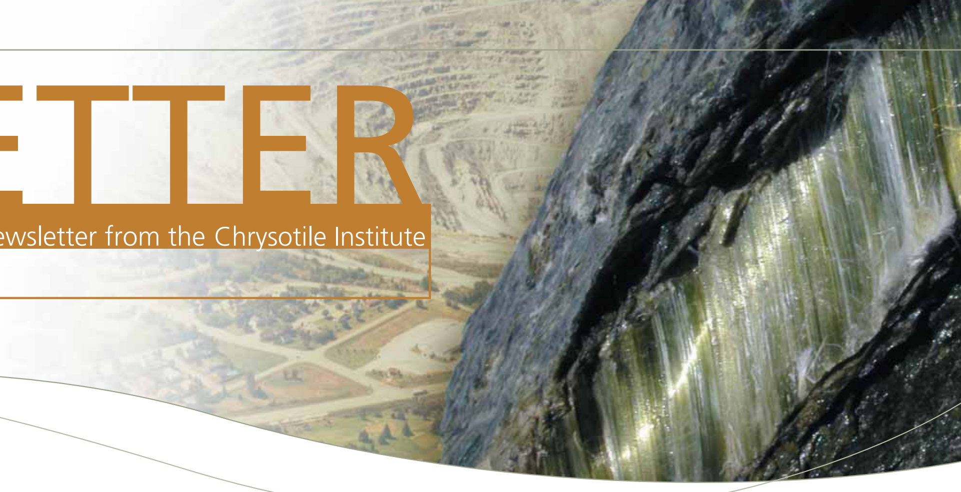
NEWSLETTER
Newsletter from the Chrysotile Institute
For safe and responsible use of chrysotile



Number 6, April 2004

A New Study confirms the difference between chrysotile and amphiboles

A comparative study on biopersistence published in the December 2003 issue of *Inhalation Toxicology* confirms that the durability of chrysotile fibres in pulmonary tissues is so low that it does not provoke any pathological changes at currently regulated exposure levels.

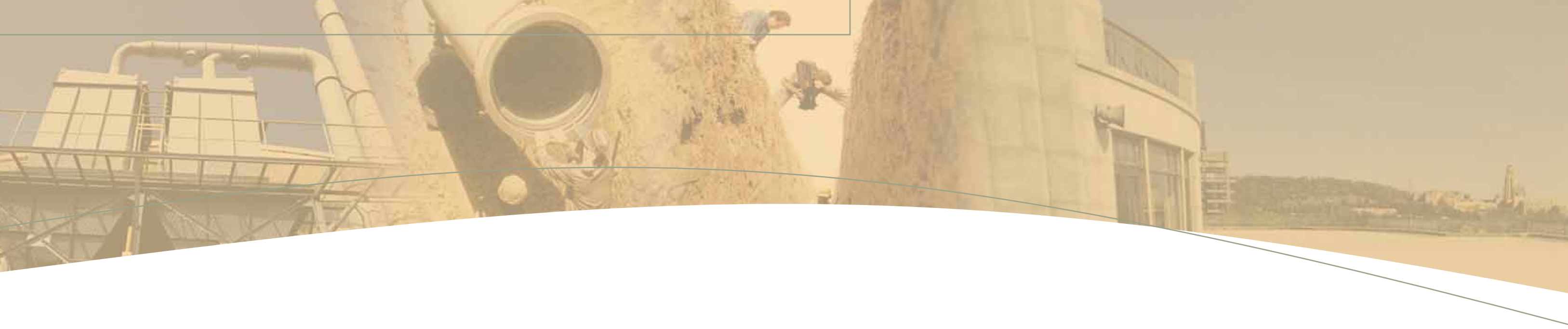
The differences between chrysotile, of the serpentine family, and amphibole types of asbestos have been the subject of many debates. Many studies have demonstrated that chrysotile is eliminated from the lungs more rapidly than the amphiboles, and is far less damageable to human health. The study group, (Eastern Research Group, Lexington, MA) convened by the U.S. Environmental Protection Agency, has unanimously endorsed this scientific fact. Yet, some individuals or groups of people still maintain that all types of asbestos present the same risks. To quantify the comparative elimination of chrysotile and one amphibole (tremolite), – both types of fibres were subject of a biopersistence protocol after inhalation, according to the recommendations of the European Commission. Furthermore, the histopathological response in the lungs was evaluated after a short term exposure. Drs. Bernstein, Chevalier and Smith presented the results of the study, obtained 90 days following cessation of exposure.

