Testimony of Barry Castleman, ScD, Environmental Consultant, before the U.S. Senate Committee on Environment and Public Works, June 12, 2007

Members of the Committee, thank you for inviting me to testify about public health issues related to asbestos exposure in America today. I have worked on public health issues surrounding asbestos for 35 years, including product bans at the Consumer Product Safety Commission and regulations at EPA, OSHA, and FDA. My bachelor's degree is in chemical engineering, my masters is in environmental engineering, and my doctorate is in public health policy from the Johns Hopkins School of Hygiene and Public Health. I will discuss public health issues related to present asbestos hazards and banning asbestos in the US.

Background

The public health and corporate history of asbestos were the subject of my doctoral thesis and a 900-page book (*Asbestos: Medical and Legal Aspects*). The book is in its 5th edition and has been cited in judicial opinions up to the Supreme Court. I have testified about this history as an expert witness in courts across this country since 1979.

It is tragic that so much of the public health catastrophe we are seeing now was not only foreseeable but foreseen long ago. The cancer hazard of breathing asbestos dust was noted in *The New York Times, Business Week, Scientific American,* and *Newsweek* all before this time in the year 1950. But it would not be until after social developments led Congress to establish the EPA, OSHA, and NIOSH in 1970 that workers and the public were first protected from or even warned about the dangers of most asbestos products. So it was not until 1973 that our use of asbestos peaked, at around 800,000 metric tons. US consumption of asbestos for the year 2006 was down to around 2000 metric tons, approximately the amount we used each day in 1973.

Americans are now dying from asbestos cancers and asbestosis at the rate of 10,000 per year, as a result of past asbestos use. That is more than one death per hour. The medical literature is replete with tragic cases of mesothelioma in people with minimal occupational and environmental exposures to asbestos. The World Trade Organization has rejected the idea that there is really such a thing as "controlled use" of asbestos, citing do-it-yourself home repair as a prominent example of something no government can make safe through regulations. Starting in the early 1980s, Sweden and other countries pressed manufacturers to substitute asbestos in vehicle brakes so they could impose national asbestos bans.

The US EPA tried to phase out the major uses of asbestos in regulations published in 1989, but the rules were overturned in a court challenge. EPA was unable to persuade the Department of Justice to appeal the court's 1991 decision, leaving the matter to Congress to resolve.

U.S. Asbestos Use Today

The main problem now is imported asbestos products, commercial asbestos product manufacture is almost extinct in the US. Because there is practically no restriction on what can be sold with asbestos in the US, we continue importing asbestos-containing brake linings, asbestos gaskets,

asbestos yarn and thread, etc., despite the fact that these products are no longer made in the US. Given the abject lack of OSHA enforcement of asbestos product labeling requirements, there is a real concern that some imported asbestos products are not even labeled with the required health warnings.

The last US asbestos mine closed in 2002. US consumption of commercial asbestos in domestic manufacturing seems to be limited now to roofing felts and related products, and chlorine manufacturing (see below). No asbestos roofing products are needed or allowed in the many countries of Europe where asbestos has been banned for over 10 years (e.g., Sweden, Germany, Italy, France, Denmark, Holland), and alternative non-asbestos roofing products are widely available here. US brake manufacturers no longer use asbestos, and the auto industry has already stopped using asbestos brakes in new vehicles and replacement parts throughout Europe and elsewhere.

Asbestos Exposure in Chlorine Manufacturing

Asbestos has long been used in the diaphragm-cell process for making chlorine. This process and the old mercury-cell process are still operated, although a newer and more environmentally and technically superior membrane-cell process has been the only type built anywhere in the world for the past 20 years. Some diaphragm and mercury cell plants have been converted to membrane cells. Power requirements are substantial for chlorine manufacture, and the membrane cell process requires 15-20% less energy than diaphragm cells.

Asbestos exposures in the chlorine industry arise from transport and storage of sacks of asbestos, typically involving tears in the sacks that must be identified and sealed, with spillage cleaned with high-efficiency vacuum filters. Cutting open and emptying sacks of asbestos and transferring asbestos into slurry mixing tanks can cause additional exposures. The empty sacks are an additional exposure source, they must be carefully gathered up, placed in sealed containers, and landfilled at approved sites. Storage and handling of partially used sacks are also sources of exposure. If the slurry is spilled, this has to be meticulously cleaned up right away, because once it dries it becomes a source of airborne asbestos exposure. Handling and storage of prepared or purchased pre-deposited asbestos diaphragms can cause additional exposures. Hydro-blasting for removal/replacement of asbestos diaphragms is another possible source of area contamination, drying, and airborne exposure. The water used for hydro-blasting has to be contained and the asbestos filtered from it. The waste asbestos from this water and the spent diaphragms have to go to a landfill that accepts asbestos.

