. This compares to a total population of 1,724,000 for the 82 towns in which 1,488,500 people are served by public water supplies. In assessing the exposure to asbestos fibers from the pipe, several factors were considered.

Factor: Age of Pipe

Some public water supplies reported asbestos-cement pipe that was 45 years old in 1975; some reported newly installed pipe less than 5 years old. The majority (66%) of the population receiving water through asbestos-cement pipe used pipe at least 25 years old in 1975. The majority of the towns had asbestos-cement pipe that was at least 25 years old in 1975: (a) 34% had asbestos-cement pipe 30 years old or greater, (b) 16%; 25-29 years old, (c) 16%; 20-24 years old, (d) 22%; 15-19 years old and (e) 12%; less than 15 years old. In a few instances asbestos-cement pipe had been used for a period of time but replaced in recent years. These were included as asbestos-cement pipe systems only for their period of usage.

CAPCO JEN 0026049

Higher values of this aggressiveness index are less corrosive than lower va'·es. Waters with an A.I. less than 10 are considered very aggressive while A.I.'s greater than 12 are considered essentially non-aggressive. The criteria established by AWWA Standard C400-75 are:

(a) use either Type I (not autoclaved) or Type II (autoclaved) pipe where A.I. > 12.0

(b) use Type II where A.I. > 10.0

The correllation between fiber release and water aggressiveness has been confirmed by studies recently completed by the EPA (Municipal Environmental Research Laboratory) on asbestos-cement pipe distribution systems in the field (22). These investigations showed that fibers were present in water sampled over a year period from two systems which had source A.I.'s under 10.0, but few, if any, fibers could be found in water samples from 3 systems with source A.I. > 12.0. In the 1974 AWWA Asbestos in Water Committee Report (16), analyses of two similar A/C pipe distribution systems were reported in terms of asbestos fiber mass/unit volume of water. The data showed that a greater amount of asbestos (0.28 μg/l) was found to be coming from the pipe in the Malvern system which had a source A.I. of 11.2 than from the A/C pipe in the Glendale system with a source A.I. of 11.8. Glendale A/C pipe was found to have contributed 0.015 μg/l.

Water samples were collected from each public water supply in Connecticut with asbestos-cement pipe, analyzed for the appropriate chemical parameters, and an A.I. was calculated for each supply. A population weighted A.I. was calculated for each town according to the number of public water supplies with asbestos-cement pipe in the town. The majority of towns had an aggressiveness index under 9.8: (a) 56% had A.I.'s under 10.0, (b) 43% had A.I.'s between 10.0 and 12.0, (c) 1 town (1%) had an A.I. above 12.0.

FACTORS COMBINED FOR ASSESSMENT OF EXPOSURE:

While current exposure to asbestos fibers leached from A/C pipe could best be described by direct measurement of the fibers in the distribution system, this might not provide an accurate assessment of exposure to fibers over the entire time the pipe was used. An assessment of exposure value or risk factor was developed from the factors described in the preceeding paragraphs which were felt to be of epidemiologic importance and important in the release of fibers from the interior of the A/C pipe. To prevent a possible bias in data analysis, the assessment of exposure (AOE) values were developed independently of the tumor registry data. None of those calculating the AOE's had knowledge of cancer incidence by town within Connecticut and thus were not influenced in the selection of parameters used to calculate the exposure to asbestos-cement pipe in each town.

CAPCO JEN 0026051

A list of towns was prepared according to the percent of population served by public water supplies and towns were subdivided into those with and those without asbestos-cement pipe. The towns were further subdivided according to urban and non-urban criteria, an urban town being defined as having an estimated 1975 population of > 2500 and > 50% of the town's population served by public water supplies. The towns were than ranked according to the following parameters to show a relative risk of exposure to asbestos from asbestos-cement pipe.

(1) maximum age of asbestos-cement pipe

(2) population-weighted A.I.

(3) Assessment of Exposure (AOE) as defined by:

$$AOE = (L) \times (P) \times (\frac{Z}{25}) \times \text{A.I. Factor}$$

where: L = length of asbestos-cement pipe in miles
P = population served by asbestos-cement pipe
Z = age of pipe in years
A.I. Factor: use 1.0 if A.I. = ≥12.0; 1.3 if A.I. = 11.1-12.0; 1.6 if A.I. = 10.1-11.0; 2.0 if A.I. = ≥10.0.

(4) Risk Factor (RF) as defined by RF = AOE/(P)

The AOE and RF were developed to combine epidemiologically important parameters and factors influencing the release of fibers from pipes. Since risk was felt to be independent of the population using asbestos-cement pipe, the RF was calculated omitting this parameter. However, rank correlations calculated for towns ranked by AOE and RF showed the town ranks to be similar (Spearman .884, $p < .0001$; Kendall .713, $p < .0001$) and only the AOE was used in further analysis. Since age of pipe and corrosiveness of water (A.I.) were felt to be most important in assessing total fiber release from pipes, these parameters were to be analyzed separately with Tumor Registry Data.

