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Chrysotile in the United States

The asbestos situation in the United States continues to provoke a lot of controversy. The courts are still overwhelmed by thousands of cases brought before the tribunals from workers who have allegedly been exposed to asbestos fibres in various situations. It is now recognized that the vast majority of the cases brought before the courts are from people who do not have any signs whatever of disease related to asbestos (see Newsletter no. 4 – *Asbestos litigation in the U.S.: the untold story*). But, the sheer scale of the phenomena has caused numerous industries to request that the American government legislate this issue, to put a brake on the judiciary spiral, which menaces the American economy. In fact, in the past three years, approximately 70 companies, of which some are listed in the Dow Jones index, have been driven to bankruptcy because of asbestos lawsuits.

The decrease of chrysotile consumption in the United States is attributable to this judiciary torment, and not health problems associated to the use of chrysotile. The controls implemented during the past 20 years and the strict regulations, which manufacturers must adhere to in the actual use of chrysotile, ensure that the health of workers is not put at risk.

But, the news media report principally the astronomical monetary amounts awarded by the tribunals and many plaintiff lawyers wish to profit from this mania by inciting workers to ask for compensation. In this frenzy, Senator Patty Murray took advantage of the exasperation of some legislators to introduce, for the second time, a legislation to prohibit the use of most asbestos containing products. The ban is part of the pending legislation litigation reform and was introduced solely for political purposes in an effort to gain support for the asbestos litigation bill.

The first attempt, as that of the U.S. EPA in 1989, failed, and it is significant to note that the concerns addressed in Senators Murray's proposal to ban all types of asbestos relate to the situation in Libby (Montana), which involved an amphibole, tremolite asbestos, and is not chrysotile.

The above initiatives have created a lot of confusion regarding the actual asbestos situation in the United States. Many partisans of the ban asbestos movement on the international scene are taking advantage of this confusion by loudly and widely claiming that chrysotile has been banned in the States since 1989. Recently, we saw in Asia and in Latin America, ban asbestos supporters soliciting their governments to ban the use of chrysotile, using as the main argument that the United Sates had already done so, and that they had to follow the world trend. Since they can't rely on scientific data, they must invent other reasons to justify this tactic, which only serves the interests of replacement products and fibres manufacturers, desperately looking to increase their market.

Therefore, we felt it needful to put a little order in this debate by presenting, in an objective manner, the actual situation in the United States. Of note, you will find copy of two letters prepared at the request of QC Researcher (Washington) for its April issue, and which presents the opinion of the ban asbestos supporters, and that of the defenders of the controlled use of chrysotile.

Commercial and regulatory situation regarding the use of chrysotile in the United States today

Chrysotile is a valuable raw material in the United States today used in the production of vehicle braking systems, asphalt roof coatings and gaskets. The U.S. consumes about 13 100 metric tonnes of chrysotile asbestos per year (2001). And, chrysotile products are imported for use. Chrysotile is no longer used for friable insulation or similar products that caused high worker exposures many decades ago.

Although use of chrysotile is stringently regulated in the United States to assure that workers and consumers are not significantly exposed to chrysotile fibres, only one restriction exists on the types of products that can be manufactured with chrysotile. Product manufacturers are free to market any chrysotile-containing product that was being marketed in 1989; EPA approval must be obtained before marketing any **new** chrysotile-containing product not being produced in 1989. It should be noted that although only chrysotile is used for the manufacturing of asbestos containing products, all asbestos fibre types are allowed to be used in the U.S.

In the mid-1980's, public panic over asbestos in buildings — which was later discovered to have been unwarranted — prompted the U.S. Environmental Protection Agency (EPA) to propose a ban on most asbestos-containing products. EPA's proposal resulted in a massive compilation of information on the benefits of asbestos in many products, as well as the potential risk for human exposure in such uses. Based on this comprehensive record, the U.S. Court of Appeals for the Fifth Circuit found such a ban unwarranted. Although the Court allowed EPA to require its prior approval before **new** products were developed, it found all existing uses must be allowed to continue.