BIOPERSISTENCE OF VARIOUS RESPIRABLE INDUSTRIAL FIBRES ($T_{1/2}$, fibres > 20µm)	
Mildly biopersistent fibres	
Chrysotile (USA)	7 hours
Synthetic glass fibres	8 days
Chrysotile (Canada)	16 days
Moderately biopersistent fibres	
Aramid Fibres	60 days
Refractory Ceramic Fibres	90 days
Highly biopersistent fibres	
Amosite	466 days
Cellulose	> 1000 days
Tremolite	> 1000 days

For this research, the authors used long chrysotile fibres from the Calidria mine (in California, USA), which was active until 2001. The particularity of the fibres exploited from this mine is that the fibres are composed of multiple short fibrils. In accordance with the consensus of international experts in this field, only fibres over 20 microns were counted. The period of inhalation of chrysotile fibres was undertaken using airborne concentrations of 200 fibres/cm^3, double the threshold required by the European Commission`s recognized protocol.

The Calidria chrysotile fibre is eliminated from the lungs more rapidly than all other fibres having undergone the same test, including synthetic glass fibres which have been recognized as non-carcinogenic. Half the fibre burden measured at the end of exposure was eliminated after 7 hours. Five days after the end of exposure, the lungs of laboratory animals, exposed to this massive dose of chrysotile, were in the same condition as the cohort group of animals not exposed. In contrast, the case for tremolite is very different.

CHRYSOTILE Institute



The elimination is very slow, and important pathological signs were observed very early following the end of exposure.

This is the third study of its kind undertaken using the same protocol : the first, which was not published, using fibres from Brazil, and a second using Canadian fibres, published in the November 2003 issue of *Inhalation Toxicology*. All three demonstrate the low durability of chrysotile, since the long fibres were eliminated in less than 20 days. This third study therefore confirms, once again, what the international scientific community now recognizes as a given, e.g :

- That the differences on human health from exposure to chrysotile vs amphiboles are so important that it becomes necessary to abandon the term 'asbestos' when referring to toxicological or epidemiological questions;
- That chrysotile is in the same range as other industrial fibres which are the least damageable to human health. If chrysotile had always been used in a controlled environment and if it had not been mixed with amphiboles, the consequences to human health would have been virtually non-existant;
- Taking into account the long durability of tremolite, the chrysotile fibres tested (from Brazil, Canada and the United States) have demonstrated such a low biopersistence, and that none showed any sign of tissue damage which was evident with tremolite. It is now demonstrated that the allegation that Chrysotile cannot be mined without tremolite contamination is therefore false.

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Environmental and occupational health hazards associated with the presence of asbestos in brake linings and pads (1900 to present): A "state-of-the-art" review

