

# Chrysotile

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In 1998, Canadian chrysotile shipments decreased by 23.9% from 1997 levels. Total shipments for 1998 were estimated to be 320 000 t valued at \$167.2 million, compared to revised shipment figures for 1997 of 420 278 t valued at \$214.9 million. Although the average price (for all shipments) increased by about 2.0%, prices for each fibre category remained stable at 1997 levels. Since the closure of the Baie Verte, Newfoundland, operation in 1994, the Canadian chrysotile industry is concentrated in Quebec. Production comes from three mines: the Black Lake and Bell mines operated by LAB Chrysotile, Inc. and the Jeffrey mine operated by J.M. Asbestos Inc.

Canadian exports of chrysotile in 1998 were an estimated 319 430 t. This represents a 25.7% decrease in volume from the previous year and a 36.6% decline when compared to 1996. The value of these exports decreased by 23.0% to \$198.7 million.

In 1998, world production of chrysotile is believed to have increased by about 1.2% to reach 1.94 Mt. This increase is attributable mostly to higher production in China, while production in other countries is expected to have either remained stable at 1997 levels or to have decreased substantially such as in Canada, Russia, Kazakstan and South Africa, and especially in Greece where a mine closure occurred during the year.

Due to depressed markets, employment in the Canadian chrysotile industry decreased to about 1500 workers in 1998.

As a consequence of the European ban movement, but foremost because of the continued Asian financial crisis, worldwide chrysotile consumption will remain low compared to recent years. However, as a result of the drawdown of consumer stocks in 1998 and the start of a slow recovery in 1999 (mostly in Thailand,

Malaysia, Indonesia and South Korea), worldwide chrysotile consumption should increase by 3-5% in 1999.

## CHRYBOTILE, WORLD PRODUCTION BY COUNTRY, 1998

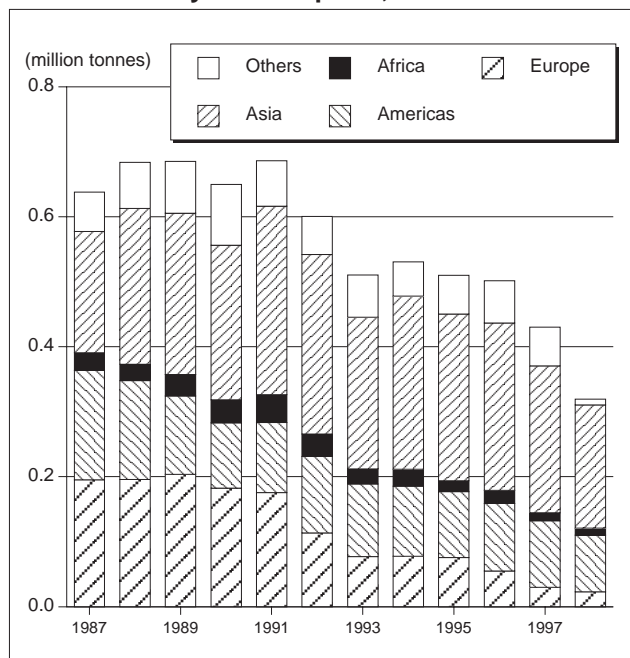
Country	Tonnes <sup>e</sup>
Russia	630 000
China	440 000
Canada	320 000
Brazil	198 000
Zimbabwe	130 000
Kazakstan	100 000
Greece	35 000
South Africa	25 000
Swaziland	25 000
India	25 000
United States	6 000
Colombia	4 500
Others	4 500
Total	1 943 000

Sources: Natural Resources Canada;  
U.S. Geological Survey.  
<sup>e</sup> Estimated.

## CHRYBOTILE AND ITS USES

Chrysotile (a natural fibrous hydrated silicate) is the only form of asbestos in the serpentine group. Crocidolite, amosite, anthophyllite, actinolite and tremolite form the amphibole group. Of these minerals, chrysotile is the least dangerous to human health and is the only one extracted in Canada. Chrysotile, which is sensitive to acid, tends to dissolve in the lungs, unless these are overburdened from exposure to excessive levels in the occupational environment. All fibres that enter the lungs cause mechanical irritation. In the past, most of the problems associated with chrysotile have been due to the poor working practices that existed then in both the handling and use of chrysotile. With the marked improvements in today's work practices and the increased protection of workers, the occupational risks associated with chrysotile have been tremendously reduced and are controllable with existing technology.

**Figure 1**  
**Canadian Chrysotile Exports, 1987-98**



Sources: Natural Resources Canada; Statistics Canada.

Because of their chemical and physical properties, chrysotile fibres are an extremely useful material that has been, and still is being, widely used throughout the world. In Canada, chrysotile fibres are classified into seven groups, each one with its own sub-categories, with the longest fibres assigned to Group 1 and the shortest to Group 7. In decreasing length, chrysotile has been used in textiles, clothing, packings, woven brake linings, clutch facings, electrical insulation materials, high-pressure and marine insulation, asbestos-cement pipe, other asbestos-cement products (e.g., sheets and mouldings, shingles), gaskets, paper products, vinyl sheet backings, and millboards. The shortest fibres (Group 7) are used in moulded brake linings and as a filler in cement, plastics, roof coatings and caulking compounds. Some 90% of all chrysotile produced globally is used in asbestos-cement products such as pipes, plates and sheets; 7% in friction products such as brake linings and clutch facings; and 3% in textiles, clothing and various other uses. Low-density and friable products are no longer marketed and are prohibited in Canada under the *Hazardous Products Act*.

## CANADIAN DEVELOPMENTS

In 1998, due to the closure of the British Canadian operations on November 1, 1997, and to 24 weeks of temporary mine closures split between the company's two remaining mines, the production level of LAB

Chrysotile, Inc. (the largest Canadian chrysotile producer) was 29.9% lower than in 1997 at 193 000 t. The company made up for its lower production by drawing from its inventory, which had been restocked in 1997. During the year, employment at LAB Chrysotile stood at 1097 workers, including some 150 workers reassigned from the former British Canadian mine.

