

**EUROPEAN COMMUNITIES – MEASURES AFFECTING
ASBESTOS AND ASBESTOS-CONTAINING PRODUCTS**

Report of the Panel

Addendum

This addendum contains the annexes to the Report of the Panel to be found in document WT/DS135/R.

ANNEXES

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Article 9

The Minister for Justice, the Minister for Equipment, Housing, Transport and Tourism, the Minister for Labour and Social Affairs, the Minister for the Economy and Finance, the Minister for the Environment, the Minister for Industry, Postal Services and Telecommunications, the Minister for Agriculture, Fisheries and Food, the Deputy Minister for the Budget, the Government Spokesperson, and the Deputy Minister for Finance and Foreign Trade shall be responsible, each in his own sphere of competence, for implementing the present Decree, which shall be published in the Official Journal of the French Republic.

Done at Paris, 24 December 1996.

By the Prime Minister

ALAIN JUPPE

The Minister for Labour and Social Affairs,
JACQUES BARROT

The Minister for Justice,
JACQUES TOUBON

*The Minister for Equipment, Housing,
Transport and Tourism*
BERNARD PONS

The Minister for the Economy, and Finance,
JEAN ARTHUIS

The Minister for the Environment,
CORINNE LEPAGE

*The Minister for Industry, Postal Services and
Telecommunications*
FRANCK BOROTRA

The Minister for Agriculture, Fisheries and Food,
PHILIPPE VASSEUR

*The Deputy Minister for the Budget,
Government Spokesperson,*
ALAIN LAMASSOURE

*The Deputy Minister for Finance and
Foreign Trade,*
YVES GALLAND

ANNEX II**QUESTIONS – REPLIES****At the First and Second Substantive Meetings
(1-2 June 1999 and 20-21 January 2000)****I. QUESTIONS TO THE PARTIES****A. QUESTIONS AT THE FIRST SUBSTANTIVE MEETING (1-2 JUNE 1999)****1. Questions by the Panel to Canada**

Question 1: Canada states that "the risks to health associated with modern chrysotile products are undetectable". Does the concept of "undetectable" risk mean the same for Canada as no risk?

1. The term "undetectable" should not be interpreted as a subjective judgement with respect to risk management, but rather as a scientific term related to quantification of the risk. In the specific context of its submission, Canada could just as easily have used the expression "below detection limits" (BDL), which is commonly used by scientists. This expression means that as determined using the latest methods and techniques and the most rigorous statistical analysis, the risk (effect) related to exposure conditions (type of fibre, dose, duration) is so slight, if it exists at all, as to be "below detection limits". Scientists generally do not use the expression "zero effect" or "no risk" or any other similar expression to describe a level of risk. Rather, they use "below detection limits" (BDL). The term "undetectable" used by Canada and the scientific community at large should be interpreted in this specific sense. Canada considers that it is inappropriate to use expressions such as "zero risk" or "no risk". Canada thus adheres strictly to the scientific definition of the expression used, i.e., not "no risk", but "undetectable risk", as indeed do the European Communities. In fact, the European Communities themselves corroborate the validity of this concept when they state, with respect to ambient concentrations of asbestos in buildings, that "it is clear that the risk [thereof] is undetectable".

Question 2: In its oral submission (1 June) Canada indicated, with respect to encapsulated products, that chrysotile fibres are only released under certain conditions. What are those conditions?

2. Products in which chrysotile is an encapsulated component release virtually no generaother osensuch

of practice cover the tools and procedures for use with
installation methods can eliminate the need to cut or drill
sites, since those products are distributed in various
specifications. Where products do have to be drilled or cut
the release of dust and keep it well within the level
confirmed by laboratory tests and testing at construction
installation of asbestos products.¹