To determine current exposure to asbestos in drinking water and confirm the importance of the aggressiveness index and the other factors used to establish the relative exposure to asbestos by the towns, a study of asbestos in source water and tapwater samples from each township has been undertaken using electron microscopy techniques (13,18). Electron diffraction and energy dispersive x-ray analysis are being used to classify fibers as chrysotile, amphibole, or nonasbestos. Information on the length, diameter, and age of A/C pipe between the source and sampling point and the aggressiveness indexes of the water at both sites are also being recorded.

To evaluate if populations not served by asbestos-cement pipe were exposed to naturally occurring asbestos in water sources, thirty-one samples were collected at water sources prior to entering the distribution system.

CAPCO JEN 0026052

Sampling sites were selected based on the type of water source, size of system and geographic location. All major water supplies were sampled including the Metropolitan District Commission, New Haven Water Company, and Bridgeport Hydraulic Company. All samples except three were either below detectable limits, which means no chrysotile or amphibole asbestos fibers were found, or not statistically significantly, which means that less than five asbestos fibers were found in the portion of the sample examined. The three source water samples containing asbestos were:

(1) A drilled rock well serving 100 customers contained 100,000 chrysotile fibers per liter.

(2) A surface water source serving 3,000 customers contained 500,000 chrysotile fibers per liter. Resampling is now in progress.

(3) A gravel well was found to contain 300,000 chrysotile fibers per liter but this could not be confirmed upon resampling.

RESULTS

Based on these sampling results it was concluded that the population served by public water systems not using asbestos-cement pipe were not exposed to significant amounts of naturally occurring asbestos in water.

Thus far, 19 water samples have been analyzed from the distribution system after water had passed through various lengths of asbestos-cement pipe. Chrysotile fiber counts ranged from below detectable limits (10,000 fibers/liter) to 700,000 fibers per liter. Some amphiboles were detected; concentrations were below 50,000 F/ℓ.

Seven of the samples had chrysotile fiber counts over 100,000 fibers per liter. In general, the fiber counts were low when compared to counts reported for water in some other situations. In Duluth where the source of amphibole fibers in the water is considered to be related to mineral processing operations, fiber counts as high as 600 million fibers per liter have been found (23). Two hundred million chrysotile fibers per liter were found in water from a lake in Marin County, California which receives runoff from areas of serpentine rock (24). In some non-Connecticut asbestos-cement pipe systems which transport highly aggressive water, chrysotile fiber counts as high as 32 million fibers per liter have been found (22).

In the Connecticut samples where chrysotile fibers were found, their lengths ranged from 0.2 to 60 μm with widths from 0.02 - 0.5 μm. Aspect ratios (length/width) ranged from 3 to 2000. Figure 1 presents a comparison between the fiber lengths found in the Conn. A/C pipe distribution systems and fibers found in a sample from a San Francisco Reservoir in California which has a natural source of chrysotile fiber from surrounding rock formations. It is apparent that the pipe distribution samples have a higher percentage of fibers over 1 μm in length than does the sample with a natural source of fibers. The median value of the San Francisco fiber length range was 0.7 μm while the median value of the fiber length range from the Conn. A/C pipe distribution samples was 2.0 μm. The data is also compared with amphibole fiber lengths as found in Duluth, Minnesota tap water 1975 (23).

The age adjusted sex specific incidence data for stomach, colon, and rectum cancer for Connecticut townships for the period 1935 to 1973 was used to investigate whether asbestos cement pipe usage in public water systems could be associated with gastrointestinal cancer. Observed versus expected ratios for the occurrence of each cancer, by sex, time period, and estimated exposure to asbestos cement pipe were calculated within each of three categories of population density. In addition, townships within each of the three categories of population density were ranked for age-adjusted rates of each cancer site, by sex and time period and compared to townships ranked for exposure to asbestos-cement pipe. These correlations revealed no obvious trends or patterns of association with the use of asbestos-cement pipe (17).

These negative findings seem to indicate that the use of A/C pipe has probably not been responsible for excess gastrointestinal cancers, but there are inherent uncertainities associated with epidemiologic studies of this type. Prior migration, occupational history, and personal habits regarding other asbestos exposure and smoking could not be obtained in this type of study. Because the study area was selected to take advantage of reliable cancer data available in the long standing State Tumor Registry, another limitation which could not be avoided was the small population served by A/C pipe. An additional factor which may be important is the relatively low dose asbestos exposure found after sampling a limited number of water systems using A/C pipe.

