

SILVER BAY CLINIC, LTD.
50 OUTER DRIVE
SILVER BAY, MINNESOTA 55614
PHONE: (218) 226-4431

RECEIVED
JUL 20 1978
E. T. F.

DONALD D. HAASE, M.D.
THOMAS M. CLIFFORD, M.D.
PETER Y. LEONARDSON, M.D.

July 17, 1978

PLAINTIFF'S EXHIBIT

CAP-374

Mr. Edward T. Fride
1200 Alworth Building
Duluth, Minnesota 55802

Dear Mr. Fride:

I have had an opportunity to review the letter from Doctor Roy E. Albert to Joseph Padgett of the Environmental Protection Agency. I have also reviewed the enclosed draft report by Philip M. Cook Ph.D. entitled "Assessment of Potential Environmental Health Hazard Associated with Airborne Mineral Fibers Emitted During Taconite Ore Processing".

My field of interest is clinical medicine. For the past 21 years I have also served as medical consultant for Reserve Mining Company at Silver Bay, Minnesota. I have made an exhaustive review of the literature concerning asbestos and I have attended multiple symposia concerning this problem.

My comments will largely be directed to the draft report of Doctor Philip Cook in so far that I feel some of his statements are either inaccurate or incomplete.

Doctor Cook states that since little or no epidemiological or animal study data exists which can be applied specifically to each occurrence, this assessment often depends on comparison of physical and chemical properties to asbestos on comparison of airborne fiber concentrations to concentrations associated with asbestos disease. However, in the case of Reserve Mining Company, many studies have been conducted which pertain to the potential carcinogenicity of particulate emissions. In 1976 Smith et al (1) published the conclusions of a Hamster Ingestion Study using Reserve Mining Company tailings. Unable to show any evidence of carcinogenicity due to the feeding of tailings. Clark and Harrington (2) conducted an epidemiologic survey utilizing 300 senior employees of Reserve Mining Company. These individuals were people who had over 10 years

ASARCO ALV 0002662

experience with the company. They concluded that the 300 individuals showed no x-ray or respiratory abnormalities in excess of the general population. Confirming evidence of this thesis was added to by McDonald et al (3) in 1977, who did an epidemiologic study of gold miners exposed to cumingtonite-grunerite fragments. Again no excess of lung cancer was found among these miners. The entire Reserve Mining Company work force is followed annually by chest x-ray and physical examination. Since the beginning of the Reserve Mining Company operation Doctor Leonard Bristol (4) of the Trudeau Institute has followed all of these x-rays. He has found no evidence of asbestosis in any members of the entire mining group in the past 25 years. In a special study in 1975, Doctor Russell Morgan (5) of John Hopkins University was asked to express his independent opinion concerning x-rays of employees of Reserve Mining Company who has over 15 years mining experience. Doctor Morgan reviewed approximately 960 employee x-rays and found no evidence of asbestosis. Recently the National Cancer Society (6) did a study in Duluth, Minnesota and has expressed the opinion that there has been no increase in pulmonary or GI cancer when compared to the U. S. population. The Minnesota State Department of Health (7) developed a survey utilizing death statistics and has found no increase in pulmonary or GI cancers in residents living in the area of the western arm of Lake Superior when compared to the Minnesota population. Furthermore, each employee of Reserve Mining Company is examined annually. After 21 years of such physical examination, during which time I personally have probably examined every senior hourly employee, I have found no evidence of asbestosis such as basal rales or finger clubbing. The conclusion is that studies pertaining to animals and more importantly to humans exposed to Reserves particulate environment have demonstrated no relatable adverse health effects.

Doctor Cook quotes a study of underground miners in a gold mine with grunerite fibers as having demonstrated a three fold excess of respiratory cancer mortality. He neglected to point out that that study (8) contained several serious flaws. First of all the group chosen for the survey was a small select group. Second, the number of respiratory cancers tallied in the survey actually were not all within the respiratory system, Finally, there

was no evidence for asbestosis in these miners presented by the author and it is a widely understood fact that increased lung cancer in asbestos exposure occurs only in the presence of asbestosis.