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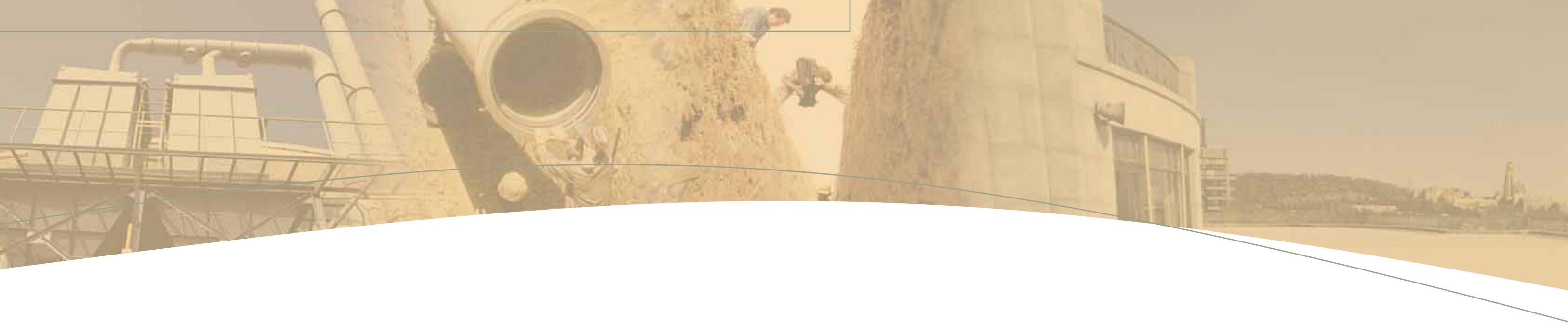
Throughout the history of automobile development, chrysotile asbestos has been an essential component of vehicle brake linings and pads. Acceptable alternatives were not fully developed until the 1980s, and these were installed in vehicles produced over the past decade. This article presents a "state-of-the-art" analysis of what was known over time about the potential environmental and occupational health hazards associated with the presence of chrysotile asbestos in brake linings and pads. As part of this analysis, the evolution of automobile brakes and brake friction materials, beginning with the early 1900s, is described. Initial concerns regarding exposures to asbestos among workers involved in the manufacture of friction products were raised as early as 1930. Between 1930 and 1959, eight studies were conducted for which friction product manufacturing workers were part of the population assessed. These studies provided evidence of asbestosis among highly exposed workers, but provided little information on the magnitude of exposure. The U.S. Public Health Service proposed the first occupational guideline for asbestos exposure in 1938. The causal relationship between asbestos exposure and lung cancer was confirmed in 1955 in asbestos textile workers in the United

Kingdom, and later, in 1960, in South Africa, mesothelioma was attributed to asbestos exposure to even relatively low airborne concentrations of crocidolite. Between 1960 and 1974, five epidemiology studies of friction product manufacturing workers were conducted. During this same time period, the initial studies of brake lining wear (dust or debris) emissions were conducted showing that automobile braking was not a substantial contributor of asbestos fibers greater than 5 μm in length to ambient air. The first exposure surveys, as well as preliminary health effects studies, for brake mechanics were also conducted during this period. In 1971, the Occupational Safety and Health Administration promulgated the first national standards for workplace exposure to asbestos. During the post-1974 time period, most of the information on exposure of brake mechanics to airborne asbestos during brake repair was gathered, primarily from a series of sampling surveys conducted by the National Institute of Occupational Safety and Health in the United States. These surveys indicated that the time-weighted average asbestos concentrations (about 1–6 h in duration) during brake servicing were between 0.004 and 0.28 fibers per cubic centimeter, and the mean time-weighted average concentration was about 0.05 fibers per cubic centimeter. The data also showed that brake mechanics were not exposed to time-weighted average concentrations above workplace exposure limits in effect at the time of the study. From 1975 to 2002, more than 25 epidemiology studies were conducted examining the risks of asbestos-related diseases in brake mechanics. These studies clearly indicated that brake mechanics were not at increased risk of adverse health effects due to exposure to asbestos. Specifically, the studies found no increased risk of mesothelioma or asbestosis in brake mechanics, and no evidence that lung cancer in this occupational group can be attributed to exposure to asbestos during brake repair. This could be due to one or a number of factors: the airborne concentration of chrysotile asbestos and the duration of exposure are too small to be significant, the chrysotile fibers are too short to be biologically important, that chrysotile fibers are substantially less potent than amphibole fibers in inducing lung cancer and mesothelioma, or other yet-to-be-understood factors. Finally, there were 20 studies published during this time period evaluating asbestos exposure or asbestos-related health effects in friction product manufacturing workers. These studies indicated that these workers were historically exposed to concentrations of chrysotile fibers perhaps 10 to 50 times greater than those of brake mechanics, but the risk of asbestosis, mesothelioma, and lung cancer, if any, was not apparent, except for those workers who had some degree of exposure to amphibole asbestos during their careers.