It seems justified, however, to report these initial, negative findings to allay fears that a large, obvious epidemic of gastrointestinal cancer attributable to the use of A/C pipe has been overlooked. It is accurate to state that if asbestos in water has influended gastrointestinal cancer rates in Connecticut, the effects are not obvious (17).

Additional studies are now in progress to provide more substantial data on fibers in Connecticut water supplies. When the present work is completed, all 82 towns identified as using asbestos-cement pipes will have been sampled. Supplies in thirty towns not using

CAPCO JEN 0026054

A/C pipe will also have been sampled. All the major sources in each town are to be analyzed for natural asbestos content. Analysis of data from at least 82 pairs of samples, before A/C pipe and from the distribution system after a known length of A/C pipe, will be compared with aggressiveness index changes of the water in the system.

It is possible that a re-evaluation of our exposure assessment will be necessary if fiber counts do not confirm the Assessment of Exposure equation as a reliable predictor of fiber exposure. Closed loop studies and field sampling are currently underway to determine if one of the three parameters used to determine the aggressiveness index (A.I.) is more important than the others. Data on corrosion control practices, such as, the addition of polyphosphates is being collected to determine their influence on preventing fibers from being released from the pipe. A situation in which iron in the water can apparently coat the interior of the pipe preventing fiber release is also being investigated. Further studies will be conducted investigating the relationship between incidence of gastrointestinal cancer and the following: 1) current asbestos counts, 2) town aggressiveness indexes, 3) age of pipe data, 4) revised AOE calculations, if indicated by the current sampling program.

An investigation of pleural and peritoneal mesothelioma using data from the Connecticut Tumor Registry is currently being conducted in conjunction with the Connecticut Cancer Epidemiology Program, Yale University School of Medicine. If sufficient numbers of cases of peritoneal mesothelioma are found which are not associated with occupational exposure, a case-control study will be conducted to determine if these are related to drinking water that has passed through asbestos-cement pipe.

The Health Effects Research Laboratory is currently sponsoring another epidemiologic study in an area of California where chrysotile asbestos occurs in the source water. This study will look at cancer incidence in counties which maintain tumor registries. Although the fiber concentrations and sizes may be somewhat different than those found in the Connecticut A/C pipe systems, the California study will provide additional data as to the health effects of ingested asbestos. Further information will also be provided by the results of a large scale animal feeding study supported by the Food and Drug Administration, EPA, and the National Institute of Environmental Health. Results of this study will not be available for several years.

CAPCO JEN 0026055

chemical parameters necessary to compute the water aggressiveness data.

REFERENCES

1. Selikoff, I.J., J. Churg, and E.C. Hammond. 1964 Asbestos Exposure and Neoplasia. J. Amer. Med Assoc. 188: 22-26.

2. Gibson, J.C., Chairman. 1973. Report of the Advisory Committee on Asbestos Cancers to the Director of the International Agency for Research on Cancer. Brit J. Industr. Med. 30: 180-186.

3. Biological Effects of Asbestos. 1973. IARC Sci. Publ. #8, Lyon France 34p.

4. Haley, T.J. 1975. Asbestosis: A Reassessment of the Overall Problem. Journal of Pharmaceutical Sciences 64(9): 1435-1449.

5. Enterline, P., P. DeCoufle, V. Henderson. 1972. Mortality in relation to occupational exposure in the Asbestos Industry. J. Occup. Med. 14(12): 879-903.

6. McDonald, J.C., A.D. McDonald, G.W. Gibbs, J. Sigmaityck, and C.E. Rossiter. 1975. Mortality in Chrysotile Asbestos Mines and Mills of Quebec. Arch. Environ. Health. 22:677-686.

7. McDonald, J.C. 1972. Cancer in Chrysotile Mines and Mills, Paper No. 29, Conf. on the Biological Effects of Asbestos, International Agency for Research on Cancer, Lyon, France, Oct. 1972.

8. Smith, W.E., L. Miller, R.E. Elasser, and D.D. Hubert. 1965. Test for Carcinogenitity of Asbestos. Ann. N.Y. Acad. Sci. 132: 456-488.

9. Westlake, G.E., H.J. Spjut, and M.N. Smith. 1965. Penetration of Colonic Mucosa by Asbestos Particles: An Electron Microscopic Study in Rats Fed Asbestos Dust. Lab. Invest. 14: 2029-2033.

10. Pontefract, R.D., and H.M. Cunningham. 1973. Penetration of Asbestos Through the Digestive Tract of Rats. Nature 243: 352-353.

