Rachel’s Environment & Health News  
#444 - A Carcinogen That’s Everywhere  
May 31, 1995

An industrial process for making glass fibers was first patented in  
Russia in 1840.[1, pg.292] At the Columbian Exposition in  
Chicago in 1893, Edward H.田和® Klauder exhibited needle-shaped,  
thread-like rods of glass, which nature does not make but  
people can. The pleura is the outer casing of the lungs; cancer of  
the pleura is called mesothelioma and it is caused by asbestos  
fibers. The International Agency for Research on Cancer (IARC),  
of the World Health Organization, listed fiber glass as a "probable  
[human] carcinogen" in 1987. In 1990, the members of the U.S.  
National Toxicology Program (NTP) --representatives of  
10 federal health agencies --concluded unanimously that fiber glass  
"may reasonably be anticipated to be a carcinogen" in humans.[3] NTP  
members were considering that fiber glass "may reasonably be  
anticipated to be a carcinogen" in humans.[3] NTP  
members were preparing to list fiber glass that way in the  
SEVENTH ANNUAL (1992) REPORT ON CARCINOGENS,  
the NTP’s annual listing of cancer-causing substances, which is  
mandated by Public Law 95-622. But industry intervened  
politically.

As we reported in REHW #367, four major manufacturers of fiber  
glass insulation campaigned for three years to prevent their product  
from being labeled a carcinogen by NTP (see REHW #367). They  
managed to delay the publication of the NTP’s SEVENTH  
ANNUAL REPORT ON CARCINOGENS for more than two  
years, but on June 24, 1994, the Secretary of Health and  
Human Services (HHS), Donna E. Shalala, sent the report to  
Congress, thus making it official policy of the U.S. government  
that fiber glass is "reasonably anticipated to be a carcinogen." In  
the U.S., fiber glass must now be labeled a carcinogen.

Fiber glass is now used for thermal insulation of industrial buildings  
and homes; as acoustic insulation; as fireproofing; as a reinforcing  
material in plastics, cement, and textiles; in automotive  
components; in gaskets and seals; in filters for air and fluids; and  
for many other miscellaneous uses. More than 30,000 commercial  
products now contain fiber glass.

As asbestos has been phased out because of health concerns, fiber  
glass production in the U.S. has been rising. In 1975, U.S.  
production of fiber glass was 247.88 million kilograms (545.3  
million pounds); by 1984 it had risen to 632.88 million kilograms  
(1392.3 million pounds).[1, pg.302] If that rate of growth (10.4%  
per year) held steady, then production of fiber glass in the U.S. in  
1995 would be 4365 million pounds.

Fiber glass is now causing serious health concerns among U.S.  
officials and health researchers. As we reported in REHW #74, in a  
series of papers published from 1969 to 1977, Dr. Meafel F.  
Stanton of the National Cancer Institute found that glass fibers  
less than 3 micrometers in diameter and greater than 20 micrometers in  
length are "potent carcinogens" in rats; and, he said in 1974, "it is unlikely  
that different mechanisms are operative in man." Micrometers are  
a millionth of a meter (and a meter is about three feet). Since  
that time, studies have continued to appear, showing that fibers of this  
size not only cause cancer in laboratory animals, but also cause  
changes in the activity and chemical composition of cells, leading to  
changes in the genetic structure and in the cellular immune system.  
Although these cell changes may be more common (and possibly  
more important) than cancer, it is the cancer-causing potential of  
glass fibers that has attracted most attention.

In 1970, Dr. Stanton announced that "it is certain that in the pleura  
of the rat, fibrous glass of small diameter is a potent carcinogen."  
The pleura is the outer casing of the lungs; cancer of the pleura in  
humans is called mesothelioma and it is caused by asbestos fibers.  
Stanton continued his research and showed that when glass fibers  
are manufactured as small as asbestos fibers, glass causes cancer in  
laboratory animals just as asbestos does.[4] Asbestos is a potent  
human carcinogen, which will have killed an estimated 300,000  
American workers by the end of this century.[5] The finding that  
fiber glass causes diseases similar to asbestos was chilling news in the  
early 1970s, and an additional 25 years of research has not made  
the problem seem less serious. Workers in glass fiber  
manufacturing plants are exposed to concentrations of fibers far  
lower than the concentrations to which asbestos workers were  
exposed, yet several industry-sponsored epidemiological studies of  
fiber glass workers in the U.S., Canada, and Europe have reported  
statistically significant increases in lung cancer.[6]

