WV-0177 #15

PLAINTIFF'S EXHIBIT

UC-2633

environmental facts

HEALTH EFFECTS OF ASBESTOS*

Dr. Irving Selikoff currently is Professor of Medicine and Director of the Environmental Laboratory at the Mount Sinai School of Medicine in New York, and one of the world's foremost experts on the health effects of asbestos fibers.

It can be concluded from the testimony of Dr. Selikoff that: 1) Exposure to asbestos fibers can and does produce significant and detrimental changes in the human body. 2) Although the heavier the exposure the more likelihood there is of contracting asbestosis, even low level exposure to asbestos fibers can and does produce detrimental changes in the human body. 3) There is no known safe limit of exposure, below which it can be said that no detriment to the body will result. 4) The detrimental changes produced by exposure to asbestos will not be manifested in a detectable way until 20 to 30 years after the initial exposure.

Whether the fibers are classified as commercial asbestos or not is really not important. Asbestos is a generic term for a number of hydrated silicates that, when crushed or processed, separate into flexible fibers made up of fibrils. A serpintine mineral, chrysotile and the amphiboles, amosite, crocidolite, are used commercially as asbestos. Actinolite, tremolite and anthophyllite have additional commercial uses. Exposure to each of the minerals listed above can produce cancer in man. The cancers appear in various areas of the body, including the larynx, lung, pleura, peritoneum and gastro-intestinal tract.

In 1971, the National Academy of Sciences Committee on Biological Effects of Atmospheric Pollutants convened a distinguished panel to address the health problems associated with asbestos. After due deliberation, the panel published a report that reached the conclusion that no type of asbestos can be regarded as free from hazard.

The evidence in this case clearly indicates that the ingestion of amphibole or asbestos fibers creates a hazard to human health. Furthermore, once fibers are ingested they have the ability to pass through membranes and find their way to various parts of the body.

While many fibers ingested or inhaled into the body may pass through the body systems and be expelled, obviously some remain in the body. Carcinogens such as asbestos are stored by the body; their effects are often cumulative and irreversible.

*This selected material is taken verbatim from the April 20, 1974 MEMORANDUM AND ORDER issued by the U.S. District Court, District of Minnesota, Fifth Division in the case of United States of America, et al. VS Reserve Mining Company, et al. Words in parentheses are inserted to clarify context only.

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Based on the record in this case which reflects the top scientific and medical input in this area today, it cannot be said that the (asbestos) fibers less than five microns in length* are more or less dangerous than the larger fibers. Although long fibers can be ingested, it is the shorter thinner fibers which penetrate most deeply in the lungs. It may well be that the shorter fibers actually are more carcinogenic than the longer fibers.

Forty-five to fifty percent of asbestos workers die of cancer, whereas in the general population 15 to 20 percent die of cancer.

Exposure to asbestos by simply living in the household of an asbestos worker has been associated directly with the disease. Mesothelioma (a fatal disease peculiar to asbestos exposure) in the Patterson, New Jersey (asbestos) plant was not limited to those occupationally exposed to amosite asbestos. The office manager died of mesothelioma as did the general manager. Likewise, an engineer and the chief engineer's daughter who used to handle asbestos products brought home by her father died of mesothelioma.

Epidemiological studies in several countries have demonstrated an association between diseases and relatively light neighborhood and household exposure to asbestos.

There are substantial differences in the considerations that might go into setting a standard for an occupational setting as opposed to a community setting. Contamination in the community exposes the health and unhealthy alike to the problems associated with asbestos contamination. The residents in the community lack the ability to make a choice about whether or not they wish to be exposed; they are a captive lot whose only alternative would be to move to another area in the state. Furthermore, they are subjected to contamination 24 hours a day, every day of the year, and their exposure begins at birth.

The levels of fibers in the Duluth water and that of other cities is such to give rise to the conclusion that, given the variabilities of measurement, the residents of these communities may ingest as many fibers as do asbestos workers. When appropriate comparisons are made it cannot be said that industrial exposure found to cause gastrointestinal cancer is greater than the exposure of the people in Duluth.

There is a significant concentration of asbestos-like fibers in the ambient air as a result of the Reserve operation and these numbers are comparable to those that were found to have been associated with disease in other environmental situations.

* Although amphibole fibers as long as 20 microns have been observed in Duluth water samples, most are less than 5 microns long with many less than 1 micron long. Source: Cook, Philip M., Gary E. Glass and James H. Tucker, "Asbestiform Amphibole Minerals: Detection and Measurement of High Concentrations in Municipal Water Supplies." Science 185:853-855, 6 September 1974.

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WJ-0177 #16

environmental facts

ASBESTOS IN LAKE SUPERIOR*

Reserve Mining Company discharges large amounts of minute amphibole fibers into Lake Superior and into the air of Silver Bay daily. The particles when deposited into the water are dispersed through Lake Superior and into Wisconsin and Michigan. The currents in the lake, which are largely influenced by the discharge, carry many of the fibers in a southwesterly direction toward Duluth and are found in substantial quantities in the Duluth drinking water. Many of these fibers are morphologically or chemically identical to amosite asbestos and an even larger number are similar to amosite asbestos. Exposure to these fibers can produce asbestosis, mesothelioma and cancer of the lung, gastrointestinal tract and kidney. Available evidence indicates that the fibers pose a (health) risk when ingested as well as when inhaled.