At LAB Chrysotile's Bell mine, which is the only underground chrysotile operation in Canada, current reserves at the 1450 production level will permit operations to continue until the end of 1999. Production will then be transferred to the 1750 level where the company plans to have its \$30 million development project, which started in 1997, completed by the end of fall 1999. These reserves, identified in a 1995 drilling program, will ensure the mine's life into the next century.

At its Black Lake operation, LAB Chrysotile pursued its \$40 million slope stabilization project. Reserves at this site are sufficient for the next 13 years at current production rates.

In 1998, the production level at J.M. Asbestos Inc. declined to 116 000 t, compared to 179 660 t in the previous year. The drop in production, brought about by lower consumer demand, forced the company to proceed during the year with periodic shut-downs of operations and temporary layoffs. The company's work force dropped from a high of 700 employees and 50 contract workers to 400 workers by early 1999.

Despite financial pressure put on it by plummeting market demand, the company pursued the development of an underground operation to extend the life of the Jeffrey mine. Completion of the access ramp in 1997 enabled work on production and haulage ramps, as well as on the preparation of the ore zones, to proceed during 1998. This work will be pursued in 1999 while completing the sinking of the production shaft and installation of the 7000-hp friction hoist will be carried out as scheduled. Construction of the underground mine is expected to be completed by the end of 2000.

Production at J.M. Asbestos Inc. will then be transferred from the open pit to the underground mine over a period of 12 months. Lower market demand enabled the company to stockpile 3.5 Mt of ore necessary to ensure a smooth transition period. The new underground operation will have a maximum capacity of 250 000 t/y of chrysotile fibre until 2020. The capital cost of this development is estimated to be \$135 million. The underground mine project is financed from the operation's cash flows and from a \$65 million loan of which 70% was guaranteed by the Quebec government in October 1998 through "Investissement-Québec." J.M. Asbestos has already invested \$60 million in the project.

Following the signature in 1997 of an agreement to sell J.M. Asbestos Inc.'s magnesium-rich serpentine tailings to Magnola Metallurgy Inc. (Magnola), the latter company undertook the development of a magnesium metal production project in Asbestos. Mostly owned by Noranda Inc., Magnola started construction of a \$730 million plant in May 1998, which is slated to be completed by spring 2000. At full capacity, the plant is expected to employ 375 workers and to produce 56 000 t/y of magnesium metal, mostly to be used as an alloying element in the automobile industry.

J.M. Asbestos pursued implementation of the ISO program to obtain ISO 9002 certification on quality assurance and ISO 14 000 certification on environmental protection. The company expects to be certified by the end of 1999.

After spending nearly \$10 million during the past three years at the site of the old Cassiar Mining Corporation operations in northern British Columbia, the Toronto, Ontario-based company Minroc Mines Inc. commissioned a pilot plant in October 1998 to test the wet milling process used for the production of fibres from the tailings stockpile. Kilborn-SNC-Lavalin is preparing a "turn-key" proposal to boost the annual output of the wet milling complex to 36 000 t. Production from this operation could start in 2000. The tailings represent a resource of 16 Mt of ore grading 4.4% chrysotile.

In addition to pursuing the wet milling project in 1998, an effort made to delineate conventional ore reserves on the property to feed a dry circuit in the former Cassiar mill permitted the identification of 6.1 Mt of surface ore. The company plans to commission, by mid-1999, a re-activated circuit of the former dry mill to process the conventional ore at a production rate of 18 000 t/y. The company is confident that it will recapture the Asian asbestos-cement sheet and pipe markets it had formerly served.

## INTERNATIONAL AND REGULATORY DEVELOPMENTS

### The Americas

#### *Latin America*

**Brazil** is an important producer of chrysotile, especially for the increasingly active Latin American market. Sociedade Anonima Mineração do Amianto (SAMA) produced about 198 000 t in 1998, a decrease of 5% from 1997. SAMA's mine is located at Minaçu in the state of Goiás. The company has programs for waste site reforestation, the treatment of mine and mill waste-waters, and dust control (through the use of wet recovery processes).

During 1998, the Brazilian chrysotile industry increased its activities to promote the safe use of chrysotile asbestos in its client countries in accordance with the international industry's responsible use policy. Brazilian union officials participating in activities in Europe in defence of the chrysotile industry also visited a fibre cement product plant in a country where asbestos fibres were substituted by cellulose fibres in the course of that country's ban of asbestos in 1993. Health and safety conditions at the plant were found to be deficient to ensure appropriate protection of workers, reinforcing the claim by some health and safety experts that the switch to asbestos substitutes is often accompanied by a lowering of the level of protection for workers.

The Asbestos International Association (AIA) regional program for Latin American countries, the AIA/CLAS (Confederación Latinoamericana del Asbesto), was again very active during the year. The objective of the program is to foster regional cooperation and identify joint priorities for action in Latin America in the context of broader efforts to gain wider global acceptance of the controlled use approach for chrysotile. It is a firm commitment on the part of industry in all of the participating countries to implement the International Labour Organization Convention 162 on Safety in the Use of Asbestos.

In 1998, the AIA/CLAS, in collaboration with the Asbestos Institute, carried out missions to four Latin American countries (Colombia, Mexico, Cuba and Panama). The objectives of the various missions were to promote the safe use of chrysotile asbestos, to assist in the implementation of the responsible use policy, and to emphasize the need for better dialogue between industry and governments. This was achieved either through: 1) meetings with consuming industry and government officials to evaluate the state of the situation; 2) information seminars attended by industry and government officials; or 3) in countries where the implementation of the responsible use policy is at a more advanced stage, through seminars specialized on industrial ventilation and dust control.