Doctor Cook states that animal experiments cannot provide absolute effect fibersize relationship since asbestos samples of uniform fiber size have not been prepared. This statement is not correct. In 1976 Wright and Kushner (9) prepared crocidolite and fluoramphibole fibers by synthetic growth. These fibers then of dimensions suitable for experiment were then administered to guinea pigs by intratracheal instillation. The net result of this experiment was that fibers over 10 microns in length consistently produced lung fibrosis. Fibers under 10 microns in length consistently produced little or no reaction. In 1972, Stanton and Wrench (10) issued a report concerning mesothelioma induction using chrysotile and fibrous glass and came to the same conclusion, that is that shorter fibers produce less reaction. Morgan (11) concludes that there is an accumulating body of evidence which shows that the fibrogenic activity of asbestos is associated with a long, rather than a short fiber. In a 1977 report to the Society of Occupational and Environmental Health, Doctor J. M. G. Davis (12) concludes that the long fiber theory of asbestos pathogenesis, especially carcinogenicity, does at the present time appear to be correct.

The statement is made that pulmonary tissues of asbestos workers contain many more short fibers than long with an even shorter fiber size distribution in pleural tissue. To support his thesis he quotes the paper by Bignon and Sebastien (13). However, at the meeting in Washington, D. C. of the Society of Occupational and Environmental Health where Doctor Sebastien presented his report verbally, he made it a point to state that fibers as long as 200 microns have been found in human lung tissue. Consequently, fibers of carcinogenic size are found in tissues.

Doctor Cook states that the environmental agencies animal tests are being conducted with Reserve Mining Company amphibole fibers which are representative of fibers found in air samples from Silver Bay. This statement is not true. The fibers used in that study were

collected in an area adjacent to the mining pit at Babbitt, Minnesota. They represent an atypical long fiber sample which is not in the mining area and which will never be included in the mining area. A letter written by Mr. Matthew Banovetz⁽¹⁴⁾, the executive vice-president of Reserve Mining Company, addressed to Doctor Laleda D. Palekar details the above information and raises serious objection to the conduct of a test using such an atypical fiber. Doctor Cook states that given the chemical, crystallographic and morphological similarity of Reserve Mining Company amphibole fibers to amosite fibers it is most likely that inhalation exposure to high concentration of these fibers would produce asbestos disease. However, it has been ascertained from the various laboratories around the world that the particles present in the tailings and in the air in the pelletizer of Reserve Mining Company average less than 3 microns in length and less than 1 micron in diameter. An electron microscope study done by Doctor Peters at Arthur D. Little Laboratories, established that 98.43% of these fragments were below 5 microns in length. All of the particulates were found to be below 10 microns in length. As stated before, it is the consensus of the scientific community that the short fiber is not fibrotic or carcinogenic in nature and therefore it would appear to me that it is not likely that inhalation of these fibers will produce asbestos disease.

Doctor Cook stated that the Harrington and Clark study (2) as showing negative effects in employees in over 20 years experience with Reserve Mining Company. He further states that these studies cannot be extended to conclude that increased risk of lung cancer or mesothelioma is absent. He does however forget to point that increased risk of lung cancer in asbestos workers occur only in the presence of interstitial fibrosis. These workers, as well as the individuals who did the x-ray studies detailed above, have found no increase in interstitial fibrosis in Reserve Mining Company employees. Without that finding it is necessary to conclude that there will be no increase risk of lung cancer.

Doctor Cook states that the average amphibole fiber concentration in Silver Bay, Minnesota is approximately 125,000 fibers per cubic meter for the years 1974, 1975 and 1976. This corresponds to a fiber concentration of 0.125 fibers per cubic centimeter. The present

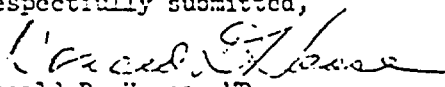
fiber emission standard for asbestos industry is less than 2 fibers per cubic centimeter over 5 microns long. Therefore the concentrations in the Silver Bay community are 1/16 that of the present asbestos fiber standard. Furthermore, when actual sizing of the fiber is done it will be found that over 98% of the fibers present in the community air are less than 5 microns in length. Therefore the air amphibole fiber concentration in the Silver Bay community is probably greater than 2,000 times lower than the present asbestos standard. He does acknowledge that stack emission controls are being installed but expresses a concern about fugitive dust from the on-land tailings basin which will begin operation in 1980. However, extensive engineering changes have been made to contain fugitive dust from the tailings basin. Such changes have been approved by the Pollution Control Agency of the State of Minnesota.

Doctor Cook states that the dose response equation for human inhaled fiber exposure is not well established and the existence of an exposure threshold, below which increased cancer risk is zero, is unknown. However, McDonald et al (15) in his Quebec study on chrysotile miners indicates that there is an exposure threshold for increased cancer risk. Friedrichs (16) in 1977 pointed out that the fiber burden in so called normal human lungs is a tremendous quantity. The fiber burden in asbestotic lungs is two orders of magnitude greater than that in so called normal human lungs. The correlary to this is that although the fiber burden in so called normal lungs is a tremendous quantity, yet without the presence of asbestosis excess lung cancers do not develop. These findings are further confirmed in animal studies which were conducted by Smith et al (17 & 18) and Stanton & Wrench (19) which show progressive reduction in cancer or fibrosis development with reduction in doses of asbestos. J.M.G. Davis (12) in 1977 confirmed these findings using chrysotile, amosite and chrysotolite.