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Fiber glass --a material that nature does not make --is now  
measurable everywhere in the air. The air in cities, rural areas,[1,  
pgs.311–314] and remote mountain tops[4] now contains  
measurable concentrations of fiber glass. If the dose-response curve  
is a straight line (that is to say, if half as much fiber glass  
half as much cancer) and if there is no threshold dose (no dose  
below which the cancer hazard disappears), then exposing the  
Earth’s 5.7 billion human inhabitants to low concentrations of  
fiber glass will inevitably take its toll by causing excess cancers in some  
portion of the population.

According to OSHA researchers, an 8-hour exposure to 0.043 glass  
fibers per cubic centimeter of air is sufficient to cause lung cancer  
in one- in-every-thousand exposed workers during a 45-year  
working lifetime.[8, pg.580] In rural areas, the concentration of  
fiber glass in outdoor air is reported to be 0.00004 fibers per cubic  
centimeter, about 1000 times below the amount thought to endanger  
one-in-every-thousand fiber glass workers.[1, pg.314] But people in  
rural areas breathe the air 24 hours a day, not 8 hours. Furthermore,  
a human lifetime is 70 years, not the 45 years assumed for a "work  
lifetime." Moreover, one-in-a-thousand is not adequate protection for  
the general public; U.S. Environmental Protection Agency uses  
one-in-100,000 or one-in-a-million as a standard for public  
exposures. (And, finally, in urban air, there’s 10 to 40 times as much  
fiber glass as in rural air.) Therefore, the amount of fiber glass in  
the outdoor air in the U.S. and Europe (and presumably elsewhere)  
already seems higher than prudent public health policies would  
permit. Assuming a straight-line dose-response curve and no  
threshold, we believe there is ample reason to be concerned about  
the human health hazards posed by fiber glass in the general  
environment. (And this says nothing about the hazards to wildlife.)
It has been 25 years since researchers at the National Cancer Institute concluded that fiber glass is a potent carcinogen in experimental animals. During that time, additional research has confirmed those findings again and again. During the same period, the amount of fiber glass manufactured has increased rapidly year after year. Ninety percent of American homes now contain fiber glass insulation. All of this fiber glass will eventually be released into the environment unless special (and very expensive) precautions are taken to prevent its release. We believe the likelihood of Americans taking such precautions is nil. Billions of pounds of fiber glass now in buildings will eventually be dumped into landfills, from which it will leak out slowly as time passes. Elevated concentrations of fiber glass are already measurable in the air above landfills today.[4]

In 1991, Patty's INDUSTRIAL HYGIENE AND TOXICOLOGY, a standard reference book on work-place safety and health, said about fiber glass, "...it is prudent for industrial hygienists to treat these materials with the same precautions as asbestos." [1, pg. 324] How do we treat asbestos? In the U.S., all new uses of asbestos have been banned. A ban of fiber glass is long overdue.

---Peter Montague


[3] The annual list of carcinogens is drawn up by an inter-agency Working Group for the Annual Reports on Carcinogens, which includes representatives from the Agency for Toxic Substances and Disease Registry (ATSDR); the Centers for Disease Control (CDC); the National Institute for Occupational Safety and Health (NIOSH); the Consumer Product Safety Commission (CPSC); the U.S. Environmental Protection Agency (EPA); the Food and Drug Administration (FDA); the National Cancer Institute (NCI); the National Institute of Environmental Health Sciences (NIEHS); the National Library of Medicine (NLM); and the Occupational Safety and Health Administration (OSHA).


Special thanks to the advocacy organization, Victims of Fiberglass (VOF), for keeping us informed about these issues over the years. VOF publishes an excellent newsletter, FIBERGLASS ROOTS OF CANCER; contact Bob Horowitz, Victims of Fiberglass, P.O. Box 894, Bryte, CA 95605-0894; phone (916) 371-0656.

Descriptor terms: fiber glass; man-made mineral fibers; carcinogens; cancer; lung cancer; studies; epidemiology; energy conservation; insulation; asbestos; iarc; who; world health organization; ntp; victims of fiberglass; hhs; osha;