The Third Conference of Mining Ministries of the Americas held in Buenos Aires, Argentina, on November 9, 1998, resulted in the *Buenos Aires Declaration*, which includes an endorsement of the Safe Use Principle for minerals and metals. In this declaration the ministers and heads of delegation agreed: "To adopt, implement and communicate management policies aimed at continuous improvement within their countries and to promote the safe use of minerals and metals, regionally and internationally, taking into account the Conclusions of the Experts who attended the Pan-American Workshop on the Safe Use of Minerals and Metals held in Lima, Peru (July 1-3, 1998)." This declaration was signed

by Argentina, Bolivia, Brazil, Canada, Colombia, Costa Rica, Cuba, Chile, the Dominican Republic, Ecuador, Guatemala, Haiti, Mexico, Nicaragua, Paraguay, Peru, Uruguay, the United States and Venezuela.

### **United States**

The U.S. Geological Survey estimated 1998 Canadian chrysotile imports into the United States at 15 704 t compared to 20 659 t in 1997. Canada remains the largest exporter (99.2%) of chrysotile to the United States, which also produces chrysotile fibres at the King City Asbestos Corporation (KCAC) New Idria mine near Coalinga, California. Shipments from this mine amounted to about 6000 t in 1998, down from 6900 t in 1997.

In the United States, asbestos was consumed in roofing products (48%), friction products (29%), gaskets (17%) and other products (6%). Although no longer manufactured in the United States, asbestos-cement pipes are currently being imported from Mexico into the United States where there remains an important demand for this product in southwestern states. The United States' main import based on tonnage is, however, asbestos-cement sheets, panels and tiles, while based on value its main import is friction products such as brake linings and pads. Total asbestos imports in 1998 amounted to about \$138.7 million, an increase of 16.9% compared to 1997.

U.S. exports of chrysotile fibres, mainly to Japan and Mexico, continued to decline due to reduced demand in these countries. U.S. exports of asbestos-containing products (mostly brake linings and other friction material) to several countries, including Australia, Canada, Germany, Japan, South Korea, Mexico, the United Kingdom and Venezuela, amounted to just over \$194 million, down 4% from 1997.

## **Europe**

### **Belgium**

Following the Belgian Council of Ministers' agreement on January 30, 1998, a Royal Decree banning the production, trade and use of asbestos, as well as any product containing this fibre, was signed on February 21, 1998. Initially planning to implement EU Directive 91/659 regarding asbestos, Belgium changed its course and adopted a more restrictive measure. The Royal Decree is the text of EU Directive 91/659 but with the following measures added: 1) the ban of asbestos-cement for building materials as of October 1, 1998; 2) the ban of friction materials for building applications/heavy industrial vehicles as of January 1, 1999; 3) the ban of friction materials for aircraft as of January 1, 2002; and 4) the ban of closings of high-pressure and calorific pipings (gaskets) as of January 1, 2002.

### **European Commission**

The European Union's (EU) Member State Working Group of Experts met in Brussels July 22-23, 1997, to: 1) receive a consultant's (Environmental Resources Management Group (ERM)) draft final report on the *Recent Assessments of the Hazards and Risks Posed by Asbestos and Substitute Fibres, and Recent Regulation of Fibres World-Wide*; and 2) address a possible move towards a ban on the use of asbestos. The European Commission (EC) then mandated ERM to look at the socio-economic impact of the issue.

On December 16, 1997, the Directorate General III (Industry) of the EC requested the opinion of the Directorate General XXIV (Consumer Policy and Consumer Health Service) on the ERM report. On February 9, 1998, following its peer review of the ERM report, the Scientific Committee on Toxicity, Ecotoxicity and the Environment (SCTEE) of the Directorate General XXIV stated in its report that, "The ERM report provides no new evidence which indicates that a change in the risk assessment for chrysotile is appropriate." On substitute materials, the SCTEE's comments echoed those from a group of international scientists mandated by the Canadian government and its partners to complete a peer review of the ERM report. In effect, the SCTEE mentioned that "... there is no significant epidemiology base to judge the human health risks (of substitutes) ... hence the conclusion that specific substitute materials pose a substantially lower risk to human health, particularly public health, than the current use of chrysotile, is not well founded ..."

However, following the September 14, 1998, adoption of the U.K. Health Department's Advisory Committee on the Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) report (reflecting the U.K. assessment on the lesser risk of substitute products) by the SCTEE, the EC's Directorate General III moved ahead and made a ban proposal to member countries, which includes a phase-in period until 2005. The EC is expected to submit a proposal for the modification of an existing Directive at the next meeting of the Technical Progress Committee (TPC) in the first half of 1999, since this approach does not require any consultation with the Council of Ministers, nor with the European Parliament. If approved by the TPC, the proposal would then be adopted by the EC.

At the end of 1998, four countries (Greece, Ireland, Portugal and Spain) remained determined to continue using chrysotile while its continued use in the United Kingdom was being debated.

### **France**

The French government's decision to ban the import, manufacture and sale of most asbestos products,



which was announced on July 3, 1996, became effective January 1, 1997.

Because the French decision was based on a report (*Health Effects of the Main Types of Asbestos Exposure*) from a credible French scientific body, the Government of Canada undertook to have this Institut National de la Santé et de la Recherche Médicale (INSERM) report reviewed by a panel of international experts hired by the Royal Society of Canada. The main findings of this review (which was peer-reviewed) were: 1) that there are no new scientific data that would justify a change in policy concerning the use of chrysotile asbestos; and (2) that the INSERM report over-estimated the real risks to the French population, mainly because of the lack of realistic exposure data. These findings are very important for Canada as they reinforce its "controlled use" position that was adopted in the early 1980s.

Following diplomatic exchanges between Canada and France at the end of September 1997, the French government indicated its willingness to have further consultations to resolve the asbestos issue. These consultations, termed the "Kouchner process" in reference to French Secretary of State Bernard Kouchner, would include a second meeting between Canadian and French experts to discuss public health risks associated with the use of asbestos, followed by a visit by Minister Kouchner. These meetings, held respectively on April 15-18, 1998, and May 4, 1998, did not result in resolution of the issue.