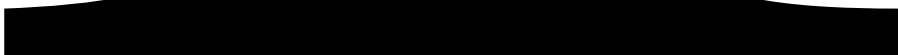
4. These workers are subject to exposure peaks, which depends on the
protective measures in place. However, aside from the intensity of exposure
is also critical, for the risk is essentially determined by the duration of exposure
according to the studies by CONSAD for OSHA (Occupational Safety and Health
1985 and 1990, the average annual exposure for such workers is 2 to 30 times higher than for
occupants of buildings with asbestos insulation, which is 0.002 to 0.02 f/ml). It can be inferred that
(exposure of 0.002 to 0.02 f/ml). It can be inferred that the exposure for such
workers is 2 to 30 times higher than for occupants of such buildings. The lifetime risk of some 20 to 300 per million, which
to have a lifetime risk of some 20 to 300 per million, which has not been shown or measured empirically.²

5. Unlike professional workers, private individuals are exposed very sporadically with
chrysotile cement products. The exposure incurred by such individuals will only be a
fraction of that of professional workers. Consequently, workers on a daily
basis with chrysotile-cement products are not subject to the same risks as logically private
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the release of fibres is at levels which do not measurably add to the chrysotile naturally present in the environment. The European Communities recognize that at such levels "it is clear that the risk is undetectable".

Question 4(a): What exactly does Canada mean by "modern chrysotile products" or "modern asbestos products"?

7. By "modern chrysotile products", Canada means the range of non-friable products where: (i) only chrysotile asbestos is used, but no amphibole asbestos (crocidolite and amosite); and (ii) in which the fibres are firmly bonded physically and chemically into the matrix (cement, asphalt, resins, plastic, etc.) of the compound (chrysotile-cement, friction material, asphalt road surfacing, etc.) and

11. This observation demonstrates the importance of producing a register of buildings containing flockings and introducing regulations requiring consultation of the register and/or inspection of buildings to be demolished to determine whether or not flockings are present before a demolition permit is issued.

12. When it is determined that a building contains flockings, specific control measures must be followed if demolition is considered necessary.

13. Otherwise, demolition of structures containing products in which chrysotile is encapsulated (generally flat or corrugated sheeting and roof tiles) requires only elementary precautions since chrysotile-cement debris remains largely inert. In Quebec, for example, demolition is regulated by the Code of Safety for the Construction Industry issued by the Occupational Health and Safety Commission (Commission de la Santé et de la Sécurité du Travail). The debris resulting from demolition is disposed of in public landfill sites for solid wastes in the same way as other construction waste and coated with covering materials as a preventative measure, superfluous according to some, in order to ensure that no chrysotile dust is left suspended in the air. Under these conditions, chrysotile-cement debris causes little or no increase in natural concentrations of asbestos in the environment, levels which the European Communities, it should be recalled, consider "undetectable." Moreover, as chrysotile asbestos is not soluble and in any case constitutes no risk when ingested, it has no effect on the local or nearby water-table.

14. Private individuals who work on a construction containing chrysotile asbestos in everyday life run little risk since such work is very sporadic and generally of short duration, while chrysotile-related risks are primarily associated with prolonged occupational exposure to high concentrations of fibres.

15. It should also be noted that individuals should exercise equal care when working with any cement material, whether or not it contains chrysotile, because they are exposed to risks of the same magnitude due to the presence of other dust, such as crystalline silica or substitute fibres which may be released during the work. Crystalline silica is classified as a Group I carcinogen by the IARC and no study has yet been carried out on the health risks associated with the inhalation of dust from substitute fibres which may be released into the air during work of this type.

16. Wearing a "surgical" type mask would be a wise precaution whenever work by an individual on any form of material might result in the formation of respirable dust.

Question 6: International institutions such as WHO or ILO are encouraging a gradual switch to substitute products (see for example ILO Convention 162 concerning Safety in the Use of Asbestos; IPCS Environmental Health Criteria (203) on Chrysotile, WHO 1998). Does Canada subscribe to this approach?

17. Canada has itself ratified Convention 162 concerning Safety in the Use of Asbestos. The Convention should, however, be considered in its entirety, and it should be recalled that in Article 10, ILO encourages a gradual switch to substitute products "where necessary to protect the health of workers and technically practicable ... by other materials or products or the use of alternative technology, scientifically evaluated by the competent authority as harmless or less harmful."

