

NOV 16 1978

November 15, 1978  
REF: 1188

Mr. E. Martinez  
B U I L D I N G

PLAINTIFF'S EXHIBIT

ASA-522

Subject: Asbestos-Cement Pipe Producers Association (AACPP)  
Meeting in Arlington, Virginia on November 8, 1978,  
to Review the Aggressive Water Guidelines for  
Asbestos-Cement Pipe

Participants:

Mr. Joseph Jackson, AACPP  
Mr. Bert Cook, Atlas Asbestos Corp.  
Mr. Fred Hawkins, Certain Teed Corp.  
Mr. Roman Korhij, Certain Teed Corp.  
Mr. John Herr, Johns-Manville Corp.  
Mr. Hugh Frazer, Canadian Johns-Manville  
Mr. Lee Taylor, Capco  
Mr. Victor Puskar, ASARCO Incorporated

Purpose of the Meeting:

To review the aggressive water guidelines presently used for  
asbestos-cement pipe.

Introduction:

The aggressive index, which takes into account the pH, hardness, and alkalinity of the water, is used to determine the applicability of a/c pipe for water supply systems. Generally, soft, acid waters attack the pipe resulting in slow erosion of the pipe and release of fibers. The use of a/c pipe for these waters is not recommended. Hard, alkaline waters, on the other hand, deposit a mineral coating on the pipe surface and virtually prevent the release of any fibers.

Numerous exceptions to the validity of the aggressive index have been observed. The purpose of the meeting was to review the validity of the aggressive index and, in particular, to discuss the data presented in the Johns-Manville research report, "Study of the Effects of Aggressive Waters on Transite Pipe." The ultimate long range objective would be to establish more accurate and universally valid guidelines for the use of a/c pipe.

Possible health hazards due to the presence of asbestos fibers in drinking water are greatly contributing to the urgency of the problem. In contrast to the inhalation of airborne asbestos

fibers, a clear cause and effect relationship between ingested asbestos and gastrointestinal cancer has not been established. In spite of the lack of any concrete evidence, steps are now being taken by some "prudent" public officials and consumer advocates to restrict the use of a/c pipe. Some municipal and county ordinances now prohibit the use of a/c pipe, and a bill has been introduced in the Virginia state legislature to prohibit a/c pipe in water distribution systems throughout the state.

The Environmental Protection Agency, so far, has not issued any regulations on either the use of a/c pipe or the permissible quantities of asbestos present in drinking water. An EPA sponsored study to establish a correlation between ingested asbestos and incidence of cancer by feeding asbestos to laboratory animals is presently under way and the results should be available in the spring of 1979. Regardless of the outcome of this study, it is believed that some restrictive regulations by the EPA will be forthcoming in the near future.

#### Summary of Discussions:

The discussions centered on the validity of the aggressive index.

The aggressive index is defined as

$AI = pH + \log (AH)$ , where

pH = index of acidity (or alkalinity) of the water-standard pH units.

A = total alkalinity - ppm as  $CaCO_3$ .

H = calcium hardness - ppm as  $CaCO_3$ .

American Water Works Association (AWWA) Bulletin C400-77 defines the aggressiveness of waters as follows:

AI = <10.0 : highly aggressive.

AI = 10.0 - 11.9 : moderately aggressive.

AI =  $\geq$ 12.0 : nonaggressive.

Mr. Jackson (President, AACPP), as well as other participants, pointed out that numerous exceptions to the validity of the aggressive index have been encountered. Erosion of the pipe and fiber release have been observed in several installations where, according to the aggressive index of the water, no erosion should have occurred. Also, naturally deposited protective coatings have been found in a/c pipes carrying low pH, low hardness water, i.e. water classified as highly aggressive.

It was the consensus of opinion that other parameters besides pH, hardness and alkalinity are also affecting the erosion of a/c pipe and the release of fiber. These additional contributory factors and their interactions are not known. The importance of a thorough understanding of the erosion and fiber release mechanism was stressed in anticipation of future regulatory standards.

Mr. J. Herr (Manager, Pipe Technology Dept., Johns-Manville Corp.) summarized the data and conclusions of tests conducted at J-M. A copy of the summary of J-M's Research Report No. E425-1074 is attached to this memorandum. It was concluded in the report that, within the scope of the tests, only pH was found to be of any significance in ascertaining attack on the a/c pipe. In a subsequent discussion of the J-M data, the test procedures were severely criticized and the validity of the data and conclusions was questioned.

Experimental data were also presented by Mr. Fred Hawkins (Certain Teed Corp.) on investigations conducted by Keasbey and Mattison Co. in 1961 on the resistance of a/c pipe to soft waters. It was concluded from this study that the stability of a/c pipe was very dependent upon the hardness of the water. The pH of the water, within the range investigated (6.4 to 8.3), or any other factor had little or no effect on the attack of the pipe.

It was agreed that additional experimental work is required to study the release of fiber from a/c pipe. The Association would then be in a position to recommend changes to the AWWA on the criteria of waters suitable for transport in a/c pipes. The alternative, it was believed, would be eventual much stricter limitations by the EPA.

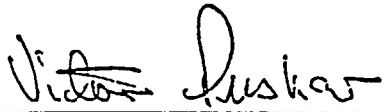
Coating of the pipe to prevent erosion and fiber release was considered to be an unacceptable solution (last resort), mainly because of bad publicity. It would imply that there is something wrong with a/c pipe already installed and it would scare the public. It would also add to the production cost and make a/c pipe less competitive.

All member companies of AACPP were urged to participate in additional studies aimed at ascertaining which attributes of the water are responsible for leaching of a/c pipe or, conversely, the deposition of a natural protective coating.

A task force comprising of F. Hawkins (Chairman) and J. Herr was set up to direct the Association's future efforts. ~~The~~ task force will write up standardized test procedure for aggressive waters on a/c pipe and will ask each member company to participate in the study. It is estimated that about 4 weeks will

be required to write up the procedures, suggested variables to be investigated, etc. The member companies will then be contacted by the Association and will be asked (voluntarily) to undertake specific portions of the investigation.

In discussing the conclusions of the meeting privately with Mr. Lee Taylor (V.P. of Marketing and Sales, Capco), Mr. Taylor expressed the opinion that Asarco should definitely participate in the Association's suggested investigations because of its implications on the future of the a/c pipe industry. Mr. Taylor, however, disagreed with the conclusion that coated pipe should not be produced. He suggested that coated pipe should be produced and installed in locations where the water is aggressive, thereby expanding the a/c pipe market. He also suggested that the technology should be developed to coat the pipe after forming, i.e. before curing and autoclaving. This would retain more moisture in the pipe during curing, thereby enhancing the strength. This, in turn, may permit a reduction of the fiber content of the furnish and the net result may be a cost saving.

  
V. Puskar

VP/cdh

cc: A.E.Albrethsen  
M.El Tawil  
V.Kudryk  
C.E.Stiefken