To some degree, workers can be protected against these asbestos exposures if they wear respirators that will remove some of the asbestos from the air they breathe, and if they wear personal protective clothing such as disposable coveralls. But these safeguards are partial. The respirators must be fit-tested and properly maintained; and even the protective clothing is a hazardous waste that requires special precautions for disposal. Chlorine Institute pamphlet 137, *Guidelines: Asbestos Handling for the Chlor-Alkali Industry*, recommends personal protective clothing and respirators only for workers exposed in excess of the permitted limits in the OSHA standard, which is all that is legally required. But OSHA has admitted that compliance with its

limits will not fully prevent deaths from asbestos. Dr. Richard Lemen and NIOSH epidemiologists estimate that exposure at OSHA's permissible exposure limit for asbestos will still cause 5 deaths from lung cancer and 2 deaths from asbestosis in every 1000 workers exposed for a working lifetime. (L. Stayner et al., Exposure-Response Analysis of Risk of Respiratory Disease Associated with Occupational Exposure to Chrysotile Asbestos. *Occ. Env. Med.* 54: 646-652, 1997).

While company manuals may state that the workers are supposed to observe various precautions to minimize asbestos exposure, there is virtually no OSHA inspection of these workplaces, and the usual combination of production demands, Gulf coast heat and humidity, and carelessness will assure that things are not always done "by the book" to minimize workers' asbestos exposure.

In the past 15-20 years, non-asbestos diaphragms have become available for relatively simple replacement in asbestos diaphragm cell plants. These are sold by Eltech/DeNora and PPG Industries in the US. The non-asbestos diaphragms cost more and last longer than asbestos. Although two-thirds of the chlorine made in the US in 2006 was from diaphragm cells, I don't know how many of these used non-asbestos diaphragms. The technology continues to advance, however, and has had wide acceptance in Europe, where the European Union's temporary exemption allowing asbestos use in chlorine manufacturing comes up for reconsideration next year. I understand that there are only 3 chlorine plants in Europe still using asbestos diaphragms.

PPG Industries has been a leader in the development of non-asbestos "Tephram" diaphragms, and PPG is also a major producer of chlorine in the US. I understand that PPG routinely replaces non-asbestos Tephram diaphragms in its asbestos diaphragm-cell units when they are taken down for periodic maintenance. I do not know of any technical reasons why other diaphragm-cell chlorine manufacturers could not do the same thing.

Therefore, if chlorine manufacturers want extra time to convert to non-asbestos technology, perhaps that could be allowed but with the requirement that when the equipment is shut down for maintenance overhauls, the new diaphragms used be non-asbestos. A similar several-year time frame might be allowed for diaphragm-cell units that manufacturers want to convert to membrane cells.

Contaminant-Asbestos in Talc, Vermiculite, Stone, and Other Minerals

1. Talc

Aside from commercial asbestos minerals that have been used for the past century in various products, asbestos also occurs as a contaminant in other minerals. This has been long recognized, and at times the occurrence of asbestos fibers in these products has even been noted in advertisements for them. For example, it was repeated that "asbestiform varieties are common" in a 1966 brochure describing NYTAL, the trade name for a talc mined in New York by R. T. Vanderbilt Company.

Health officials had long ago noted that New York talc miners were dying from lung scarring, including asbestos bodies in the scarred lung tissues and pathology "similar to [findings] reported in asbestosis." (FW Porro et al., Pneumoconiosis in the Talc Industry. *Am. J. Roent. Radium Therapy* 47: 507-524, 1942. Quote from FW Porro et al., Pathology of Talc Pneumoconiosis with Report of an Autopsy. *North. N. Y. Med. J.* 3: 23-25, 1946). New York state labor protection officials noted that other writers had attributed talc lung scarring to the fibrous varieties of talc, and observed that, for New York talc miners, "In general, the clinical, [chest X-ray], and pathological findings were similar to those observed in asbestosis." (M Kleinfeld et al., Talc Pneumoconiosis. *Arch. Ind. Health* 12: 66-72, 1955; M Kleinfeld et al., Talc Pneumoconiosis/A Report of Six Patients with Postmortem Findings. *Arch. Env. Health* 7: 101-115, 1963) So it should have come as no surprise that these talc miners also had an excessive death rate from cancers of the lung and pleura (M Kleinfeld et al, Mortality among Talc Miners and Millers in New York State. *Indust. Hyg. Review* 9: 3-12, 1967).