18. To date, no comparative scientific study has conclusively shown that, under similar conditions of production, manufacture or use, substitute products are harmless or less harmful than chrysotile asbestos. Indeed, some recent studies show that chrysotile displays lower biopersistence than the main fibrous substitutes such as refractory ceramic fibres, glass fibres, aramid fibres and cellulose fibres. There are also numerous scientific studies in existence which show that, at the low levels of exposure currently observed in the chrysotile products industry (generally less than 1 fibre/ml.), there is no measurable increase in the risk to human health.

19. The same argument applies to the IPCS *Environmental Health Criteria (203) on Chrysotile*, WHO 1998, which states: "where safer substitute materials for chrysotile are available, they should be considered for use."⁴

Question 7: What criteria should be used to determine the relative risk associated with substitute products and chrysotile asbestos?

20. Canada has referred to the consensus that the relative risk of fibrous materials varies according to three factors ("3 D"): dimension, durability and dose.

21. The dimension (length and diameter) affects "respirability". This is the factor which determines whether a fibre can actually penetrate the confines of the respiratory system: the alveoli.

22. However, the dimension factor is a necessary but not sufficient condition. An inhaled fibre must stay in the system long enough i.e. it must have sufficiently long (biopersistence) to exert its pathogenic effect. This is the durability factor. In this respect, Canada has submitted (and the latest data, which Canada can provide, confirms this) that in inhalation experiments with animals, chrysotile is very quickly eliminated from the lungs (within 24 to 48 hours), while amphiboles persist practically indefinitely, and then trigger the range of inflammatory reactions which precede and herald the known pathologies. The small quantity of data available on the biopersistence of certain substitute fibres (for example aramid fibres are more biopersistent than chrysotile) suggest that the durability factor should be seriously considered in evaluating the relative risk associated with fibres of substitutes for chrysotile asbestos. In this connection, the following quotation from a Scandinavian study bears repeating:

"(...) adverse effects are associated rather with the fibres that are retained (amphiboles), than with the ones being cleared (largely chrysotile)".⁵

23. Another study, published in 1995, indicates that: "biopersistence of inhaled fibrous materials is a critical factor in determining carcinogenic potency."⁶

24. A recent report by Bernstein (1997) for the *Joint Research Centre, Environmental Institute, European Chemical Bureau* in Ispra (Italy) under the title *Correlation Between Short Term Biopersistence and Chronic Toxicity Studies* confirmed the relevance of the durability factor in evaluating the risk associated with substitute fibres and chrysotile asbestos.⁷

25. We had good reason to draw attention to the importance of the third factor, the dose. It introduces the phenomenon of the threshold of exposure above which harmful effects begin to appear, and below which (with obvious differences according to the type of fibrous material) the risk, if any, becomes undetectable.

26. Although the "3 D" are the recognized critical factors in the risk associated with respirable fibres, other factors; Such as the capacity to induce the production of reactive molecular forms may influence the degree of risk. Indeed, as several fibre toxicity mechanisms remain uncertain, it must be ensured that the experimental and epidemiological studies to evaluate the risk posed by the fibres to

⁴ IPCS *Environmental Health Criteria (203) on Chrysotile*, WHO, Geneva, 1998, p.144.

⁵ Albin A., Pooley F.D., Strömberg U., Attewell R., Mitha R. and Welinder H., *Retention Patterns of Asbestos Fibres in Lung Tissue among Asbestos Cement Workers*, (1994) *Occup. Environ. Med.* 51: 05-211.

⁶ Bellman and Muhle, (1995) *Schriftenreihe der Bundesanstalt für Arbeitsschutz (Federal Office for Worker Protection)*.

⁷ Bernstein, *Correlation between Short Term Biopersistence and Chronic Toxicity Studies* (1997) *Joint Research Centre, Environmental Institute, European Chemicals Bureau in Ispra (Italy)*.

which has not occurred since the early 1980s, and a ban on chrysotile would not in any way alter the situation.

31.

36. Recent analyses of Canadian data on mesothelioma in Canada¹¹, British Columbia¹² and Quebec¹³⁻¹⁴ agree that rates of incidence of mesothelioma have been stable in women of all age groups since 1984. In Quebec, the rates are 70 per cent higher than elsewhere in Canada, probably because of more frequent and more intense exposure in the workplace. In fact, Quebec produced about half of the world's commercial chrysotile until the 1950s. Quebec also used large quantities of amphiboles in various sectors, particularly in certain sectors in which many women were employed, especially during the Second World War.

