

**Comments of
Professor Richard Wilson
Department of Physics & Center for Risk Analysis
Harvard University
Cambridge, Massachusetts
On the
Proposed Asbestos Ban
Senate Employment and Workplace Safety Subcommittee
Under the
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Modified on March 2nd to include some items actually said (2nd paragraph), and
include the clarification of some points in answers to questions**

These comments are submitted in order to summarize and in some places expand on the letter of February 13th submitted by Dr. Robert P. Nolan and myself.

Mme Chairman, Senators, Ladies and Gentlemen. About 1972 I began careful comparative studies of various risks, both occupational and environmental. I have written many papers on this and a comprehensive approach to the subject is in my book "Risk Benefit Analysis," copies of which I have here. I was immediately appalled at the situation about asbestos. It worried me that the industry position was that a threshold exists, and the US Government, Consumer Product Safety Commission, assumed there is a non-linear dose response relationship. There are fundamental theoretical reasons, enunciated in 1976 by Sir Richard Peto and others, (Crump et al. 1976) that a linear dose response should be the default for almost all carcinogens, depending only on the fact that most of these agents (chemical, radiation, or otherwise) cause cancers, or other medical outcome, indistinguishable from those occurring naturally. Then Taylor's theorem in mathematics applies. I was therefore delighted when his brother Julian Peto of the UK challenged the threshold concept for asbestos at a meeting of the New York Academy of Sciences in 1978. I was also concerned that measurements of airborne asbestos concentrations were often taken in a calm period, whereas the uptake from surface concentrations will rise as the cube of the wind velocity. I was also delighted by the action of Sir Richard Doll of the UK, who in response to Julian Peto's criticism asked Julian to join him in an important report to the UK government in the early 1980s which influenced much of the ensuing policy..

I emphasize that I yield to no one in concern for the victims of the high exposures of the "Bad Old Days". My father died in 1986 of lung cancer. Sir Richard Doll and I went over the numbers carefully and agreed that it was due to cigarette smoking – although he had stopped 41 years before. My grandmother died of lung cancer also - caused I believe in her case by air pollution in the town of Halifax in UK. Some of you will remember the old non-conformist prayer: "from Hell, Hull and Halifax good Lord deliver us". One of

my wife's cousins, an executive at Johns Manville, died of lung cancer – caused no doubt by high asbestos exposures.

In the 1980s everyone became more cautious. The occupational exposure limits were reduced a hundred fold and asbestos was removed from hundreds of locations. There were proposals in the US to ban the use of asbestos entirely which might have been justifiable in the ignorance of 1975. Asbestos has been banned in over 40 countries around the world, but not in the USA. We argue that the time for an absolute asbestos ban has passed. We have used more sophisticated regulatory tools with much success. In 1971 all the commercial asbestos fiber-types were being used in the United States, asbestos consumption was above 500,000 tons per year and the permissible asbestos exposure level was 12 fibers/ml (equal to or great than 5 microns in length) an asbestos ban may have been justifiable as the simplest solution to a huge problem. Since the U.S. Occupational Safety and Health Administration began to regulate asbestos in 1971, we would like to point out the events that have occurred to eliminate any need for an asbestos ban in the United States.

The permissible occupational exposure limit has been reduced to 0.1 fibers/ml over a hundred fold lower than the 1971 asbestos standard and hundreds of times lower than the historical high asbestos exposure levels of the “bad old days” associated with asbestos-related disease. The current US permissible exposure level for asbestos is as low as any in the world. We strongly disagree with statements in the Ban Asbestos Bill indicating the current US permissible exposure level is not safe.

In the late 1970s Federal organization who had been insufficiently cautious before went overboard . The predictions by various federal agencies over the years about the number of Americans who would develop asbestos-related cancers have been consistently lowered. In 1978 Mr. Joseph Califano released a report from the National Cancer Institute and the National Institute of Environmental Health Sciences (completely discredited within a couple of weeks by epidemiologists at a conference in Buenos Aires, although the Council of Environmental Quality still referred to it 18 months later) suggesting that occupational exposures, were the major cause of cancer with asbestos causing 17%. They predicted that 2 million premature asbestos-related cancer deaths would occur over the next thirty years – 70,000 per year. The false assumption was made that any worker exposed to asbestos – even to a small extent - had the same cancer risk as the highest exposed asbestos worker. They also forgot to say that these would almost all be from past exposures (Efron 1984, Wilson and Crouch 2001)

From the 70,000 asbestos-related cancers predicted annually from 1978 to 2008 the proposed legislation reports “that as many as 10,000 American citizens will die each year from mesothelioma and other asbestos-related diseases.” This, we believe, is high. Before the asbestos use there were 400 mesotheliomas a year among men and a comparable number among women. The number went up and peaked at 2000 in men in the year 1990, and is now falling. These are almost certainly due to the high exposures starting in the 1940s till the drop in amphibole asbestos that began in 1980. Since there is a long latency period, often 40 + years for mesothelioma, this makes sense. This makes

a total of about 1700 asbestos related mesotheliomas, falling slowly to zero in about the year 2030 or 2040. Lung cancer has a shorter latency period, and has many other causes, so it is unsure whether there are still many lung cancers caused by past exposures. Perhaps a maximum of 1000 per year, making a total of 1700-3000 cancers per year..