Starting in 2002, there have been published reports of cases of mesothelioma, considered a signal tumor for asbestos exposure, among New York talc miners. An epidemiology report sponsored by R. T. Vanderbilt Company found 2 cases among the 782 white men who had been employed for at least one day at the New York talc mines between 1948-1989 (Y Honda et al., Mortality among Workers at a Talc Mining and Milling Facility. *Ann. Occup. Hyg.* 46: 575-585, 2002) R. T. Vanderbilt Company has stipulated that, subsequent to the period covered in this study, at least 5 more cases of mesothelioma have occurred among its employees (*Hirsch vs. RT Vanderbilt Co.* Middlesex Co. NJ Superior Court, Nov. 2, 2006). It appears that some of these cases were the subject of workers' compensation claims.

Meanwhile, independent pathologists reported finding at least 8 confirmed cases of mesothelioma among New York state talc miners and millers as of 1986, and added 5 new cases (MJ Hull et al., Mesothelioma among Workers in Asbestiform Fiber-bearing Talc Mines in New York State. *Ibid.* Suppl. 1, 132-136, 2002) Commercial amphibole asbestos fibers were virtually absent in the lung tissues of all 10 cases subjected to pathological examination, indicating that other occupational asbestos exposures (e.g., in construction) were not responsible for these mesotheliomas of these workers.

R. T. Vanderbilt denies that there is asbestos in its talc and that its talc causes asbestos diseases. It is interesting to read internal memoranda of the Johns-Manville Corporation, the country's largest asbestos company, shortly after J-M bought a talc mine in the early 1970s. J-M's talc had asbestos in it, and J-M labeled it accordingly, pursuant to the 1972 OSHA asbestos regulations. This upset executives at Vanderbilt, who claimed that J-M placing asbestos warnings on containers of talc was causing a "big stink" and "irreparable damage" to Vanderbilt in 1974. J-M laboratories proceeded to examine the Vanderbilt talc product grades microscopically. Their comments on what they found were expressed in internal memos that only came to light in recent years, after the consummation of the J-M bankruptcy plan in 1988.

The J-M people found plenty of asbestos in the New York talc and used very strong language about Vanderbilt's insistence that there was no asbestos in its talc:

> It is apparent that the R. T. Vanderbilt presentations to OSHA, NIOSH, FDA, MESA, etc. are based on something less than the truth. I feel it difficult to believe that they could be so grossly misinformed as to what their materials really are.
> (RS Lamar, J-M Internal Correspondence, Oct. 11, 1974)

> The R. T. Vanderbilt position with respect to labeling must be deliberately perfidious; they cannot be this misinformed. Slim Thompson, their technical director, has a Ph.D. in mineralogy. At the moment, Vanderbilt is misleading their customers and confusing ours with the decision not to label. Ultimately, the truth will out, and they will be forced to label.
> (RS Lamar, "An Assessment of the J-M Position with Talc," J-M Internal Correspondence, Mar. 20, 1975)

The truth still hasn't won out, I am sorry to say. Fully 32 years after this was written by a morally offended official at the largest asbestos corporation in America, R. T. Vanderbilt still sells talc that they say has no asbestos hazards.

As a result, this talc is used commercially in an unknown number of industrial processes and consumer products, endangering thousands, perhaps millions, of unwitting workers, consumers, and children. Along with two other scientists, I filed a complaint with the Consumer Product Safety Commission about Durham's Water Putty, a product sold across the country in Ace Hardware stores, because it exposes users to airborne asbestos arising from the product's ingredient of Vanderbilt talc (Jan. 29, 2007). The Center for Environmental Health, in Oakland, filed a complaint last month with the California Attorney General's Office, asserting that Durham's product has violated state law because it has been sold without cancer warning labeling. The Connecticut Department of Public Health filed another complaint with CPSC about asbestos hazards to school children from Vanderbilt talc in art clay products (Feb. 6, 2007). In 2006, a jury awarded $3.3 million to the estate of a New Jersey potter, finding that Vanderbilt's talc was a substantial cause of his death. Only Vanderbilt knows what other commercial uses and products expose the American people to this talc.