On July 7, 1998, following recommendations in its earlier report, the INSERM released a summary of the conclusions of an expert panel on the health effects of several asbestos substitute fibres. This study was conducted at the request of the Health Branch and the Labour Relations Branch of the French Department of Employment and Solidarity as a follow-up to the process that began with the INSERM expert panel on asbestos. The main conclusions reported are that: 1) because the "fibre" structure of asbestos is a major pathogenic factor, any new fibre proposed as an asbestos substitute (or for any other use) should automatically be suspected of being pathogenic because of its structure; 2) it was not possible to reach a firm conclusion on the cancer risk posed by substitutes because of a lack of data, especially epidemiological data; and 3) "most likely, similar concentrations of asbestos fibres (as are used currently in experiments to test the carcinogenicity of asbestos substitute fibres) would have yielded results of little or no significance in carcinogenicity studies."

- **World Trade Organization**

On May 28, 1998, the Canadian government announced its decision to initiate an action at the World Trade Organization (WTO) for the settlement of the dispute with France on the issue of

chrysotile asbestos. The government's objective in doing so is to maintain market access for all mineral and metal products, including chrysotile asbestos, in accordance with the Safe Use Principle of the Government of Canada's Minerals and Metals Policy.

Consultations, the first step under the dispute settlement procedures of the WTO, were held on July 8, 1998, in Geneva. Unfortunately, this process did not enable Canada and France to find a mutually satisfactory resolution to the issue.

On October 8, 1998, the Government of Canada formally asked the WTO to establish a dispute settlement panel for the resolution of the dispute with France on the issue of chrysotile asbestos. This request was accepted by the WTO Secretariat on November 25, 1998. The selection of the three panel members who will hear the case began in December 1998 and was ongoing at the end of the year. Once the panellists are appointed, the dispute settlement panel will receive written submissions by Canada and the European Commission (representing France) before proceeding to a first hearing. Written rebuttals will then be provided by both parties before a second hearing is held. After a due process, the panel will issue an interim report to both parties followed by a final report to rule on the issue. This report will likely be made public in the fall of 1999.

Brazil, Zimbabwe and the United States have reserved third-party rights to participate in the panel proceedings. Brazil and Zimbabwe will participate in support of Canada's position, while the United States' interests are mostly judicial.

### **Greece**

The Zidani chrysotile mine in Greece, which returned to production in 1993 under the terms of a renewable five-year lease to Hellenic Mineral Mining Co. Ltd. (HMMC), temporarily shut down in 1998. Its estimated production of chrysotile fibres in 1998 is 35 000 t, or half of what it produced in 1997. The country's asbestos-cement industry, comprising three companies (Hellenic Plastics S.A. (Hellenit), General Company of Building Materials (GEDY), and Inocimenti S.A.), operated with a 45 000-t/y finished product capacity in 1998.

### **United Kingdom**

In accordance with its 1997 commitment to follow a due process in the introduction of new legislation to limit the import, supply and use of chrysotile asbestos and to base its decisions on sound science, the United Kingdom proceeded with two consultations during 1998.

Following up on a March 11, 1998, decision to delay amendments to its Asbestos (Prohibitions) Regulations until the position on the scientific evidence about substitutes became clearer, the U.K. held consultations between April 17 and July 31, 1998, on regulatory proposals to provide greater protection for workers from exposure to asbestos.

On August 18, 1998, based on "authoritative conclusions" drawn by a U.K. Health Department Advisory Committee on the Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) regarding the greater safety of substitutes, the U.K.'s Health and Safety Commission held a second consultation between September 17 and December 17, 1998, on proposals for amendments to the Asbestos (Prohibitions) Regulations 1992.

Participating in these consultations, two sets of submissions (one joint at the international level referred to in the "International Activities" section later in this chapter, and the other Canadian), were provided to the U.K.'s Health & Safety Executive. The latter submission by the Government of Canada, the Government of Quebec, the Asbestos Institute, Canadian chrysotile mining companies, and labour unions restated Canada's policy on the safe and responsible use of chrysotile and voiced arguments against ban measures, including the Health & Safety Commission's (HSC) own evaluation that the costs of banning would exceed the benefits of such a measure.

The HSC also published, on December 16, 1998, a "guidance on substitutes for white asbestos" that will enable it to pursue an active enforcement policy concerning substitution. The United Kingdom is expected to introduce new legislation restricting the use and import of asbestos in step with similar changes in mid-1999 at the European Union level.

## Other Producers

### China

Chrysotile asbestos production in China is estimated at 440 000 t in 1998, mostly emanating from the country's western provinces of Xinjiang and Qinghai and the eastern provinces of Liaoning and Hebei. This production is slated for domestic consumption in the manufacturing of asbestos-cement products used in the development of the country's infrastructure. Asbestos consumption in China is expected to keep pace with the increasing construction activity that may result in an increase in imports.

### Kazakstan

Chrysotile asbestos production in Kazakstan comes from the Kostanai region where the Joint Stock Combine (JSC) Kostanaiasbest operates the Dzhetygarinsk open-pit mine. Production in 1998 is estimated at 100 000 t, down from 150 000 t in 1997.

### Russia

Russia, the world's largest asbestos producer, is estimated to have produced 630 000 t of chrysotile asbestos in 1998, a reduction of about 11% from 1997. The Russian chrysotile mining industry consists of three companies: JSC Uralasbest, JSC Orenburgasbest, and JSC Tuvaasbest, who operate four open-pit mines located in the Urals (3) and in the Tuva region (1) north of Mongolia. An important portion of the country's production is for domestic consumption or is transformed before being exported. About 30% is said to be exported as fibre concentrates while the rest is used to manufacture asbestos-cement products (80%) and technical products (20%) such as friction material products, thermal and electric insulation materials, etc.

### South Africa

Asbestos production in the Republic of South Africa decreased to approximately 25 000 t of chrysotile fibres in 1998, or about half the output in 1997, due to production problems experienced by Msauli Asbes Beperk, which operates an underground mine and processing plant in the Barberton area of Mpumalanga. The rest of South Africa's production comes from two small operators: Kaapsehoop Asbestos and Stella Asbestos, who both operate mines in the same area as above and supply the local markets.