The U.S. Court found a ban of asbestos-containing products unwarranted because:

- No significant human exposures to asbestos fibres would occur if the products were produced and used under controlled conditions;
- Substitutes for asbestos-containing products themselves posed potential human health risks that could be more significant than any potential risks from asbestos; and,
- Asbestos-containing products offered significant benefits not offered by substitute products.

Production and use of chrysotile-containing products, like production and use of many other chemicals that can pose risks if not adequately controlled, are regulated in the United States not only by EPA, but also by the Occupational Safety and Health Administration (OSHA) and the Department of transportation (DOT). EPA regulates air and water emissions from chrysotile production facilities and provides rules for disposal of asbestos-containing waste. OSHA has established comprehensive health standards for asbestos that require workers with potential exposures to be aware of and trained to minimize any risks and sets a stringent limit for airborne exposure. DOT regulates transport of asbestos.

As a result of comprehensive regulation in the United States today, exposures to workers or the public are minimal and do not pose significant risk. At the same time, the public derives benefits from the unique qualities of this mineral as an effective and low cost raw material for construction and friction products.

THE STATUS OF ASBESTOS PRODUCTS IN THE U.S.A. (AUGUST 2003)	
PROHIBITED	**AUTHORIZED**
Corrugated paper	Corrugated asbestos cement sheet
Commercial paper	Flat asbestos cement sheet
Flooring felt	Vinyl asbestos floor tile
Rollboard	Asbestos cement pipes
Speciality paper	Asbestos cement shingles
New uses of asbestos	Friction materials
	Brake linings
	Clutch facing
	Disc brake pads
	Asbestos clothing
	Automatic transmission component
	Roofing felt
	Roof coating
	Non-roof coatings
	Millboard
	Pipeline wrap
	Acetylene cylinder filler
	Asbestos diaphragms
	High-grad electrical paper
	Packings
	Sealant tape
	Brake blocks
	Missile liners
	Arc shutes

Should the United States ban the use and importation of chrysotile?

These letters were written for the April 2003 edition of the QC Researcher, and present the arguments of the groups supporting and opposing the use of Chrysotile in the United States. Senator Patty Murray is the sponsor of the Ban Asbestos in America Act, and Mr. Bob J. Pigg is the President of the Asbestos Information Association / North America

YES

By Sen. Patty Murray

Everyone knows that asbestos causes deadly diseases, such as lung cancer, asbestosis and mesothelioma – a cancer of the lining of the internal organs. Most of the industrialized world has banned asbestos, but the United States has not fully banned it.

In the U.S., asbestos is still placed in consumer products on purpose. In fact, in 2001, the United States used 13,000 metric tons of asbestos to make roofing materials, brake pads, gaskets and other products. This may be surprising especially for mechanics who earn their living working on automobiles. I was certainly shocked to learn that asbestos was still legal in the United States, and continues to be used in buildings, homes, cars and workplaces.

In 1989, the Environmental Protection Agency (EPA) tried to ban asbestos, but the asbestos industry sued the EPA, and in 1991, the 5th U.S. Circuit Court of Appeals overturned most of the ban. The first Bush administration chose not to appeal the ruling.

Today, the federal government must protect the health of its citizens and ban this deadly substance.

The asbestos industry claims there are no acceptable substitutes for asbestos. But most companies have found substitutes, like cellulose, fiberglass and ceramics. In 2001, the United States consumed about one-tenth of the asbestos it used in the 1980s, proving that alternatives are available. Germany, which has banned asbestos, still manufacturers asbestos-free cars.

The asbestos industry also claims asbestos is only dangerous when inhaled, and that products in which the asbestos is bound don't pose significant risks. But, the EPA found that asbestos in such products pose enough risks to workers during manufacturing and use that these applications should also be prohibited. The EPA also argued that all asbestos products break down over time and add to background concentrations of asbestos in our environment.