37. According to a study by Schanzer, Semenciw and Ugnat (Health Canada, 1997), the incidence of mesothelioma in men in Canada increased by 22 per cent from 1984 to 1993, half the increase estimated by the French experts, and also half that in France.¹⁵ Over the same ten-year period, the incidence of mesothelioma rose by 45 per cent in Quebec (the same as in France), 34 per cent in Ontario, 0 per cent in British Columbia and less than 10 per cent for the rest of Canada. These rates reflect wide disparities in Canada, contrary to the European Communities' assertion. The incidence in men also levelled off in 1984 in British Columbia (according to Coleman and Philips), and seems to have levelled off in Quebec after 1990.

38. Finally, the analysis of Canadian rates between 1973 and 1992 (Schanzer and colleagues, 1997) estimates that the risk is four times higher for men born before 1940 than for those born between 1951 and 1955. These analyses therefore suggest that the incidence of mesothelioma has levelled off in Canada is declining in British Columbia, and has levelled off in Quebec.

39. The following table, adapted from the one submitted by the European Communities, shows that despite the much higher asbestos production in Canada and Quebec than in France, the incidence of mesothelioma and the increase in that incidence were lower in Canada than in France. Thus, although Quebec produced almost half the chrysotile used in the world, the incidence of mesothelioma in Quebec was, surprisingly, no higher than in France.

40. With respect to the proportion of lung cancer cases attributable to occupational exposure to asbestos, no country in the world possesses such statistics. However, case-control studies of a number of cancers and types of exposure in the general population in Canada (some metropolitan regions or provinces) suggest an upper limit to the proportion of lung cancer cases attributable to asbestos, but they suffer from flaws which make it impossible to determine the specific proportion that is due to asbestos, independently of other major risk factors.

41. A case-control study of cancers in Montreal¹⁷ suggests that the specific association between lung cancer and asbestos would explain at most 7.6 per cent of lung cancers in men between 1979 and 1985; but the real proportion is lower because part of the 7.6 per cent is attributable to concomitant exposure: PAHs (polycyclic aromatic hydrocarbons), solvents, alkanes, welding fumes, tobacco (residual effects after statistical control), etc.

42. Case-control studies in the United States, the United Kingdom and Sweden provide other estimates of the percentage of lung cancers attributable to asbestos. As the review of the studies¹⁸ cited by INSERM (pages 10 and 179 of the Report) indicates, the enormous heterogeneity of these studies (e.g. the attributable percentage ranges from 0.6 per cent to 16.6 per cent in the United Kingdom alone) stems from variations in the prevalence of asbestos exposure (types of industry and proportion of workers exposed), which prevents any extrapolation of their findings to Canada (or to France).

Question 19: China's defense to the WTO's report on PAHs as a specific Swiss product from fa25 now Tj

45. Report 203 also recognizes the difference in the dangers associated with chrysotile and amphiboles:

"The mechanisms of the relatively more rapid clearance of chrysotile fibres compared to those of amphiboles (...)"

"The more rapid removal of chrysotile fibres from the human lung is further supported by findings from animal studies (...)"²⁰

46. Report 203 recognizes that the presence of chrysotile fibres in water is harmless:

"... it was concluded that there was little convincing evidence of an association between asbestos in public water supplies and cancer induction. More recent identified studies do not contribute additionally to our understanding of health risk associated with exposure to chrysotile in drinking water."⁴⁶ RepdiesEHC No. 53ies art)terggasbliesveleaxposs wd tsoevanced wand

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or no relation to these risk factors. Rather, specific information should be provided for each country on the following: the proportion of workers exposed, the conditions of exposure (types of industry and products, workplace hygiene regulations) product uses and distribution in various population groups (brakes, flockings, construction materials, cement, public buildings, etc.), the types of asbestos used and their applications. These conditions vary greatly from country to country and over time.