The drop in production also resulted from the closure in early 1997 of the country's last producing crocidolite (blue asbestos) mine located in the Northern Cape Province; it was operated by Griqualand Exploration and Finance Co. (GEFCO). Rehabilitation work at the mining and milling site should be completed in 1999.

The Government of South Africa hosted a National Asbestos Summit on November 24-26, 1998, to review all issues related to the use of asbestos. This summit was essentially a rousing call to initiate a process to deal with the legacy of past mining practices and uses. The main conclusions of the summit were the need to: 1) strengthen South Africa's regulatory system on the controlled use of asbestos; 2) intensify the rehabilitation of asbestos mining dumps; 3) review the compensation and other remedial systems for the recognition of occupational illnesses and compensation to affected workers; and 4) prohibit the use of non-chrysotile asbestos.

### Swaziland and Zimbabwe

In Swaziland, production at the HVL Asbestos (Swaziland) Ltd.-owned Havelock underground chrysotile mine is estimated to have decreased by 7% to 25 000 t compared to 1997. Similarly, at Zimbabwe's Shabanie & Mashaba asbestos mines, chrysotile production is reported to have dropped by

8% from the 1997 production level and forced the company to lay off part of its work force. These drops in production were brought about by lower demand in Asian markets and also, in the case of Zimbabwe, by political instability.

## Responsible Use Policy

To demonstrate its support for the promotion and implementation of the responsible use policy adopted by the chrysotile producers and exporters of five countries (Brazil, Canada, Swaziland, Zimbabwe and South Africa, the latter of which signed in January 1998), the Canadian government signed, on March 3, 1997, a memorandum of understanding (MOU) in support of the responsible use policy with Canadian chrysotile producers. This MOU commits the government to assist the industry in encouraging the governments of asbestos-consuming countries to endorse the responsible use policy and to develop appropriate regulations where they do not already exist.

The responsible use policy, a voluntary industry policy aimed at increasing workers' protection worldwide, resulted from a 1994 meeting and was signed in late 1995/early 1996. The ultimate objective of this new policy, to be known as the "Responsible Use of Chrysotile," is to supply chrysotile only to those users that are in compliance with their respective national regulations or that have submitted a written commitment with an action plan in order to be in full compliance with their national regulations. The responsible use policy is based on the recognition and acceptance of the principles of the 1986 International Labour Organization Convention 162 and Code of Practice on Safety in the Use of Asbestos.

Acting on a conclusion of The International Conference on the Safe and Responsible Use of Chrysotile Fibres held in Montréal on September 16-19, 1997, that "chrysotile producers should export their technology and their expertise with their fibre," the Asbestos Institute in 1998 travelled to Mexico, Cuba, India, Panama, Morocco, Lebanon, Colombia, Algeria and Thailand to hold information seminars and/or training sessions to promote the safe use of chrysotile.

Developed by the Asbestos Institute in cooperation with labour and the governments of Canada and Quebec, the program, which began in October 1997, is aimed at providing Canadian expertise to train workers in targeted consuming countries in order to increase their knowledge of safe and responsible chrysotile asbestos manufacturing techniques. Supported by Natural Resources Canada, this training program promotes the International Labour Organization's Convention 162 on Safety in the Use of Asbestos.

Activities for the promotion of the safe use of chrysotile planned for 1999 include visits to over seven consuming countries.

## International Activities

In parallel with its efforts to assist the Canadian chrysotile industry in the implementation of the producers' responsible use policy, the Canadian government is also consulting with other chrysotile-producing countries (Brazil, Russia, South Africa, Swaziland and Zimbabwe) in order to develop a strategy to further enhance the promotion of the safe use of chrysotile in consuming countries. Five meetings were organized with industry and government representatives of these countries during 1998 to coordinate activities led either by industry, governments or labour to promote the safe use principle as applied to chrysotile asbestos worldwide. These activities include: 1) the presentation to European Union officials of an Aide-Mémoire expressing the producing countries' views on chrysotile and its safe use; 2) a July 31, 1998, submission to the United Kingdom's consultations on the amendment of its asbestos regulations and supporting approved codes of practice; and 3) the meeting, on October 20, 1998, between a union delegation comprising representatives from Angola, Brazil, Canada, India, Portugal, Russia, Swaziland and Zimbabwe and officials from the European Commission to raise their concerns relative to the EC's project to ban asbestos.

Visits to the Canadian chrysotile industry by journalists from Belgium, Morocco and the United Kingdom in 1998, and from Latin America (Chile, Colombia, El Salvador, Panama and the Dominican Republic) in January 1999 were organized to ensure a broader dissemination of the safe use principle to the benefit of consumers, regulators and industries in consuming countries.

## OUTLOOK

As a consequence of the European ban movement, but foremost because of the Asian financial crisis, worldwide chrysotile consumption will remain depressed in 1999 compared to pre-1997 levels. However, signs of a recovery in Thailand at the end of 1998 may indicate a gradual resumption in demand in Asian countries in 1999, especially in Thailand, Malaysia, Indonesia and South Korea. Demand from Japan, which was still battling at the end of the year to stabilize and reorganize its financial system, is expected to remain depressed in 1999. Already felt in 1997 (lower demand in Asian markets was felt starting in mid-1997), the Asian crisis resulted in a decrease in Canadian exports to Asian countries of 39% compared to 1996 levels. The combination of a gradual increase in consumption in Asian countries

and a need for consumers to re-stock inventories drawn down in 1998 will likely result in increased exports in 1999. Canadian producers, who export about 60% of their production to Asia (while the European market only accounts for about 6%), are expecting a 3-5% increase in their total sales in 1999. The full recovery of the Asian market is not expected before 2002.

In Europe, the loss of France as a major consumer, and the impact of its ban decision on chrysotile consumption in other European consuming countries, led to a 59% decrease in exports to the area in 1998 compared to 1996. It is, however, comforting to see that the last European countries with a chrysotile industry, particularly Spain, Portugal, Greece and Turkey, appear determined to continue using the product.