In summary then, Doctor Cook's draft report of June 1, 1978 does not fully summarize the present state of knowledge concerning taconite as an asbestos cancer hazard. There is a great body of evidence regarding the effective fiber length on the induction of carcinogenic cancer.

- 6 -

Respectfully submitted,


Donald D. Haase, MD
Silver Bay Clinic Ltd.,
Silver Bay, Minnesota 55614

DDH/mj

ASARCO ALV 0002667

BIBLIOGRAPHY

1. Smith, W. E. "Biological Effects of Drinking Water with and without addition of various minerals." Personal report to Reserve Mining Company, 1976.
2. Clark, Terrence C. and Harrington, Vernon A. "Taconite Dust Exposure and Respiratory Abnormalities," presented to St. Mary's Hospital Staff, July, 1977.
3. McDonald, J. C., Gibbs, G. W., Liddell, F.D.K., and McDonald, A. D. "Mortality after long exposure to Cummingtonite-Grunerite," presented at the American Thoracic Society Annual Meeting in San Francisco, June 17th, 1977.
4. Bristol, Leonard J. "Personal Communication to the Author."
5. Morgan, Russell H. "Personal Communication to Mr. MacLay R. Hyde."
6. Masson, Thomas J., McKay, Frank W., Miller, Robert W. "Asbestos-Like Fibers in Duluth Water Supply, Relation to Cancer Mortality." JAMA, May 20, 1974.
7. Sigurdson, Eunice E., Mandel, Jack., McHugh, Richard., Levy, Barry S., Jagger, Helen., Knorr, Robert., Laudon, Emaline and Pearson, John. "Incidence of Gastrointestinal and Lung Cancer in Residents of Duluth, Two Harbors, Beaver Bay, and Silver Bay 1968-1974." presented to the Duluth Medical and Lay Community March 21, 1977.
8. Gillan, J. D., Dement, J. M., Lenen, R. A., Wagoner, J. K. Archer, V. E., and Blejer, H. P. Mortality patterns among hard rock gold miners exposed to an asbestiform mineral. Ann. N.Y. Acad. Sci. 271, 336-344 (1976).
9. Wright, G. W. and Kuschner, M. "The Influence of Varying Lengths of Glass and Asbestos Fibers on Tissue Response in Guinea Pigs." Unpublished report.
10. Stanton, Mearl F. and Wrench, Constance. "Mechanisms of Mesothelioma Induction with Asbestos and Fibrous Glass." Journal National Cancer Institute 48: 797-821, 1972.
11. Morgan, A. "Fibre Dimensions: Their Significance in the Deposition and Clearance of Inhaled Fibrous Dusts." presented at the Society for Occupational and Environmental Health, Washington, D. C. 1977.
12. Davis, J.M.G. "Current Concepts in Asbestos Fibre Pathogenicity." presented at the Society for Occupational and Environmental Health, Washington, D. C. 1977.
13. Bignon, J., Sebastien, P., Gaudicher, A., and Bonnaud, G. Measurement of asbestos retention in humans related to health effects. U. S. Bureau of Standards Meeting on Asbestos, Gaithersburg, Maryland (1977)
14. Banovetz Letter to Doctor Palekar See enclosed copy.
15. McDonald, J. Corbett, McDonald, Alison D., Gibbs, Graham W., Siemiatycki, Jack and Rossiter, Charles E. "Mortality in the Chrysotile Asbestos Mines and Mills of Quebec." Archives of Environmental Health, Volume 22, June 1971.
16. Friedrichs, K. H. "Morphological Aspects of various Fiber Collectives." presented at the Society of Occupational and Environmental Health Symposium, Washington, D. C. 1977.

17. Smith, Wm. E., Hubert, D. D., Miller, L., Badollet, M.S., and Churg, J. "Tests 1. Threshold Levels of Carcinogenicity of Asbestos." Internationale Konferenz ueber die biologischen Wirkungen des Asbestos. Dresden 1968, Pp 317.
18. Smith, William E. "Experimental Studies on Biological Effects of Tremolite Talc on Hamster." Presented at the Symposium on Talc Dust Hazards, U. S. Bureau of Mines, Washington, D. C. May 8, 1973.