SUMMARY

Over the last 100 yr, brake linings have evolved considerably, due to increased public expectations about automobile performance and safety. To meet these challenges, the original woven materials used on external brakes were replaced with chrysotile-based molded linings attached to internal drum and disc brakes. As a better understanding of asbestos-related disease continued into the early 1970s, and environmental regulations became increasingly more stringent, friction product, brake, and automobile manufacturers began to research and develop chrysotile fiber substitutes. Although nonasbestos organic brake linings and pads may have satisfied the minimum FMVSS requirements soon after development, these new friction material formulations were not incorporated into vehicles until they met all of the internal laboratory and field tests required by friction product, brake, and automobile manufacturers to meet the public's expectation of brake performance. It took several more years to develop the proper formulation for non-asbestos brake linings and pads that were equal in performance to chrysotile-based brake linings and pads that had been in place for more than 70 yr. By the 1980s, most U.S. vehicles had incorporated nonasbestos semimetallic front disc pads, but the technology to replace chrysotile rear drum brakes linings was not fully developed until the mid 1990s.

Early in the last century, questions were raised about the health hazards posed to workers manufacturing



asbestos-containing products. In 1930, the first epidemiology study was published showing that exposures to high concentrations of asbestos in dusty manufacturing settings resulted in asbestosis (Merewether & Price; 1930). In this study, initial concerns regarding exposures to asbestos among workers involved in friction product manufacturing were raised. Between 1930 and 1959, seven studies were conducted where friction product manufacturing workers were part of the study population assessed. These studies provided evidence of asbestosis among highly exposed workers, but provided little information on the magnitude of exposure. Findings from early studies of manufacturing facilities eventually served as the basis for the first asbestos exposure limit of 5 mppcf, which was adopted by ACGIH in 1946 and continued to be used as a guideline by ACGIH and others for several decades. It was in 1955 that a causal relationship between asbestos exposure and lung cancer was documented for manufacturing settings (Doll, 1955). During this same time, animal studies were being developed that used high doses of asbestos in an attempt to replicate asbestos-related worker diseases. The data provided during this time period were, however, inadequate to describe an asbestos dose-response relationship for friction product manufacturing workers, and no data were provided on the potential exposures of brake mechanics.

In 1960, mesothelioma was attributed to asbestos exposure in crocidolite miners, as well as individuals living near the mine, leading to an increased focus on low-level exposure to asbestos and concerns about the lung cancer and mesothelioma risks. Simultaneously, several animal models were being developed to better understand these dose-response mechanisms, despite the high doses required to induce cancer in animals. The speculation that brake wear debris could account for a significant source of asbestos in urban air, the creation of several regulatory agencies, including OSHA and the U.S. EPA, and the lowering of recommended asbestos occupational exposure levels resulted in the first series of studies (conducted in the late 1960s and early 1970) to evaluate the contribution of brake dust to the atmosphere. These studies, conducted by the U.S. EPA, NIOSH, and the automobile industry, suggested that brake wear debris was not a significant source of atmospheric asbestos as was originally postulated. In addition, studies conducted on the amount of asbestos released during brake repair operations of passenger vehicles indicated that airborne concentrations of asbestos for brake repair workers were below the occupational standards of the time. Finally, the first preliminary health effects studies of brake mechanics, as well as five additional health effects studies of friction product manufacturing workers, were conducted during the 1960 to 1974 time period.

