UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
July 30, 1985

Honorable Lee M. Thomas
Administrator
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

OFFICE OF
THE ADMINISTRATOR

Dear Mr. Thomas:

On July 24, 1984, the Environmental Health Committee of the Science Advisory Board reviewed a document, "Major Issues Associated with Health Effects of Asbestos in Drinking Water (Carcinogenesis of Ingested Asbestos Fibers)," prepared by the Criteria and Standards Division in the Office of Drinking Water. The Committee provided advice on this document in a letter of October 29, 1984, which noted a pending study of asbestos ingestion by experimental animals conducted by the National Toxicology Program (NTP). A subsequent report from the Office of Drinking Water, titled "Risk from Ingestion of Fibers in Drinking Water," evaluates this NTP bioassay. On May 22, 1985, the Committee met in public session to review this report. Based on the additional information, it finds no reason to change the conclusion of the October 29, 1984, letter which states as follows:

> "Given the positive signal seen in some epidemiologic studies, plus well documented evidence for the association between asbestos fiber inhalation and lung cancer, it is hard for the Committee to feel comfortable in dismissing the possibility of an increased risk of gastrointestinal cancer in humans exposed to asbestos fibers from drinking water. However, the Committee consensus is that current peer-reviewed evidence for humans and animals does not support the view that asbestos ingested in water causes organ-specific cancers."

A description of the NTP bioassay and its results is included in our attached technical comments. The Committee also notes that additional toxicological bioassays or epidemiological surveys are unlikely to contribute more information to our understanding of the toxicity of ingested asbestos fibers. Should EPA desire to resolve the current uncertainty, the Committee recommends that the Agency sponsor research into the mechanism(s) of action of asbestos.

Sincerely,

Richard A. Griesemer

Richard A. Griesemer, D.V.M., Ph.D.
Chair, Environmental Health Committee

Norton Nelson

Norton Nelson, Ph.D.
Chair, Executive Committee

cc: A. James Barnes [A-101]
Henry L. Longest II [WH-556]
Assistant Administrators

TECHNICAL COMMENTS OF THE ENVIRONMENTAL HEALTH COMMITTEE ON MAJOR ISSUES ASSOCIATED WITH HEALTH EFFECTS OF ASBESTOS IN DRINKING WATER (CARCINOGENESIS OF INGESTED ASBESTOS FIBERS)

On May 22, 1985, the Environmental Health Committee of the Science Advisory Board met in public session to review a report, "Risk from Ingestion of Fibers in Drinking Water," prepared by the Criteria and Standards Division in the Office of Drinking Water (OIW). The primary purpose of this report was to update the Division's previous evaluation of the effects of asbestos in drinking water based on a National Toxicology Program (NTP) report that was not available at the time when the first report was prepared. Following its review of the most recent OIW evaluation, the Committee finds no reason to change its earlier conclusion reached on October 29, 1984.

The NTP report (no. 295) on the bioassay in the rat of chrysotile fibers was one of a number of NTP reports (Nos. 246, 249, 277, 280 and 295), which collectively represent an NTP investigation of the carcinogenicity of asbestiform fibers for animals when administered in the diet for a lifetime. Chrysotile and amosite were administered to both F334 rats and Syrian hamsters, whereas crocidolite and nonfibrous tremolite were administered only to F344 rats. The experimental design was similar in all six studies. The test substance was mixed with food and formed into pellets containing 1% of the test substance. However, there was a lack of information about fiber size (length in particular) in the test substance after the pelleting procedure. For five of the experiments, two sizes of fibers were studied (described as small and intermediate in range of fiber sizes). The group sizes for each sex, each fiber size range and controls ranged from 88 to 250 animals and were selected on the basis of estimated ability to detect changes in the known spontaneous incidences of gastrointestinal tumors in the two species.

The bioassays were conducted in two laboratories, one for hamsters and one for rats, at about the same time. Staggered experimental starts were required but were nearly contemporary, and the teams of investigators remained intact. They conducted the experiments uniformly from beginning to end. The bioassays were conducted for the lifetime of the animals, starting with the mothers of the test animals. In some experiments (including chrysotile asbestos in the rat) separate groups of 100 animals received the test substance by gavage during the preweaning period. Thus, the bioassays were not standard but were of greater duration with larger numbers of animals than the usual protocol.

One dose level, 1% in the diet, was used in all treated groups, and control animals received the diet without added materials. At death, the entire gastrointestinal tract was opened and examined, and all grossly visible lesions were examined microscopically along with samples of grossly normal tissues. All the major organs were studied according to NTP protocols.

Overall, this was a well-designed series of qualitative experiments in which the probability of detecting carcinogenesis induced by the three asbestiform fibers and nonfibrous tremolite was reasonably high. Controls could have been added in which nonfibrous mineral, of similar chemical composition was fed to compare with fibrous mineral. Since the results are not statistically significant, however, a control for fiber alone was less important.

The only suggestive evidence of carcinogenicity was the finding of 3.6% (9/250) adenomatous polyps in the large intestines of male rats fed 1% chrysotile asbestos of intermediate size range. No polyps were found in 88 matched control animals. In rats given chrysotile by gavage in the preweaning period, 2% (2/100) had polyps in the large intestine. Similar lesions were found in 0.6% (3/524) pooled control rats from all of the NTP asbestos experiments. Multiple polyps tended to occur in the affected rats. Short fiber length chrysotile asbestos showed no evidence of polyps. In experiments with other forms of asbestos, occasional polyps also were found, but these lesions were of comparable incidence to those in the control rats.

The weight of the evidence for carcinogenicity of chrysotile by the dietary route is slight at best, a marginal increase in the incidence of one type of benign neoplasm, at one site, in one sex, of one species, in one of two size ranges of test material, at one dose level. The Committee interprets this evidence as "equivocal." That is, while other known effects of chrysotile asbestos may suggest carcinogenic potential by this route of administration, the data do not support a cause and effect relationship. A confirming experiment in both sexes would be needed. From the overall evidence available, however, the Committee does not believe that additional animal bioassays would resolve the issue. Instead, equivalent resources devoted to the mechanisms of asbestos action are more likely to provide crucial evidence bearing on the hazard.