The move to ban all forms of asbestos is not new. In 1979 there was a move for an absolute ban on asbestos. An advanced notice of proposed rule making by the US Environmental Protection Agency appeared on October 17, 1979. That year the total US consumption of asbestos was 560,000 tons compared to 2,000 tons now. Moreover about 6.6% was the very toxic amosite asbestos and crocidolite asbestos. The balance was the less toxic chrysotile asbestos. The final rule prohibiting most asbestos containing products because it “constituted an unreasonable risk to health and the environment” did not appear until 1989 by which time the amphibole asbestos minerals were leaving commerce. And exposure limits were much reduced.

On October 18, 1991 the 5th Circuit Court of Appeal vacated EPA’s proposed ban because the agency had “failed to muster substantial evidence” to support the rule. In 1986 the EPA estimated that a ban on asbestos shingles would “cost \$23-34 million to save 0.32 statistic lives (\$72-106 million per life).” I note that in about the year 2000 EPA instituted (uncontested) a rule suggesting regulation if the cost is less than \$5.6 million per statistical life. The 5th Circuit went on to query why EPA would consider asbestos so dangerous if for example “...over the next 13 years, we can expect more than a dozen deaths from ingested *toothpicks*-a death toll more than twice what the EPA predicts will flow from the quarter billion-dollar bans on asbestos pipe, shingles and roof coatings.”

The Court of Appeal’s decision remanded the matter back to EPA to muster further evidence to support their claim that asbestos exposure constitutes an “unreasonable risk”. Such additional evidence has never been provided by EPA and we would argue that for chrysotile asbestos it does not exist. The Ban Asbestos Bill has not addressed any of the Court of Appeal’s concerns about mustering substantial evidence. In the intervening time it has been shown that controlled use of chrysotile asbestos is feasible and it is happening in many parts of the world (Nolan *et al.* 2001). The “substantial evidence” the 5th Circuit asked for to show that controlled asbestos exposure presents an “unreasonable risk” is not available and we argue that such evidence does not exist (Wilson *et al.* 2001).

Has anything changed to justify the US Senate’s bill to ban asbestos now?

As we re-visit the ban issue 28 years after the first proposal and 16 years after the Court shot it down, much has happened to make a complete ban of asbestos in the US an even less sensible public health policy. One involves the definition of asbestos. The original etymology of the word is from the Greek. It does not burn. That was, of course the most important first use of commercial asbestos. One cannot have a simple chemical definition, because the same chemical appears in two distinct forms. One “asbestiform” has a thin fibrous structure and another a bulk form. There are also cleavage fragments that have not been regulated as asbestos and are almost certainly less toxic. It is

generally agreed that only the first – asbestiform – are legitimately called “asbestos”.and it is the form that is extremely toxic and that has been regulated. There is more controversy about whether to treat all the forms common in 1970 as having the same toxicity because we could not at the time prove that they were different or to consider them differently because they could not be proved to be the same!. Regulators chose the former, but in the intervening time an increasing number of scientists believe that chrysotile is less likely to cause lung cancer than the amphibole asbestos minerals (amosite and crocidolite). For example a quantitative risk assessment by Hodgson and Darnton of the UK Health and Safety Executive appeared in 2000 found a difference of over a factor of 5, although I personally have problems with their modeling because they have a non linear dose response for one of them.

There is even more agreement that chrysotile is much less likely to cause mesothelioma – if indeed it causes it at all. Julian Peto's work on mesothelioma among a cohort in Lancashire UK, exposed to pure chrysotile found none that could be attributed to the chrysotile, and put an upper limit on the potency one fifth of that caused by amphiboles. The most recent estimate based on modeling by Yarborough in 2006 which I do not necessarily support, is that the difference in potency between crocidolite asbestos and chrysotile asbestos for mesothelioma is 500 to 1. Yarborough concluded that the “risk of chrysotile for mesothelioma in most regulatory context reflects public policies, not the application of the scientific method as applied to epidemiology studies.” Yarborough clearly would not support the claim in the Ban Asbestos Bill that the current asbestos permissible exposure limit does not protect workers. Crocidolite asbestos and high exposure to amosite asbestos are probably the major etiological agents in this disease.