11. Kay, G. 1973. Ontario Intensifies Search for Asbestos in Drinking Water. Water and Poll. Control. 9: 33-35.

12. Cook, P.M., G.E. Glass, J.H. Tucker. 1974. Asbestiform Amphibole Minerals Detection and Measurement of High Concentrations in Municipal Water Supplies. Science. 185: 853-85

CAPCO JEN 0026057

13. McFarren, E.F., J.R. Millette, R.J. Lishka. 1975. Asbestos Analysis by Electron Microscope. Proc. AWWA Amer. Water Quality Technology Conf. Amer. Water Works Assoc. XIV-1 - XIV-12.

14. Preliminary Assessment of Suspected Carcinogens in Drinking Water, Report to Congress, 1975, Appendix E. 135.

15. Olson, H.L. 1974. Asbestos in Potable Water Supplies. J. AWWA. Amer. Water Works Assoc.

16. A Study of the Problem of Asbestos in Water. Committee Report. 1974. American Water Works Assoc. J. 66(9) Part 2: 1-22.

17. Harrington, J.M., G.F. Craun, J.W. Meigs, J.T. Flannery, R.S. Woodhull. An Investigation of the Relationship Between the Use of Asbestos-Cement Pipe for Public Water Supply and the Incidence of Gastrointestinal Cancer In Connecticut. 1935-1973. (In preparation of submission to the Amer. Journal of Epidemiology)

18. Millette, J.R., and E.F. McFarren. 1976. Energy Dispersive X-ray Analysis of Waterborne Asbestos Fibers in TEM, SEM, and STEM. Scanning Electron Microscopy 1976 Proceedings, IIT Research Institute, Chicago, Vol. 1: 451-460.

19. Meigs, J.W. 1975. The Connecticut Cancer Epidemiology Unit, Conn. Med. 39: 637-640.

20. Webster, I., 1974. The ingestion of Asbestos Fibers. Environmental Health Perspectives. 9: 199-202.

21. AWWA. 1975. Standard for Asbestos-Cement Pressure Pipe, 4 in. through 24 in. for Water and Other Liquids. Amer. Water Works Assoc. Publication AWWA C400-75.

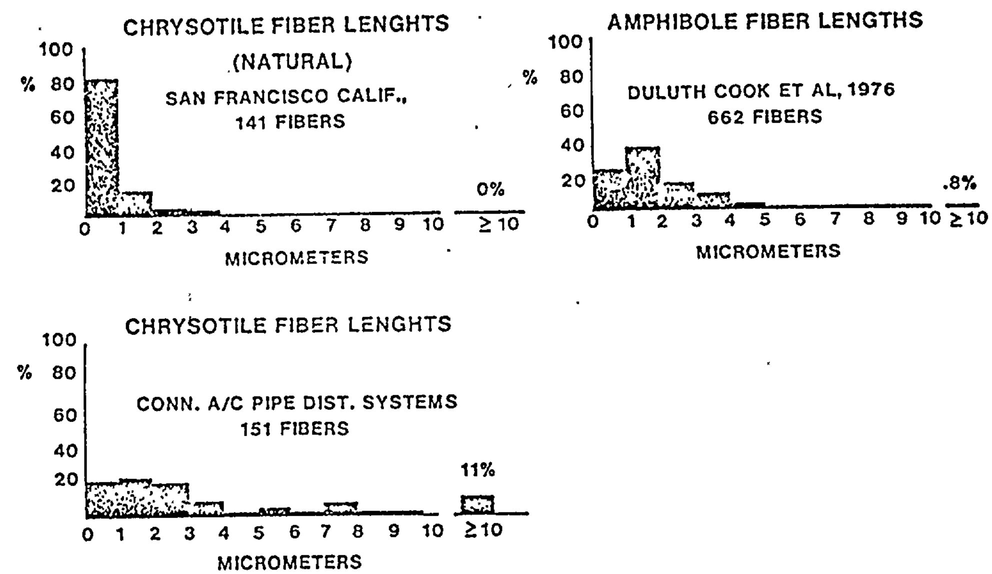
22. Buelow, R.W., J.R. Millette, and E.F. McFarren. Field Investigation of the Performance of Asbestos-Cement Pipe Under Various Water Quality Conditions. (Submitted to the JAWWA)

23. Cook, P.M., I.B. Rubin, C.J. Maggiore, and W.J. Nicholson. 1976. X-ray Diffraction and Electron Mean Analysis of Asbestiform Minerals in Lake Superior Waters. Proc. Intern. Conf. on Environ. Sensing and Assessment, Pub. by IEEE, Piscataway, NJ. 34(2): 1-9.

24. Cooper, R.C. and J.C. Murchio, 1974. Preliminary Studies of Asbestiform Fibers in Domestic Water Supplies, Final Report to the Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio (available from NTIS, U.S. Dept. of

CAPCO JEN 0026058

FIGURE 1



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