51. No analysis can distinguish the impact of asbestos imports by type of fibre for the following reasons: (i) the available data do not normally allow us to distinguish retrospectively between the mineralogical types of imported asbestos; (ii) even if such information were available, it would not be possible to distinguish the effects based on mineralogical type of asbestos because the volumes of imports of chrysotile and amphiboles are closely correlated (i.e. historically, the more chrysotile that was imported, the more amphiboles were imported too); and (iii) there are paradoxes, such as countries which produced chrysotile while also importing amphiboles to satisfy their industrial needs of the time.

52. Furthermore, importing a small quantity of amphiboles for uncontrolled use, in flockings, for

countries and often led to higher risks of pathologies than in countries/regions that import more asbestos.

56. Technically speaking, what the Panel and the European Communities call "logic" consists of an error of inference which is classic in epidemiology, the social sciences and biostatistics: the ecological fallacy. This fallacy consists of confusing observations of large groups (aggregates) showing non-specific aggregate correlations with real individual effects. In particular, it consists of ignoring the fact that the conditions of exposure and "co-factors" (other risk factors) for individuals in the various large aggregates vary enormously. These big observation units are so broad that they are in fact not comparable or similar when it comes to the factors which actually determine the risk.

57. Thus, in the case of chrysotile, the study and graph by Takahashi *et al* cited by the European Communities do not distinguish between the effects of chrysotile and those of asbestos; separate graphs are needed for the consumption of chrysotile and amphiboles. In fact, similar graphs and correlations to those of Takahashi would be obtained for the consumption of artificial fibres or consumption of cement. What should one deduce from that?

58. Crude ecological correlations lend themselves to arbitrary and contradictory interpretations. There are only ten countries in the graph, which is too few: the sample, selection criteria or their characteristics skew the analysis. If another twenty countries were added, including Quebec, South Africa and Western Australia, the picture would be more representative but much less coherent, the correlation would be weaker and the line would be flatter. Indeed, to fit a straight line between these ten points is arbitrary. The best correlation with Takahashi's ten points is not a straight line but rather an "S-shaped" curve (e.g. logistic or cumulative normal curve), with a practical risk threshold (no risk for consumption below 1 kg./capita/year) and a risk ceiling (no additional risk for consumption over 2.5 kg./capita/year). It is no more absurd to argue for this interpretation than for a linear relationship. We are not saying that these data show a risk threshold, but wish to underline the arbitrary nature of the European Communities' interpretation of these ecological data.

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the same oral submission, Canada adds the following: "the French measure deviates significantly from the precepts of international standards". In other words, the French measure deviates to such an extent from the fundamental principles of international standards that the latter are no longer recognizable.

Question 14: Is there any difference between the concept of using international standards "as a basis" for a technical regulation within the meaning of Article 2.4 of the Agreement on Technical Barriers to Trade and the concept of a technical regulation "in accordance with relevant international standards" within the meaning of Article 2.5 of the same Agreement?

69. Yes. As the Appellate Body reported in its Report on European Communities *Measures Concerning Meat and Meat Products (Hormones)*, there is a difference between the meaning of the terms "based on" and "conform to". In paragraph 163 of the Report, the Appellate Body stated that: "[...] the ordinary meaning of 'based on' is quite different from the plain or natural import of 'conform to.' A thing is commonly said to be 'based on' another thing when the former 'stands' or is 'founded' or 'built' upon or 'is supported by' the latter. In contrast, much more is required before one thing may be regarded as 'conform[ing]' to 'another': the former must 'comply with' 'yield or show compliance' with the latter. The reference of 'conform to' is to 'correspondence in form or manner' to 'compliance with' or 'acquiescence', to 'follow[ing] in form or nature.' A measure that 'conforms to' and incorporates a [given standard] is, of course, 'based on' that standard. A measure, however, based on the standard might not conform to that standard, as where only some, not all, of the elements of the standard are incorporated into the measure." [Footnote omitted]

70. Article 2.4 of the TBT Agreement lays down the obligation to use relevant international standards or relevant parts of them as the basis of technical regulations. According to the ordinary meaning of words, this means that technical regulations must be founded on international standards or relevant parts of them. In other words, technical regulations must have as their fundamental principle or point of departure what is set out in international standards. This does not mean that the technical regulations adopted by a Member must be identical to international standards but where the latter are relevant, the technical regulations should be prepared on the basis of those international standards: the underlying international standard must be recognizable on a reading of the measure. Canada has established that the international standards concerning asbestos are relevant. The European Communities have not offered any convincing evidence to the contrary. In this instance, the French measure strays so far from the international standards that they are no longer recognizable as the foundation. The European Communities have not offered any reason to justify this departure and consequently the disputed measure is in contravention of Article 2.4 of the TBT Agreement.