The Senate Judiciary Committee is currently working on legislation to address the asbestos-litigation crisis. But in the long term, if we are going to solve the problems caused by our historic dependence on asbestos, we need to stop adding it to products on purpose. During the last session of Congress, I introduced the Ban Asbestos America Act, and I will introduce it again soon. The EPA was on the right track when it banned asbestos in 1989. I intend to pick up where the agency left off to resolve this issue once and for all, and it's going to take a coalition of citizens to accomplish this.

NO

By Mr. Bob J. Pigg

It is essential that terms be defined and understood. Asbestos is a generic name given to the fibrous variety of six naturally occurring minerals used in commercial products. Asbestos minerals belong to two groups: chrysotile and amphibole. Overwhelming scientific evidence proves that chrysotile presents must less health risk than the amphiboles. This is important because only chrysotile is used in or imported into the United States today, and only in a few products in which the fibers are firmly encapsulated in a matrix. The concerns addressed in Sen. Patty Murray's proposal to ban asbestos refer to a situation in Libby, Montana, which involved an amphibole, called tremolite asbestos and is NOT chrysotile asbestos.

There is no health need to ban the few products containing only bound chrysotile asbestos, which are being used safely and are not related to former products no longer being manufactured or installed. Asbestos is the most regulated substance in the United Sates. Substitute fibers are neither regulated nor have they been proven safer than chrysotile asbestos.

The Environmental Protection Agency's (EPA) 1989 attempt to ban most asbestos products was overturned by the courts in 1991, after the court determined that current uses of chrysotile do not present unreasonable risk and that an asbestos ban would do more ham than good. For example, the court pointed out that twice as many deaths occur annually from ingested toothpicks than would result over a 13-year period (according to EPA) estimates) unless asbestos were banned in cement pipe, shingles and roof coatings.

Today, nearly all chrysotile asbestos in the United Sates is found in asphaltic roofing compounds. The Occupational Safety and Health Administration found that these products need not be regulated, since no exposures occur during the installation or use. Chrysotile asbestos is also used in friction products, gaskets for high-temperature industrial applications and specialized instances where substitutes are unavailable, such as NASA's space shuttle.

A legislative ban on present-day uses of chrysotile asbestos would do nothing to rectify any misuses that may have occurred in the past nor change the type of asbestos fiber that was used. A ban would have zero public-health benefit and would deny society the use of a few safe, reliable and economical products. It also could stoke public hysteria, re-igniting the clamor of the 1980s for universal removal of all asbestos-containing products. EPA found in the 1990s that such drastic action was unwarranted.

A new protocol to assess asbestos-related risk is presented to the EPA

On May 30, 2003, the Eastern Research Group, Inc. submitted to the EPA a report on the peer consultation workshop to discuss a proposed protocol to assess asbestos-related risk (document available on the Internet at (http://www.epa.gov/superfund/programs/risk/asbestos/pdfs/asbestos_report.pdf). This is part of an evaluation process launched in May 2000 after a scientific meeting held in Oakland (California) where a group of international scientists gathered together to consider the inaccuracy of the forecasting model presently in use to evaluate the number of occupational diseases linked to the past use of asbestos.

Eleven expert panellists participated in a peer consultation workshop to review the proposed protocol submitted by Drs. Berman and Crump (see AI Newsletter number 4). The peer consultation panel strongly endorsed the conceptual approach of developing an updated cancer risk assessment methodology that takes into account fibre type and fibre dimension. The opportunity is at hand to use substantial new information from epidemiology, experimental toxicology, and exposure characterization on what continues to be an extremely important societal issue — assessing the health risks associated with environmental and occupational exposures to asbestos. The panel recommended that EPA proceed in an expeditious manner to consider the panellists' conclusions and recommendations with a goal of having an updated asbestos risk assessment methodology. The panel urges that additional analyses underpinning the document, preparation of documentation, and further review be carried out in an open and transparent manner.

The panellists made conclusions and recommendations regarding eleven (11) issues:

1) **Measurement methods.** Continuing advances have been made in the application of exposure measurement technology for asbestos fibres during the past two decades, including the use of transmission electron microscopy (TEM) and allied techniques as an alternative to phase contrast microscopy (PCM). The proposed risk assessment methodology incorporates these advances in the development of an exposure index, which represents a substantial advance over the existing methodology.