In developing countries, the benefits and safety of chrysotile-cement products continue to be recognized despite increasing competition from substitute fibres and galvanized steel. In particular, chrysotile-cement pipes are essential to the distribution of potable water and irrigation in many countries where aggressive soils and economic conditions are not appropriate for substitute products. Asian countries are still the main markets for Canadian fibres, accounting for just under 60% of Canadian exports in 1998. Japan remained the preferred destination during the year, despite a 31% drop in imports compared to 1997, while exports to Thailand, the area's second highest, fell by 50%. One of the rare countries to register an increase in 1998 (for the second year in a row) is India where exports grew by 10% and are expected to remain strong for the next few years, mainly due to increased demand for infrastructure. Indonesia and South Korea continued to be very significant markets in 1998, but exports fell by 45% and 63% respectively compared to 1997. Exports to these two countries are expected to recover gradually in 1999 when the effect of the monetary crisis subsides.

The Americas increased its relative position as an important destination for Canadian chrysotile, accounting for over 27% of Canada's exports. However, this increase only reflects a smaller incremental reduction in imports compared to Canada's other international markets since exports to most countries of the Americas decreased relative to 1997. This decrease in demand was brought about by the impact of the Asian financial crisis on the export-based economies of these countries. In 1998, Mexico's imports decreased by 19% compared to 1997 as a result of a marked downturn in its economy; exports to Mexico in 1999 should improve slightly. However, Canadian exports to Cuba in 1998 decreased by 33% compared to 1997, remaining at a level 49% higher than in 1995; in 1999, Cuba should continue to be an important destination for Canadian chrysotile. Exports to the United States decreased by about 24% in 1998 compared to 1997, but are expected to stabi-

lize at this level for the coming years. Canadian chrysotile exports to Colombia, Brazil and Chile decreased by 4%, 2% and 42% respectively compared to 1997. The only significant increase in imports reported were to El Salvador (122%), Ecuador (73%) and the Dominican Republic (155%).

In Africa, Canadian exports fell significantly in 1998, most notably in Morocco and Tunisia, whereas exports to Algeria and Nigeria recovered part of the volume lost in recent years as a result of social unrest and/or competitive Russian exports to these regions. Canadian exports to the Middle East, mostly to the United Arab Emirates and Egypt, increased by 35% compared to 1997.

The aggressive introduction of new chrysotile-containing products to address current health concerns may help turn markets around in the medium term.

*Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 65. (2) Information in this review was current as of February 1, 1999.*



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**TARIFFS**


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Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
2524.00.10	Crude asbestos	Free	Free	Free	Free
2524.00.90	Other asbestos	Free	Free	Free	Free
6811.10	Corrugated sheets of asbestos-cement, of cellulose fibre-cement or the like	5%	Free	Free	Free
6811.20	Sheets, panels/tiles, etc., of asbestos-cement, cellulose fibre-cement, etc.	5%	Free	Free	Free
6811.30	Tubes, pipes, and tube or pipe fittings of asbestos-cement, of cellulose fibre-cement, etc.	5%	Free	Free	Free
6811.90	Other articles of asbestos-cement, of cellulose fibre-cement, or the like	5%	Free	Free	Free
6812.10	Fabricated asbestos fibres; mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate	Free	Free	Free	Free
6812.20	Asbestos yarn and thread	Free	Free	Free	Free
6812.30	Asbestos cords and string, whether or not plaited	Free	Free	Free	Free
6812.40	Asbestos woven or knitted fabric	Free	Free	Free	Free
6812.50	Asbestos clothing, clothing accessories, footwear and headgear	15.5%	Free	Free	Free
6812.60	Asbestos paper, millboard and felt	Free	Free	Free	Free
6812.70	Compressed asbestos fibre jointing, in sheets or rolls	Free	Free	Free	Free
6812.90	Other asbestos fabricated products n.e.s.	Free	Free	Free	Free
6813.10.10	Asbestos brake linings and pads for motor vehicles of heading nos. 87.02, 87.03, 87.04 or 87.05	7%	Free	Free	Free
6813.10.90	Other asbestos brake linings and pads	5%	5%	Free	Free
6813.90.10	Asbestos clutch facings for motor vehicles of heading nos. 87.02, 87.03, 87.04 or 87.05	Free	Free	Free	Free
6813.90.90	Other asbestos friction material and articles	Free	Free	Free	Free

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Sources: Customs Tariff, effective January 1999, Revenue Canada; Harmonized Tariff Schedule of the United States, 1999.

n.e.s. Not elsewhere specified.