71. Given that the Decree deviates to such an extent from the international standards that they are not evident as its basis, the European Communities cannot claim that "[...] it must be concluded (sic) that the international texts quoted, or sometimes not quoted, by Canada serve 'as a basis' for the French decree."

72. Furthermore, the obligation to use international standards as the basis for preparing technical regulations should not be interpreted as permission simply to ignore important aspects of those standards, as France has done. France is, in effect, forcing the replacement of asbestos by substitutes, ignoring the fact that it is only in the event of necessity that such replacement is recommended and only where the substitutes are harmless and safe. France has quite simply ignored the test of "necessity" required by the international standards and reports in order to operate a policy of banning asbestos. This is particularly disconcerting when it is considered that these are the same standards and reports that are cited by the European Communities to justify the French position in paragraphs 531 *et seq.* of their submission and that those standards and reports are very specific in this respect.

73. For its part, Article 2.5 of the TBT Agreement establishes a rebuttable presumption when the measure is in accordance with international standards. The French measure is clearly not in

justification of technical regulations which have tenuous links with the intended objective or even

- 1.3 per cent for gaskets;
- 2.4 per cent for miscellaneous applications (adhesives, mastics, mortars, etc.).

Friable products:

- 7 per cent for asbestos board and paper;
- 3 per cent for textile products (braiding, tape, coverings, etc.).

85. The use of very friable products (asbestos flocking and wadding) ended in France in 1978. No more asbestos fibres were incorporated in floor coverings after 1984. In the 90s (before the ban), asbestos-cement products, brakes and mouldings accounted for more than 90 per cent of the asbestos imported. Friable products such as textiles and board consumed less than 10 per cent.

Question 18: The European Communities state that Canada "consumes little asbestos and thus exports the bulk of its production". The European Communities also note, in paragraph 53: "... the fact that the increase in the frequency of mesothelioma-type cancers can be seen throughout Canada shows that the risk of death from chrysotile is not confined to the asbestos mining industry ... but that it affects all sectors of the economy". To which sectors of the economy do the European Communities refer? Are statistics and studies available?

86. Per capita consumption in Canada is among the highest in the industrial world. Canada exports most of its chrysotile asbestos production (400,000 tonnes out of 450,000 in 1990). Thus, the proportion reserved for home use is very small. Nevertheless, Canada's consumption is very considerable compared with other industrialized countries. Thus, in 1990, per capita consumption in Canada was distinctly higher than in France: (i) Canada: 2.05 kg per capita; (ii) Brazil: 1.26 kg. per capita; (iii) France: 1.11 kg per capita; (iv) United States: 0.13 kg per capita. This high level of asbestos consumption in Canada explains the high and steadily increasing incidence of mesothelioma in that country.

87. There are studies available which show that in Quebec and the other areas investigated a wide range of economic sectors is affected by mesothelioma. Thus, a study by Siemiatycki³³ in Montreal shows that the workers mainly at risk of mesothelioma are those exposed while working with materials containing asbestos. The results of the study show that construction sector workers run a risk of developing mesothelioma almost 12 times higher than the average. Another study³⁴ by the Quebec Occupational Health and Safety Commission (CSST), reveals that the risk of mesothelioma has increased steadily in Canada since 1967. The study notes that the incidence of this disease is increasing especially rapidly in the maintenance sector.

Question 19: With respect to substitute products, INSERM has stated, in particular, that "suitable research work should be carried out and developed as a matter of urgency, before substitute fibres are generally introduced" (Effects on health of the main types of asbestos exposure, INSERM, 1997, p. 434) and that "taking into account the present uncertainties concerning the effects on humans of exposure to fibres used as a substitute for asbestos, it is important to ensure that the levels of exposure among users of products containing fibre substitutes for asbestos are as low as possible" (Effects on health of fibres used as a substitute for asbestos, INSERM, 1998, p. 34). In the light of these observations, can the European Communities explain the statement in paragraphs 140 et seq. of their written submission according to which "there are no data giving rise to concern as to the carcinogenicity of fibres used as a substitute for asbestos in cement fibres"?