2) **Integration of exposure and risk assessment models.** A key aspect of the proposed risk assessment methodology is a linking of specific exposure characterization methodology with exposure-response coefficients. It has been emphasized that any change in the exposure characterization metrics must be accompanied by changes in the exposure-response coefficients of the risk assessment models.

3) **Access to additional raw data sets.** The panellists strongly recommended that EPA make every attempt to acquire and analyze raw data sets from key human epidemiological studies. Where possible, it would also be desirable to obtain fibre exposure information (i.e., length and diameter) for these re-analyses. Several panellists believed that review of additional data sets offers substantial opportunity for improving the proposed risk assessment methodology.

4) **Fibre diameter.** The proposed risk assessment methodology uses a diameter cut-off of 0.5 micrometers (µm) for considering fibres. There was general agreement that the diameter cut-off should be between 0.5 and 1.5 µm. This issue is deserving of further analysis.

5) **Fibre length.** The proposed model index assigns zero risk to fibres less than 5 µm in length. Fibres between 5 and 10 µm are assigned a risk that is one three-hundredth of the risk assigned to fibres longer than 10 µm. Panellists agreed that there is a considerably greater risk for lung cancer for fibres longer than 10 µm. However, the panel was uncertain as to an exact cut size for length and the magnitude of the relative potency. The panellists also agreed that the available data suggest that the risk for fibres less than 5 µm in length is very low and could be zero.

6) **Fibre type.** For mesothelioma, the panellists supported the use of different relative carcinogenic potencies for different fibre types. The panellists unanimously agreed that the available epidemiology studies provide compelling evidence that the carcinogenic potency of amphibole fibres is two orders of magnitude greater (100 x) than that for chrysotile fibres. For lung cancer, the panellists had differing opinions on the inferences that can be made on the relative potency of chrysotile and amphibole fibres. Some panellists supported the finding that amphibole fibres are 5 times or more potent for lung cancer than are chrysotile fibres. Other panellists did not think the statistical analyses in the draft methodology document supports this relative potency and wondered if additional review of the epidemiological data might identify factors other than fibre type (e.g., industry considered) that provide further insights on the matter

7) **Cleavage fragments.** The general view is that data indicate that durability and dimension are critical to pulmonary pathogenesis. Therefore, it is prudent at this time to assume equivalent potency for cancer in the absence of other information to the contrary.

8) **Other amphiboles.** The panel agreed with the report's conclusion that the potency of currently regulated and unregulated amphibole fibres should be considered equal based on the reasoning that similar durability and dimension would be expected to result in similar pathogenicity.

9) **Methods.** The panellists urged, in the study-specific analysis, exploration of alternative exposure-response models other than the lung cancer and mesothelioma risk models EPA has been using since 1986. This would possibly include non-linear response models (e.g., log-linear models), examination of sepa-rate effects for concentration and duration, time since first exposure, time since cessation of exposure, possibly dropping the "factor," and different methods for measurement error. Exploration of non-linearity should also include shape of the curve in the low exposure area. Panellists recommended meta-regression using original (untransformed) exposure-response coefficients, in which predictor variables include the estimated percentage of amphiboles, percentage of fibre greater than

10 µm, and categorical grouping of studies according to quality. Meta-regression will allow simple inspection of likelihood to consider the importance of different predictor variables. Sensitivity analyses should be conducted in which the inclusion or exclusion of specific studies or groups of studies is evaluated.

10) Cigarette smoking. Most panellists felt strongly that future analyses need to pay more attention to the effects of smoking on the lung cancer exposure-response model and extrapolations to risk. The panellists noted that smoking is the primary cause for lung cancer, but the lung cancer dose-response relationship for smoking is complex due to the effects of smoking duration, intensity, and cessation. With respect to applying the model to make risk projections for any future cohort, the background rate of lung cancer employed in the model needs to be carefully determined to capture the smoking behaviour of the cohort.