It was during the post-1974 time period that most of the information on chrysotile exposure of brake mechanics was generated. In 1975, the question about the asbestos-related hazard to brake mechanics came to the forefront with the release of a preliminary study by researchers at Mount Sinai Hospital that, in part, provided conflicting results to previously published studies. Specifically, they reported that chrysotile concentrations in brake dust were higher than previously thought, and that a preliminary review of x-rays from a select group of mechanics suggested a higher than expected incidence of x-ray and respiratory function abnormalities. The results of this report spurred decades of work to evaluate the exposure of garage mechanics and epidemiology studies of brake workers.

More than 25 epidemiology studies were conducted over the next 30 yr after issuance of the Mount Sinai report on vehicle and brake mechanics. In addition, there have been more than 15 studies of either asbestos exposure or asbestos-related health effects in friction product manufacturing workers. This body of information indicates that mechanics have not been exposed to harmful concentrations of chrysotile fibers as a result of their work with brakes. Although the levels of exposure to chrysotile fibers occurring during friction materials manufacturing are substantially

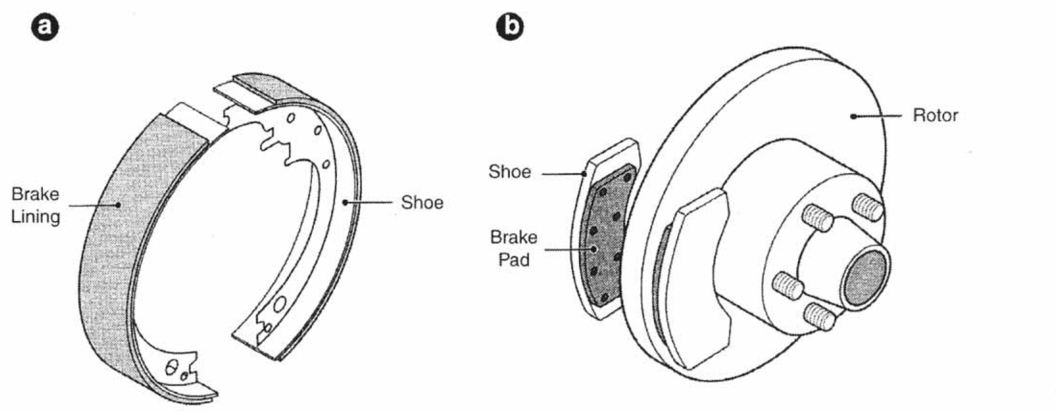


FIGURE 1. Diagrams of a brake lining and brake pad. (a) A brake lining designed to be used with an internal drum brake. (b) A brake pad designed for use with a disc brake.

higher than those that occur during motor vehicle repair, the studies of friction materials manufacturing workers have shown that an increased risk of asbestos-related disease in this occupational group, if any, is not clearly detectable. Only the friction materials manufacturing workers in the UK who were exposed to crocidolite while making railroad engine brake linings were found to have an increased relative risk of mesothelioma, an example of the differences in the relative potency of amphibole and chrysotile fibers.

Despite these findings, over the years, various regulatory actions have attempted to ban or phase out the use of chrysotile fiber in brake linings and pads. For example, the U.S. EPA banned the manufacturing, importation, and use of asbestos-containing products, including brake linings and pads, in 1989, due to perceived health risk issues. The U.S. Court of Appeals for the Fifth Circuit later annulled the majority of this ban. Although the U.S. EPA ban is no longer in effect for brake linings and pads, friction product, brake, and automobile manufacturers proceeded with the elimination of chrysotile-based brake linings and pads in U.S. passenger cars and light trucks. As of 2000, virtually no new passenger cars or light trucks sold in the United States utilized chrysotile-based brake linings and pads.