³³ Siemiatycki J., *Risk Factors for Cancer in the Workplace*, Boca Raton, Florida, CRC Press, 1991.

³⁴ R. Bégin *et al.* *Work-Related Mesothelioma in Quebec, 1967-1990*, American Journal of Industrial Medicine 22:531-542 (1992).

88. There are no data giving rise to concern as to the fibres used as a substitute for asbestos in cement fibres. First of all, it should be noted that asbestos cement is often replaced by products from another branch of technology (PVC plastics, ductile iron, various metals, etc.). This is the case, in particular, with pipes and roofing. In France, industry had decided to stop producing asbestos-cement pipes before the ban, because of the competition from PVC and ductile iron. When asbestos is replaced in fibro-cement, it is replaced by PVA, para-aramid or cellulose. It is never replaced in fibro-cement by man-made mineral fibres. PVA, cellulose and para-aramid fibres have been used for a very long time without any sort of health warning having been given by occupational health specialists. PVA fibres have been used since 1930, para-aramid fibres for 30 years or so. As for cellulose, it has been in use for several centuries.³⁵

89. In 1996, these substances gave no cause for concern, and this has since been confirmed by studies conducted by CSTE DG XXIV of the Commission of the European Communities and COC³⁶ in the United Kingdom.³⁷ Moreover, by the time the decision to ban asbestos was taken (July 1996), key facts had become available as a result of the G2SAT report on the comparative harmfulness of asbestos and man-made mineral fibres.³⁸ This report established a hierarchy of risks as between chrysotile asbestos, ceramic fibres and mineral wools (glass wool, rock wool, slag wool) which made it impossible to avoid a global ban with exceptions.³⁹ Thus, in 1996, France had to choose between asbestos, a known and proven human carcinogen, and substances used for decades without any problem ever having been reported.

90. INSERM's concerns relate to certain man-made mineral fibres rarely used as substitutes for asbestos and France has taken INSERM's recommendations into account. The expert opinion requested from INSERM related mainly to the fibres most under suspicion, i.e. man-made mineral fibres (ceramic fibres and mineral wools), whose harmfulness had been stressed by the opponents of a ban on asbestos. It confirmed the results of the G2SAT Report, as well as the classification adopted at the European level for ceramic fibres and mineral wools. France took into account the recommendations to proceed with caution and proposed an action plan for consideration by the social partners as soon as the results were published: (i) reminder of the regulations applicable, given the European classification; (ii) controls on fibre labelling; (iii) package of measures to monitor exposure levels, in particular among secondary users; (iv) establishment of groups of workers exposed to man-made mineral fibres for epidemiological follow up purposes.

Question 20: Why did asbestos cement remain outside the scope of Directive 91/659/EEC (paragraph 82 of the first submission of the European Communities)?

³⁵ We recall that, where asbestos is concerned, the first findings of its harmful effects on health go back to 1906, as attested by the report of a French labour inspector who drew attention to the number of deaths among workers who had worked in factories making asbestos-based products.

³⁶ Opinion on chrysotile asbestos and possible substitute products, Scientific Committee on Toxicity, Eco-toxicity and the Environment (CSTEE), 19 September 1998; Statement for Health and Safety Executive (HSE) on Carcinogenic Risks of Three Chrysotile Substitutes, Committee on the Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC), July 1998.

³⁷ At this point, we note that asbestos cement accounted for 90 per cent of the asbestos imported into France at the time of the ban. Thus, in accordance with INSERM's recommendations, France has not generalized the use of man-made mineral fibres in place of asbestos.

³⁸ Used much less frequently as a substitute for asbestos (less than 10 per cent of the asbestos used in France).

³⁹ This hierarchy of risks showed that chrysotile asbestos (a proven human carcinogen) poses a much greater threat than ceramic fibres (a suspected animal carcinogen) and *a fortiori* mineral wool (no carcinogenic effect on animals, no effect on the human lung).