11) Localized tremolite exposures. During the course of public comments, the panel received input from several individuals who expressed concerns about environmental exposures to tremolite asbestos from localized geologic formations. While the panel was not in a position or charged with the evaluation of this issue, the panel did feel that this was a potentially serious matter deserving of attention by the appropriate public health authorities. Evaluation of these kinds of situations would benefit from the use of the improved risk assessment methodology being considered

Chrysotile asbestos related diseases: What is the reality?

Last April, during the International Commemoration Day for Dead and Injured Workers, many newspapers reported a press release under the sponsorship of the International Labour Organization about the large number of workers dying every year due to exposure to asbestos. According to the information distributed, asbestos would be responsible for 100,000 deaths every year, and it is estimated that it would cause the deaths of more than one million in thirty years' time.

In fact, this campaign was initiated and led by the International Federation of Building and Wood Workers with the support of the Bureau of Workers' Activities (ACTRAV), which is the European labour arm of the ILO. It represents only the views of those trade unions, a few of which are the affiliates of ICFTU. The press release can be found on the ILO website (www.ilo.org/public/english/dialogue/actrav/accident_at_work.htm). The ILO participates at some of the ACTRAV activities, such as the annual International Commemoration Day for Dead and Injured Workers, but the ACTRAV does not speak on behalf of the ILO. The official position of the ILO on the asbestos issue is still the application of the principles in Convention 162, Recommendation 172 and the Code of Practice on Asbestos.

Knowing of their involvement in the large substitute fibre industry where a significant number of their members are working, it is not surprising that the Federation of Building and Wood Workers and other European labour organizations are supporting an international anti-asbestos campaign. The replacement of chrysotile-containing building materials by alternative products will help create jobs in an important sphere of their activities, which is a very lucrative, booming industry. These new products, however, cannot compete with the quality, the durability and the low cost of those with containing chrysotile fibres, and they know it. We need to stress, once again, that these new products have never been proven safer or less harmful than products containing chrysotile fibres. All this information is never mentioned in their propaganda.

Regarding the alarmist figure of 100 000 deaths per year, this is far from reality. The estimated number of deaths linked to all types of asbestos fibres that is regularly promulgated by the anti-asbestos lobbies is based on the Peto model, which has been proven to have grossly mistaken and have exaggerated the actual number of deaths. This model does not recognize the differences between fibre types, the amphiboles being more dangerous to the workers' health than chrysotile, and extrapolates to the future the occupational diseases associated with high exposure to asbestos fibres, mainly amphiboles. In fact, the U.S. Environmental Protection Agency (EPA) convened a large group of scientists in Oakland (California) in May 2000 in order to develop new data that would allow an update of their health risk assessment based on sound science, which will be published in the near future.

The fact that amphiboles are no longer in use and only chrysotile fibres are utilized in most importing countries and considering the impressive reduction in workers' exposure to airborne fibres makes these predictions unrealistic. For example, among the 3000 theoretical annual statistical cases of deaths due to exposure to asbestos in the United Kingdom, the British HSE was not able to associate a single case to the use of chrysotile-cement.

Report demonstrates that short chrysotile fibres are unlikely to cause cancer in humans

In attempting to answer whether the smallest chrysotile fibres that remain in the lung the longest are biologically relevant in producing a possible pathological response, a report was prepared by Eastern Research Group, Inc. for the U.S. Agency for Toxic Substances and Disease Registry (ASTDR). This study states that "given findings from epidemiological studies, laboratory animal studies, and *in vitro* genotoxicity studies, combined with the lung's ability to clear short fibres, the panel agreed that there is a strong weight of evidence that asbestos and synthetic vitreous fibres (SVFs) shorter than 5 µm [micrometers] are unlikely to cause cancer in humans."

The main conclusions of their two-day meeting are the following:

1) Health effects from asbestos and SVFs ultimately are functions of fibre dose, fibre dimension (length and diameter), and fibre durability or persistence in the lung (as determined by the mineral type, the amorphous or crystalline structure, and the surface chemistry).