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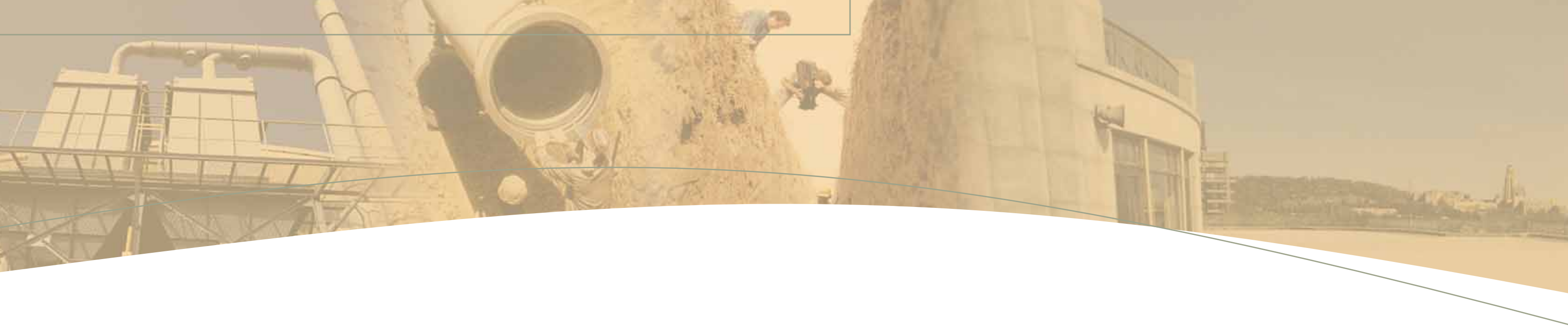

ASBESTOS WATCHDOG

Only a small minority of claims relate to the genuinely dangerous blue and brown forms of asbestos, which can cause fatal damage to health. The majority of claims relate to white asbestos, a wholly different mineral which poses no measurable risk to health.

A new organisation, ASBESTOS WATCHDOG, has been set up, with the backing of a team of internationally recognised scientists, to provide the expert advice which is necessary to challenge the confusion.

Asbestos Watchdog holds no brief for those irresponsible employers who have exposed their workforce to genuine risk from blue/brown asbestos. But Asbestos Watchdog is fully committed to support those who are wrongly accused of putting their employees at risk from white asbestos, when this can be demonstrated not to have been the cause of ill-health.

And Asbestos Watchdog's research shows that the majority of compensation claims fall into this category. Insurers are therefore paying out massive sums unnecessarily, on claims which should be challenged.

Similar evidence to that offered by the "expert witness" (see Case History, below) was recently given extensive publicity by a BBC programme which claimed that asbestos was giving rise to a "silent epidemic" which will kill hundreds of thousands of employees.

Unless it is effectively challenged, this kind of scare-mongering is likely to lead to thousands more compensation claims, with the bill to be picked up by the insurance industry, inevitably leading to an even greater escalation in premiums.

Case history

One recent case illustrates the damage this confusion can lead to.

A warehouseman who worked for a firm of builders' merchants for 10 years contracted cancer and died. A compensation claims was lodged against the firm. Lawyers took up the case on a "no win, no fee" basis, and retained a doctor who acted as an expert witness for both sides. Compensation, payable by the insurers, was adjudicated at £100,000.

The builders' merchants then contacted AW who were able to prove that the deceased could not have contracted his cancer from asbestos exposure while working at its premises. The company is now suing the doctor for failure in his duty of care. He has offered no defence for the unreliability of his evidence, but is claiming immunity as an expert witness.

"Chrysotile asbestos [white] when used in products in the building environment present a risk to health too small to be measured"
Dr John Hoskins, Consultant Toxicologist & Research Scientist

"The weight of scientific evidence concerning chrysotile fibres [white Asbestos] used in materials would indicate that there is minimal risk to health"
Dr David Bernstein, Consultant in Toxicology, Geneva, Switzerland

The **Ross & Roland report for the Geological Society of America** [Paper 373 in 2003] concludes that "white chrysotile asbestos is an exception that low to moderate exposure to this mineral even over a long period presents a very low health risk"

For more information on this urgent and vital issue visit www.asbestoswatchdog.co.uk
asbestos WATCHDOG

WHITE ASBESTOS POSES A RISK TO HEALTH
"TOO SMALL TO BE MEASURED" SAY WORLD EXPERTS
...meanwhile the spurious claims continue to proliferate

Any insurer knows that asbestos claims have become one of the biggest problems the industry faces - worth billions of pounds a year.
Yet the vast majority of these claims should never be accepted.
This is because they are based on a deliberately fostered scientific misunderstanding, confusing one type of asbestos with another.