The people in this country urgently require the government's protection against the sale of such products by manufacturers who prefer to play semantic games over what mineralogists and government regulations call "asbestos", while people continue to be unknowingly exposed to mortal peril. The grossly excessive number of mesotheliomas among the New York talc mine and mill workers is very powerful evidence that this material is lethal and should be regulated as asbestos and banned when asbestos is banned.

2. Vermiculite

We have seen this suppression of contaminant-asbestos health warnings in other cases. WR Grace sold vermiculite insulation that was contaminated with asbestos until 1990, ultimately placing it in millions of homes in the US and Canada. The company had been called the Vermiculite and Asbestos Corporation when it opened in 1919, and Montana State Board of Health reports on the high asbestos exposures of the workers were sent to the company in the 1950s and 1960s. WR Grace sold this material without applying OSHA asbestos warning labels

first required in 1972. By 1985, a "Personal and Confidential" memo reviewed the serious business problems from Grace continuing to sell vermiculite products that contained asbestos (RC Walsh, Feb. 2, 1985). Noting the difficulty of continuing to obtain insurance, one of the parties to this exchange commented that this "increases attractiveness of setting business up as a subsidiary or some other legal form to distance it from Grace assets." Criminal proceedings are currently pending against Grace executives for selling this product as they did, but it was a public health failure that the government had not taken earlier action to prevent the widespread sale and exposure of millions of people to this deadly product. (A. Schneider, Big Asbestos Prosecution in Jeopardy, US Argues. *Seattle Post-Intelligencer*, June 5, 2007) http://seattlepi.nwsource.com:80/local/318479_grace05.html?source=rss

Vermiculite is still mined in the US by Virginia Vermiculite. Mine Safety and Health Administration (MSHA) officials have raised concern about asbestos exposure of workers at this site and at plants receiving and processing this material. Vermiculite has been widely used in such products as potting soil, insulation, and cat litter.
(A. Schneider, Virginia Miners at Risk from Asbestos. *Seattle Post-Intelligencer*, Oct. 4, 2000) http://seattlepi.nwsource.com/uncivilaction/asb04.shtml

3. Stone

Asbestos can also be present in basic stone used in construction. In 2005, research was published linking residence in areas of California with naturally-occurring asbestos outcrops and increased risk of mesothelioma (Pan et al., *Am. J. Resp. Crit. Care Med.* Oct. 2005). Dr. Marc Schenker, one author of this study, expressed concern about the health hazard faced by people with environmental exposure in areas where land development was proceeding in El Dorado County, California, and other areas where asbestos minerals are known to be present in the soil in significant amounts. http://www.medicalnewstoday.com/medicalnews.php?newsid=32149

What is needed is a process whereby the EPA does surveillance of possible sources of contaminant-asbestos around the country, starting with Vanderbilt talc and Virginia Vermiculite, using USGS mineral survey maps to help identify hot spots. Then, as operations of concern are discovered, there needs to be a process of investigation, first for the government to realistically sample the products of these operations and do bulk sample analysis. Then, if there is any concern over public and worker exposure, the company should have to disclose its commercial customer list to EPA. EPA could then contact the customers to see how the material is handled, ask what products it is used to make, and assess what asbestos exposures result for workers, consumers, and people living where the stuff is shipped, processed, and put to end use. In annual reports, EPA should disclose what operations it has under investigation, and summarize the state of these investigations, describing the commercial uses of the suspect materials. And of course, the EPA needs the authority to close operations and stop the sale of products that are deemed a threat to public health.

Broad Support for Banning Asbestos in the US and International Implications

A statement in support of the Ban Asbestos in America Act of 2007 has been endorsed by groups that have been active on asbestos issues for many years in the US and around the world. These include trade unions, leading environmental groups, asbestos victims' groups, and medical and public health groups. I ask that this statement and list of supporters be made a part of the record of this hearing.

You can see that there are many groups from other countries that signed the statement in support of banning asbestos in the US, countries where asbestos is still used and is the subject of public health struggles. I work with people all over the world on asbestos, and everywhere the local asbestos industry points to the US and says, "But asbestos is not banned in the United States." It would be great value to public health workers the world over if the US finally banned asbestos. It would significantly assist efforts in Brazil, India, South Africa, Thailand, and many other countries. So, on behalf of the rest of the world and the people in our country, I urge you to ban asbestos in the US now. It is long past time for the US to take a 21st century position on this issue and catch up to Croatia by banning asbestos.

Barry Castleman, Environmental Consultant, P.O. Box 188, Garrett Park, MD 20896
Tel. 301-933-9097

****