**TABLE 1. CANADA, ASBESTOS PRODUCTION AND TRADE, 1997 AND 1998**

Item No.	1997		1998P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>PRODUCTION (Shipments)</b>					
By type					
Group 3, spinning	4 788	5 490	..	..	
Group 4, shingle	92 569	78 342	..	..	
Group 5, paper	94 123	55 207	..	..	
Group 6, stucco	147 297	56 507	..	..	
Group 7, refuse	81 501	19 364	..	..	
Total	420 278	214 910	320 000	167 200	
By province					
Quebec	420 278	214 910	320 000	167 200	
Newfoundland	—	—	—	—	
Total	420 278	214 910	320 000	167 200	
<b>EXPORTS</b>					
2524.00.10	Crude asbestos				
	United States	1 831	497	3 209	783
	Japan	962	374	276	109
	Total	2 793	871	3 485	892
2524.00.21	Asbestos milled fibres, Group 3 grades				
	EC countries (12) <sup>1</sup>				
	Spain	248	321	396	653
	Portugal	72	95	93	125
	Germany	11	15	—	—
	EC countries, subtotal	331	431	489	778
	Mexico	1 097	1 420	1 104	1 562
	United Arab Emirates	—	—	738	1 218
	Algeria	—	—	400	660
	Hungary	213	276	342	564
	Turkey	734	952	332	527
	Peru	230	298	288	374
	Cuba	1	1	301	370
	India	185	242	248	298
	South Korea	466	604	219	284
	Other countries	1 011	1 255	569	656
	Total	4 268	5 479	5 030	7 291
2524.00.22	Asbestos milled fibres, groups 4 and 5 grades				
	EC countries (12) <sup>1</sup>				
	Spain	7 250	6 841	6 399	6 320
	Portugal	2 219	2 074	2 815	2 646
	United Kingdom	1 792	1 479	619	408
	Greece	—	—	115	131
	Ireland	648	416	171	110
	Germany	55	76	70	94
	France	21	22	18	33
	Belgium	1 456	1 400	—	—
	Denmark	13	9	—	—
	EC countries, subtotal	13 454	12 317	10 207	9 742
	Japan	35 370	33 026	26 757	25 015
	India	17 917	14 436	20 610	16 693
	Colombia	10 416	9 122	12 380	10 587
	Thailand	31 655	22 808	14 515	10 143
	Mexico	13 409	11 135	9 734	7 976
	Brazil	7 154	6 359	7 564	6 639
	Malaysia	4 909	3 849	4 953	3 947
	Sri Lanka	4 025	3 962	3 768	3 622
	Indonesia	9 418	6 560	5 101	3 442
	United Arab Emirates	2 485	2 310	3 163	3 100
	South Korea	6 046	3 242	4 718	3 057
	Cuba	6 346	4 769	3 636	2 621
	Algeria	2 136	1 970	3 020	2 554
	Egypt	2 123	2 268	2 363	2 428
	Nigeria	2 071	1 498	2 966	2 321
	Chile	3 652	3 181	1 984	1 692
	Other countries	20 113	17 233	15 152	13 006
	Total	192 699	160 045	152 591	128 585

TABLE 1 (cont'd)

Item No.	1997		1998P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>EXPORTS (cont'd)</b>					
2524.00.29	Asbestos shorts, groups 6, 7, 8 and 9 grades				
	EC countries (12) <sup>1</sup>				
	Portugal	1 974	612	2 674	956
	Spain	2 188	978	1 924	822
	United Kingdom	2 014	696	781	235
	Ireland	1 033	411	239	95
	Germany	48	16	108	37
	Belgium	914	373	—	—
	Denmark	113	57	—	—
	Greece	36	9	—	—
	EC countries, subtotal	8 320	3 152	5 726	2 145
	Japan	48 603	19 647	31 117	12 995
	India	25 917	11 433	27 762	11 366
	Thailand	38 455	17 554	20 794	8 909
	United States	18 748	5 557	12 341	3 814
	Mexico	11 635	3 903	10 431	3 488
	South Korea	24 187	8 712	6 382	2 172
	Indonesia	11 241	4 766	6 244	2 170
	Colombia	8 108	3 366	5 395	2 067
	Brazil	5 431	1 756	4 940	1 863
	Malaysia	5 935	2 389	4 223	1 751
	Taiwan	3 529	1 470	3 628	1 557
	Other countries	20 373	7 998	19 341	7 659
	Total	230 482	91 703	158 324	61 956
	Grand total, crude, milled fibres and shorts	430 242	258 098	319 430	198 724
6811.10	Corrugated sheets of asbestos-cement, of cellulose fibre-cement, or the like				
	United States	..	16	..	8
	Total	..	16	..	8
6811.20	Sheets n.e.s., panels/tiles, etc., of asbestos-cement, cellulose fibre-cement, etc.				
	United States	..	1 247	..	11 340
	Japan	..	94	..	70
	Cuba	..	758	..	52
	Guinea	—	—	..	9
	Liberia	—	—	..	5
	Ukraine	..	26	—	—
	Total	..	2 125	..	11 476
6811.30	Tubes, pipes and tube or pipe fittings of asbestos-cement, of cellulose fibre-cement, etc.				
	United States	..	5	—	—
	Total	..	5	—	—
6811.90	Articles n.e.s. of asbestos-cement, of cellulose fibre-cement, or the like				
	United States	..	111	..	422
	Taiwan	—	—	..	18
	Total	..	111	..	440
6812.10	Fabricated asbestos fibres; mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate				
	United States	..	21	..	50
	Cuba	—	—	..	6
	Taiwan	..	12	—	—
	Mexico	..	56	—	—
	Total	..	89	..	56

TABLE 1 (cont'd)

Item No.	1997		1998P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>EXPORTS (cont'd)</b>					
6812.20	Asbestos yarn and thread				
	Brazil	94	451	178	791
	Venezuela	52	280	74	368
	Iran, Islamic Republic of	29	88	30	90
	United Kingdom	19	65	14	75
	Uruguay	—	—	14	70
	Uganda	—	—	14	67
	United States	1	21	1	18
	Other countries	33	115	—	—
	Total	218	1 020	325	1 479
6812.30	Asbestos cords and string, whether or not plaited				
	United States	..	23	..	22
	Cuba	—	—	..	5
	Total	..	23	..	27
6812.40	Asbestos woven or knitted fabric				
	United Kingdom	124	1 083	67	604
	United States	30	387	23	341
	Brazil	—	—	25	155
	Japan	—	—	2	49
	Other countries	23	277	—	—
	Total	177	1 747	117	1 149
6812.50	Asbestos clothing, clothing accessories, footwear and headgear				
	Singapore	—	—	..	29
	Taiwan	—	—	..	14
	Cuba	..	18	—	—
	Total	..	18	..	43
6812.60	Asbestos paper, millboard and felt				
	United States	—	—	..	19
	Taiwan	—	—	..	17
	Total	—	—	..	36
6812.70	Compressed asbestos fibre jointing, in sheets or rolls				
	United States	..	1 028	..	947
	Other countries	..	262	..	155
	Total	..	1 290	..	1 102
6812.90.10	Asbestos building material, n.e.s.				
	India	—	—	..	21
	Cuba	—	—	..	17
	United States	..	11	—	—
	United Arab Emirates	..	31	—	—
	China	..	59	—	38
	Total	..	101	..	76
6812.90.90	Other asbestos fabricated products, n.e.s.				
	United States	..	114	..	51
	Other countries	..	66	..	31
	Total	..	180	..	82
6813.10	Asbestos brake linings and pads				
	United States	..	43 184	..	48 769
	Other countries	..	294	..	570
	Total	..	43 478	..	49 339