At present the court is faced with a situation where a commercial industry is daily exposing thousands of people to substantial quantities of a known human carcinogen. Emphasis is placed upon the fact that the Court is not dealing with a situation in which a substance causes cancer in experimental animals where the effect on humans is largely speculative. Fibers identical and similar to those emitted from Reserve's plant have been directly associated with a marked increase in the incidence of cancer in humans.

Next to magnetite and quartz, cummingtonite-grunerite is generally the most abundant mineral throughout the iron formation on the East Mesabi district in which Reserve's Peter Mitchell Pit is located, except, of course, where other metamorphic silicates have already developed. In many parts of the upper slaty and cherty, where Reserve mines, cummingtonite-grunerite commonly exceeds 50% of the rock.

Reserve knew as early as 1969 that the Peter Mitchell Pit contained "asbestos". This particular material was the commercial type asbestos.

One of the issues in this case is whether or not the amphibole minerals mined in the Peter Mitchell pit are "identical to" or "similar to" amosite asbestos. It must be noted that asbestos is a commercial term that has no independent mineralogical or geological significance. Amosite, too, is a trade name and a non-mineralogical term, for certain fibrous minerals in the cummingtonite-grunerite range that have commercial importance. Amosite does not indicate a specific mineral composition; it has a range of mineral compositions with a range in bulk chemistry.

Scientists for both sides have found that cummingtonite-grunerite and amosite have in most instances similar morphology, crystallography and chemistry and are, therefore, indistinguishable.

It is sufficient to say that in Reserve's discharge into both the air and water there are fibers within the cummingtonite-grunerite range of fibrous amphiboles and within this number there are fibers that have the identical morphology, crystallography and chemistry as amosite asbestos, a known human carcinogen.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL RESEARCH LABORATORY DULUTH, MINNESOTA

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While there is a dose-response relationship associated with the adverse effects of asbestos exposure and there may be a threshold exposure value below which no increase in cancer would be found, this exposure threshold is not now known.

It has been clearly established in this case that Reserve's discharge creates a serious health hazard to the people exposed to it. The exact scope of this potential health hazard is impossible to accurately quantify at this time. Significant increases in diseases associated with asbestos exposure do not develop until 15 to 20 years after the initial exposure to the fibers.

The state of the scientific and medical knowledge available in this area is in its early stages and there is insufficient knowledge upon which to base an opinion as the magnitude of the risks associated with this exposure. The fact that few fibers have been found in the tissue of certain deceased Duluth residents may indicate that the general contamination of the community of Duluth has not yet reached alarming proportions. Unfortunately, the real answer to this problem will not be available until some ten to twenty years from this date when the health experience of those exposed to the fibers emitted from Reserve's plant is reviewed.

Reserve dumps 67,000 tons of tailings waste into Lake Superior each day.

To get some idea of the immense size of Reserve's operations and the lake discharge, it should be compared with the total amount of solids which naturally enter all of Lake Superior from streams and shore erosion each day which is approximately 12,000 tons (plus or minus 6,000 tons) per day. Reserve's contribution to the suspended solid concentration in Lake Superior would be five to six times larger than the suspended solids entering the lake from all of its natural sources. Clearly, Reserve's discharge is the singularly more significant input of suspended solids into Lake Superior.

The evidence in the case indicates that the daily profit in the operation at Reserve is in the neighborhood of $60,000.00 per day. In other words, for every dollar Armco and Republic (the owners of Reserve) initially invested in Reserve, they get back ninety cents each year the plant remains in operation.

The testimony adduced at the trial was to the effect that (with product improvement) Reserve, Republic and Armco could afford at the very least a $180,000,000 to $200,000,000 capital outlay with reasonably associated operating costs without substantially changing their economic situation as to profitability, intra-industry position, interest coverage, bond rating, etc. The evidence is clear that Republic and Armco are two of the largest corporations in this country. They are prosperous now and would remain prosperous even after the necessary alterations (in tailings disposal) are made.

Defendants have the economic and engineering capability to carry out an on-land disposal system that satisfies the health and environmental considerations raised. In essence they have decided to continue exposing thousands daily to a substantial health risk in order to maintain the current profitability of the present operation and delay the capital outlay (with its concommitant profit) needed to institute modifications.

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WV-0177 #17

UNION CARBIDE CORPORATION 39 Old Ridgebury Road, Danbury, CT 06817
Chemicals & Plastics Group - P2

RECEIVED
MAR 24 1987
Medical Dept.

March 17, 1987

To: R. G. Rowe, M.D.
Tech Center
Location 511

Subject: Asbestos Medical Questionnaire

In response to your letter dated March 5, 1987, the answer to your inquiry is as follows:

(1) The OSHA Asbestos Standard mandates the use of the Initial and Periodic Questionnaires in their entirety.

(2) The MRMS Asbestos Workers Health Survey Questionnaire will not suffice and its use will not enable compliance with the OSHA Asbestos Standard.

I realize that the OSHA quesionnaires are more detailed than the MRMS version and I would suggest that it be administered by a nurse or technician at the time of the examination to avoid misunderstanding of the questions and invalid answers. One of the biggest problems in determining standards based upon dose-response relationships and clinical assessment of dose-effects is the lack of sound clinical data. The use of a standardized questionnaire should help to improve the quality of this data and I urge you to do all you can to get employee cooperation in its completion.

H. C. Lewinsohn, M.D.

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