



## Project Summary

# Asbestos Sampling Plan for the San Francisco Bay Area, California

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This research project was initiated to facilitate the use of waterborne asbestos data for a possible case-control epidemiological study of ingested asbestos in five Bay Area counties near San Francisco, California. For each county, and each census tract within the area, information about historical water supply and distribution, water treatment practices, and asbestos levels has been compiled. It was determined that none of the major water districts servicing the San Francisco Bay Area are free of asbestos fibers. Individual asbestos measurements range in value from less than  $10^4$  fibers/liter to  $1.8 \times 10^8$  fibers/liter of finished water. It was determined that a sampling protocol to augment the current asbestos data base should include sampling the largest flows of water and should take into consideration: variation within the distribution system, possible seasonal variation, the drought of 1976-1978, and the historical waterborne asbestos levels.

The final report was submitted in fulfillment of Purchase Agreement No. (3253NAET) by the Department of Biomedical and Environmental Health Sciences of the University of California, Berkeley, California, under the sponsorship of the U.S. Environmental Protection Agency

*This Project Summary was developed by EPA's Health Effects Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).*

### Introduction

A study of asbestos in drinking water supplies and cancer incidence from 1971-1976 was conducted at the University of California at Berkeley. The indirect epidemiological approach used (the census tract was the smallest unit) in that study showed the existence of a statistical association between the presence of asbestos fibers in drinking water and the incidence of certain cancers among residents served by those water supplies. In particular, the incidence of cancer of the digestive tract and digestive related organs was associated with increasing amounts of asbestos in the drinking water supply of the San Francisco Bay Area.

In order to take into account more fully the effects of other variables such as smoking, alcohol consumption, and occupation on the association found, a case-control study could be conducted. To conduct such an epidemiological study of ingested asbestos fibers and cancer, it is necessary to determine an individual's exposure to waterborne asbestos over the past 30 or 40 years. A review of the waterborne asbestos data base amassed during the indirect study and recommendations as to how to augment the data was necessary.

### Results

The available data show that the presence of asbestos fibers in Bay Area drinking water is a result of water coming in contact with serpentine rock, either as runoff (Marin County) or through reservoirs (Crystal Springs), and the major water systems within this study area have not changed much over the past 30

to 40 years. Any historical changes in the asbestos levels found in tap water probably result from the use of different treatment practices. The contribution of asbestos-cement pipe to the level of asbestos found in drinking water has yet to be determined. The University of California indirect epidemiology study was not specifically designed to measure the risk that might be attributed to the use of asbestos-cement pipe.

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### Conclusions

The individual asbestos fiber concentrations available in the full report are the values for single grab samples of tap water taken from a census tract. Water sampling sites were chosen on the basis of (1) being representative of a specific water distribution system, and (2) convenience of sampling. In order to more fully characterize the asbestos content of these water systems, it may be necessary to make composite samples by combining samples of water over a period of time. This would minimize the problems of utilizing grab samples and reduce the number of water samples to be analyzed. This would also take into account the intermittent and non-uniform occurrence of asbestos in water from various sources.

### Recommendations

A sampling protocol to augment the current asbestos data base should address the following points:

1. Drought of 1976-1978. Most of the data on asbestos in Bay Area drinking water were collected during the extreme drought years of 1976-1978. It is not known if the waterborne asbestos concentrations are truly representative of a year with normal rainfall.
2. Seasonality. It has not been determined if there is any variation in waterborne asbestos at different times of the year.

3. Variation within a distribution system. Finished water from each system and corresponding tap water samples from various census tracts within the system should be analyzed and compared. Different distribution systems having the same source should also be compared.
4. Historical waterborne asbestos levels. The history of water supply for the area has been well documented. Since changes have occurred mainly in the treatment practices employed by the water suppliers, source water prior to treatment should be fairly representative of historical asbestos levels, and extensive sampling and analysis should be carried out.

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*James R. Millette is the EPA Project Officer (see below).*

*The complete report, entitled "Asbestos Sampling Plan for the San Francisco Bay Area, California," (Order No. PB 85-151 207/AS; Cost: \$11.50, subject to change) will be available only from:*

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