The inclusion of chrysotile fibres to the PIC List of the Rotterdam Convention is abusive and must be rejected

In the past year, most of us have written our respective governments on numerous occasions signalling our strong objection to the proposal of including chrysotile on the Prior Informed Consent List of the Rotterdam Convention. This matter continues to be of utmost importance to the industry.

The inclusion of chrysotile to the PIC list would abusively restrict the international trade of chrysotile, and allow the currently available replacement fibres a free grab of the market. These replacement fibres, not subject of the PIC list, would be exempt from the obligatory procedures and the burdensome paperwork imposed on chrysotile. Such discriminatory treatment is totally unfair and unwarranted, compared with other industrial fibres and products.

The Rotterdam Convention was designed to manage the international trade of pesticides and other dangerous chemical compounds in order to protect human health and the environment from potential harm. Chrysotile certainly does not share those characteristics.

The PIC list of regulated products is aimed at specifically at pesticides, including extremely dangerous pesticide formulations and industrial chemical products which have either been banned or strictly regulated. Chrysotile is the only product which is already endowed with its own regulatory instrument - Convention 162 of the International Labour Organisation.

We should not capitulate to the demands of the European Community, Chile or others, who are extremely aggressive in the international anti-chrysotile offensive for the benefit of their own large replacement products and fibres industries.

No effort should be spared to defend chrysotile against such blatant injustice. The current safe and responsible use policy, adopted and implemented by the chrysotile industry, is recognized world wide for its efficiency in the protection of the health and safety of workers in countries using chrysotile.

Of great interest is the fact that many already consider the inclusion of chrysotile on the PIC list is a "fait accompli", and that the September 2004 vote is merely a formality. Well, we consider this affirmative very insulting for countries that have definite reservations on this matter. The proponents of a chrysotile ban claim victory, as they believe that the inclusion on the PIC list is just another step towards a global ban.

We shall not be unduly influenced by the propaganda of those groups linking the opposition for regulating the trade of chrysotile under the PIC procedures with environmental negligence in such a dishonest manner.

Countries that opted for the safe and controlled-use of chrysotile, rather than simply burying the problem created by the questionable work practices of the past, have demonstrated a responsible attitude. The same cannot be said for the replacement products manufacturing concerns waging an aggressive commercial war against chrysotile for financial gain. The protection of the health and safety of workers does not appear to be of great concern to them.

The misuse of this regulatory instrument, the Rotterdam Convention, is simply their newest tactic in the ongoing hostilities, and it risks destroying decades of excellent product stewardship and progress made by the chrysotile industries toward an ever-safer workplace.

We feel that it is only reasonable to request that European countries, or for example Chile, who have demanded that chrysotile be included on the PIC List, to respect the wishes of countries that have opted to adopt the responsible and controlled-use approach of chrysotile fibers. Countries that have implemented the responsible-use approach are rightfully entitled to their decision without being subjected to harassment by those who do not agree. Respect must come from both sides. In this dossier, it is time that common sense prevail.

We would also like to remind you, that it is false that the addition of chrysotile to the PIC list was unanimously endorsed. Many countries present at the November 2003 discussions wished and were ready to vote against the inclusion of chrysotile to the PIC list. However, it was proposed, against all expectations, to defer the decision until the September 2004 meetings. We were sorely disappointed with this procrastination.

We would like to emphasize the crucial importance for the industry, to resolve this issue once and for all and refuse the inclusion of chrysotile to the list of products regulated by the PIC procedure at the September meetings in Geneva.

This Newsletter is available in English, French and Spanish.

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