2) Deposition and retention of short fibres. The lung depositional patterns of fibres less than 5 µm long have been well established and depend almost entirely on fibre width. For short fibres with diameters between 0.1 and 1.6 µm, total lung deposition in healthy people will be between 10% and 20% of what is inhaled, with most of that deposition occurring in the deep lung; the fibres that do not deposit will be exhaled. For short fibres with diameters less than 0.1 µm, a greater proportion will deposit and there will be a somewhat greater proportion of deposition in the proximal airways.

   The short fibres can be cleared from the lung by various mechanisms, depending on where the fibres deposit. Fibres depositing on the surface of conductive airways (i.e., the tracheobronchial region) are efficiently cleared by the mucociliary escalator, generally within 24 hours. Many of the short fibres that reach the gas exchange region of the lung are cleared by alveolar macrophages, and the rate of clearance by phagocytosis has been found to vary with fibre length and to differ across mammalian species.

3) Cancer effects of short fibres. Given findings from epidemiological studies, laboratory animal studies, and *in vitro* genotoxicity studies, combined with the lung's ability to clear short fibres, the panel agreed that there is a strong weight of evidence that asbestos and SVFs shorter than 5 µm are unlikely to cause cancer in humans.

4) Noncancer effects of short fibres. The laboratory animal studies, epidemiological studies, and *in vitro* studies generally suggest that asbestos and SVF pathogenicity increases with fibre length, but there are several notable exceptions. In laboratory animals, for example, short asbestos and SVFs at sufficiently high doses have been shown to cause inflammation, pulmonary interstitial fibrosis, and pleural reactions; however, the doses needed to cause these effects in humans may not be relevant to environmental exposures.

   Regarding possible environmental accidental exposure, like in New York City after the World Trade Center terrorist attack, it was also recommended at the end of the panel's meeting to perform personal exposure sampling, or an equivalent, to quantify what exposures result when household surfaces are contaminated with asbestos or SVFs; analyze samples using conventional fibre counting methods (i.e., counting only fibres longer than 5 µm), but archive a subset of filter samples for further analysis.

   http://www.atsdr.cdc.gov/HAC/asbestospanel/finalpart1.pdf

New evidence regarding safety of chrysotile brake pads

Two new scientific studies published in the 38th Edition of the *Regulatory Toxicology and Pharmacology* confirms the very low risk for maintenance workers related to the use of chrysotile asbestos in brake pads.

In the first article[1], authors Blake, Van Orden, Banasik and Harbison present the results of a series of tests to evaluate an auto mechanic's exposure to airborne asbestos fibres while performing routine brake maintenance. The test conditions, methods, and tools were as those

commonly used during the 1960s. Effects of the independent variables (filing, sanding and arc grinding) of the replacement shoes elements were tested. The results indicated a presence in the air of only chrysotile asbestos and fibre exposure for each test remained below 0.1 fibre/ml

In a second article[2], Professor Langer considered the transformation of the chrysotile fibre subjected to high temperatures, and examined its concentration in a garage where asbestos-containing brake pads were used. Using heating studies and milling as an approximation of thermal and mechanical shear stress that chrysotile is subjected to on a brake lining, biological blunting is shown to begin at much lower temperature than expected. Temperatures hundreds of degrees below the olivine transformation point cause the mineral to lose structural water with accompanying crystal structure degradation, meaning a reduction or loss of biological activity. The author considers that biological and epidemiological data for brake workers exposed to chrysotile asbestos should be viewed in context with the conditions of service to which the product was subjected over a lower range of temperatures than previously considered important.

Sources

1.Charles L. Blake, Drew R. Van Orden, Marek Banasik, Raymond Harbison, *Airborne Asbestos Concentration from Brake Changing Does not Exceed Permissible Exposure Limit*, Regulatory Toxicology and Pharmacology 38 (2003), pp. 58-70.

2. Arthur M. Langer, *Reduction of the Biological Potential of Chrysotile Asbestos Arising from Conditions of Service on Brake Pads*, Regulatory Toxicology and Pharmacology 38 (2003), pp. 71-77.