TABLE 1 (cont'd)

Item No.		1997		1998P	
		(tonnes)	(\$000)	(tonnes)	(\$000)
<b>EXPORTS (cont'd)</b>					
6813.90	Asbestos friction material and articles, n.e.s.				
	United States	..	7	..	62
	Venezuela	..	43	-	-
	Total	..	50	..	62
Total exports, asbestos manufactured		..	308 351	..	264 061
<b>IMPORTS</b>					
2524.00.10	Crude asbestos	-	-	82	78
2524.00.90	Other asbestos	-	-	57	30
6811.10	Corrugated sheets of asbestos-cement, of cellulose fibre-cement, or the like	198	154	70	80
6811.20	Sheets n.e.s., panels/tiles, etc., of asbestos-cement, cellulose-fibre cement, etc.	1 145	1 411	1 355	1 485
6811.30	Tubes, pipes, and tube or pipe fittings of asbestos-cement, cellulose fibre-cement, etc.	488	436	659	565
6811.90	Articles n.e.s., of asbestos-cement, cellulose fibre-cement or the like	120	609	169	856
6812.10	Fabricated asbestos fibres; mixtures with a basis of asbestos or with a basis of asbestos and magnesium carbonate	13	165	9	77
6812.20	Asbestos yarn and thread	2	10	3	24
6812.30	Asbestos cords and string, whether or not plaited	15	80	21	165
6812.40	Asbestos woven or knitted fabric	40	551	29	401
6812.50	Asbestos clothing, clothing accessories, footwear and headgear	11	265	12	273
6812.60	Asbestos paper, millboard and felt	..	278	..	382
6812.70	Compressed asbestos fibre jointing, in sheets or rolls	127	1 508	86	942
6812.90.10	Asbestos belting	..	5	-	-
6812.90.90	Other asbestos fabricated products n.e.s.	..	2 455	-	-
6813.10	Asbestos brake linings and pads	..	69 002	..	66 484
6813.90	Asbestos friction material and articles n.e.s.	..	8 274	..	6 683
Total imports		..	85 278	..	81 022

Sources: Natural Resources Canada; Statistics Canada.

- Nil; .. Not available or not applicable; n.e.s. Not elsewhere specified; P Preliminary.

<sup>1</sup> EC includes Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom.

Note: Numbers may not add to totals due to rounding.

**TABLE 2. CANADIAN CHRYSOTILE PRODUCERS, 1998**

Producers	Mine Location	Normal Mill Capacity		Remarks
		Ore/Day	Fibre/Year	
		(tonnes)		
Teranov Mining Corp.	Baie Verte, Nfld.	6 000	20 000	Wet-processing of tailings started in July 1991. Jointly owned by Black Hill Minerals Ltd. (50%) and Cliff Resources Corporation (50%). Did not produce since 1994.
LAB Chrysotile Inc. <sup>1</sup>				Partnership owned 55% by LAQ and 45% by Mazarin Mining Corporation Inc.
- Lac d'Amiante du Québec, Ltée (LAQ)	Black Lake, Que.	9 000	185 000	Open-pit. Since September 1989, LAQ has been owned by Jean Dupéré (President of LAB Chrysotile) and Connell Bros. Company, Ltd. of the United States.
- Asbestos Corporation Limited British Canadian mine	Black Lake, Que.	7 000	55 000	Sold to Mazarin Mining Exploration Inc. on September 2, 1992. Open-pit. Re-opened on July 8, 1996, on a slightly smaller scale; to close again on November 1, 1997.
- Bell Asbestos Mines, Ltd.	Thetford Mines, Que.	2 700	100 000	Sold to Mazarin Mining Exploration Inc. on September 2, 1992. Underground. Mine re-opened January 1989.
J.M. Asbestos Inc. Jeffrey mine	Asbestos, Que.	15 000	250 000	Open-pit (effective capacity reduced by one half since 1982).
Total of four producers at year-end			590 000	

<sup>1</sup> A partnership involving three operating companies.

**TABLE 3. CANADA, ASBESTOS PRODUCTION AND EXPORTS, 1986-98**

	Crude Asbestos	Milled Fibres	Short Fibres	Total
	(tonnes)			
<b>PRODUCTION<sup>1</sup></b>				
1986	–	332 092	330 289	662 381
1987	–	365 144	299 402	664 546
1988	14	399 550	310 793	710 357
1989	–	410 588	303 448	714 036
1990	–	379 047	306 580	685 627
1991	–	335 506	350 502	686 008
1992	–	259 819	327 175	586 994
1993	–	235 908	287 059	522 967
1994	–	249 862	280 995	530 857
1995	–	255 621	259 932	515 553
1996	..	241 188	265 088	506 276
1997 <sup>r</sup>	..	..	..	420 278
1998 <sup>p</sup>	..	..	..	320 000
<b>EXPORTS</b>				
1986	127	375 948	341 609	717 684
1987	1 696	353 321	293 808	648 825
1988	11 288	381 561	292 236	685 085
1989	17 198	379 601	312 915	709 714
1990	1 469	378 074	269 942	649 485
1991	2 302	353 391	330 360	686 053
1992	1 489	272 013	327 075	600 577
1993	1 739	229 000	279 695	510 434
1994	2 155	248 804	280 394	531 353
1995	968	251 251 <sup>r</sup>	257 356	509 575
1996	911	239 111	263 985	504 007
1997 <sup>r</sup>	2 793	196 967	230 482	430 242
1998 <sup>p</sup>	3 485	157 621	158 324	319 430

Sources: Natural Resources Canada; Statistics Canada.

– Nil; .. Not available; **P** Preliminary; <sup>r</sup> Revised.<sup>1</sup> Producers' shipments.