I am concerned about the definitions of asbestos used in the Ban Asbestos Bill. They are not specific enough and could be interpreted to include other “non-asbestiform”. materials mentioned above. For example acicular is not a characteristic unique to asbestiform materials. Non-asbestos amphibole fibers can be described as acicular and are not regulated as asbestos by the U.S. Occupational Safety and Health Administration (OSHA). Three minerals are included in the ban which have never been regulated as asbestos – richterite, winchite and erionite. Fibrous erionite, which has been found in natural outcroppings in Turkey and used by the local villagers for a variety of purposes which involved high exposure has designated by the International Agency for Research on Cancer as a human carcinogen (Group 1) but there has never been an erionite related mesothelioma reported in the United States. The two other “durable fibers” mentioned are richterite and winchite which have been described in the vermiculite deposit at Libby, Montana. Neither of these two fiber-types has ever been regulated as asbestos by OSHA. The predominant fiber in Libby is tremolite asbestos. I and others recommend that “asbestiform” be added to the description of both these minerals to increase the precision and that the word acicular be deleted as a characteristic of asbestos. Only then could the definitions in Ban Asbestos Bill be adequate for regulatory purposes.

Consumption of these two amphibole asbestos fiber-types, amosite and crocidolite, started to decline in the 1960s and the US incidence of mesothelioma has been declining

since the 1990s (Weill *et al.* 2004). This updates earlier reports including one by Price and myself (Price and Wilson 2001). This decline is consistent with the idea that the mesotheliomas are caused by past (40 years and more) exposure to these dangerous amphibole asbestos minerals. It is also consistent with the idea, also suggested by epidemiology, that chrysotile asbestos is not known to cause mesothelioma.

US consumption of asbestos has fallen to 2,000 tons of chrysotile asbestos in 2006 which is about ¼ % of the consumption in the mid-1970s. Exposures are much better controlled. Ninety percent of the chrysotile asbestos is used in asphalt roofing products which are not regulated by the U.S. Occupational Safety and Health Administration as an asbestos-containing product because there is no evidence of asbestos release from this matrix.

Less than 17% of the countries around the world have chosen to ban asbestos (most after the EPA ban was vacated in 1991) but worldwide consumption has remained in excess of 2,000,000 tons per annum. Most of the asbestos bans were not total but were to ban certain uses of asbestos while other critical uses such as gaskets to contain corrosive gases in rocket engines and diaphragms for production of chlorine, are allowed. The US Court of Appeal review is unique in that the openness of the US Judicial process allowed for an impartial review of a government led asbestos ban. To our knowledge the issues raised by the 5th Circuit have never been addressed in any country where asbestos has been banned.

Asbestos is not a manufactured material although mining and manufacturing processes are used to make it useful. A ban on these processes will not address the risks caused by asbestos outcropping in many areas of the country. These natural risks are orders of magnitude greater than the residual risks of processed asbestos. For example the asbestos exposures in Libby, Montana are to dangerous amphibole asbestos. There has been no risk and toxicity assessment for these to determine the safe human exposure, although it is reported that the EPA is making one.. The remediation measures in Libby taken to date are not based on a health standard.

The Ban Asbestos Bill calls for banning minerals or products which contain asbestos “in any concentration”. This search for zero is an old fashioned and obsolete procedure. It may be appropriate when one has no knowledge, as in primitive societies, or our society in 1975. Modern analytical methods can identify very low concentrations of mineral fiber present in ore deposits, or even in the general urban environment, which may or may not be asbestos. Modern analytical methods and modeling are capable of reliable predictions – particularly of upper limits to risk. Nor should we insist on zero risk – which is theoretically not achievable and the search for which is usually counterproductive. Now that the use has been much reduced, and exposures curtailed even more, we can demonstrate that there is a “negligible risk”, a procedure now used in other hazardous situations. The Ban Asbestos Bill as written may cause the presence of asbestos at low concentrations to be claimed where it is not present (Langer *et al.* 1991)

The US asbestos policy proposed in this draft bill, is not based on a modern understanding of the cancer risk from various asbestos fiber-types. Another consequence of this is that after the expenditure of \$100 million in Libby, Montana the evidence of a benefit remains elusive as stated by the EPA Inspector General in his December, 2006 report.

Now that the commercial amphibole asbestos have been removed from commerce by economic forces and the asbestos consumption in the US has been reduced 250 times and is consumption only of chrysotile asbestos, and the exposure levels in the workplace reduced by many hundred fold, it can be demonstrated that there a “negligible risk” in the sense now being used for many other hazardous situations. There is therefore is no justification for banning the controlled use of chrysotile asbestos. The use of asbestos in gaskets, O rings and the like pose negligible risk to anyone and to curtail them without reason is counterproductive to the economy and well being of the US as a whole.

Of course, as well as reducing the exposures, which we have done, society must treat the victims of the past high exposures and learn what one can from their suffering. In this testimony I do not address any details of this necessity.

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