91. The purpose of the 1991 Directive 91/659/EEC was to ban, on the basis of the epidemiological data available at the time⁴⁰, all varieties of asbestos other than chrysotile, which was then considered less dangerous than amphiboles. This directive also restricted the use of chrysotile to those products which were incapable of releasing asbestos fibres spontaneously into the air without special intervention and for which the possibilities of replacement had not yet been fully established. Since the publication of that directive, our understanding of the risk and the international database have expanded considerably⁴¹ and research on the replacement of the asbestos in asbestos cement products has led to solutions that pose no threat to the health of the user and are technically and economically viable.

Question 21: Is it possible to estimate the number of deaths, since 1945, due to chrysotile asbestos occurring in the categories which the submission of the European Communities described as "secondary" occupational, para-occupational and domestic? What type of exposure is responsible for the 25 per cent of mesothelioma cases in the building sector mentioned in paragraph 413 of the submission of the European Communities (construction, occasional handling, de-flocking, demolition, etc.)?

92. The number of deaths by mesothelioma among "secondary" users can be estimated at between 10 and 15 per million inhabitants per year. For mesothelioma, the spontaneous death rate, i.e. other than by exposure to asbestos, is about one to two cases per million inhabitants per year. It is true that, up to about the 1970s, the great majority of these deaths occurred among primary users (asbestos mining and processing).⁴² During that period the rate reached about five cases per million inhabitants per year in most of the industrial countries for which reliable health data are available (see Table 4, page 166 of the INSERM Report. All the studies show that those affected were almost exclusively so-called "secondary" users.⁴³ The study by J. Peto *et al.*⁴⁴ analyses mesothelioma mortality in England and Wales during the years 1979 to 1990. It shows that about 95 per cent of all the deaths that occurred during that period concerned workers belonging to the "secondary" user group. In the industrial countries, this proportion of 95 per cent of all asbestos-related deaths has applied to this category of workers since about the 1970s. At present, among men, the mesothelioma death rate stands at about 15 to 20 deaths⁴⁵ per million inhabitants per year: thus it may be estimated that in these countries 10 to 15 deaths per million inhabitants per year occur among male workers in the "secondary" user category.⁴⁶ Even if a small fraction of these deaths can be attributed to exposure to amphiboles, it is none the less true that the number of deaths due to chrysotile is quite considerable.

93. The overwhelming majority of mesotheliomas occurring among construction workers are the result of occasional exposure to high peaks of asbestos. This can be illustrated by reference to the table headed "Distribution of R brhe great majcase5 W0my reference to the

handle asbestos-containing materials only intermittently. This is because of the numbers involved.⁴⁷ To the workers in these construction trades it is necessary to add the workers in many other occupations: welders, dockers, laboratory technicians, fitters, upholsterers, power station workers, etc., who are only occasionally exposed to high peaks of asbestos and, taken together, account for the majority of deaths by mesothelioma.

Question 22: The article annexed by the European Communities (A. Gilg, *et al.*, *Estimation of the Past and Future Burden of Mortality from Mesothelioma in France*, *Occupational Environmental Medicine*, 1998; 55: 760-765) estimates that between 1996 and 2020, about 20,000 men will die of mesothelioma. Is it possible to determine the different circumstances of exposure to asbestos that will have induced these 20,000 cases of mesothelioma?

94. Occupational exposure to asbestos in France concerns the approximately 20-25 per cent of men who have been exposed at least once in the course of their working life.⁴⁸ This reflects the enormous variety of exposures. In France about 85 per cent of all the men exposed work in industrial production (mainly metallurgy, machines and appliances), building and public works or services, sectors characterized by occasional exposure to asbestos. It is these types of exposure that will cause

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attributable to cellulose fibres." The COC concluded from its study that "the evidence presented to the committee on fibre dimensions, studies in animals including that of biopersistence in the lung, indicate that the carcinogenic risk posed by PVA fibres, para-aramid fibres or cellulose fibres is likely to be less than that posed by chrysotile". These conclusions are shared by CSTE of DG XXIV⁵⁴ which found that "there is sufficient evidence that all forms of asbestos, including chrysotile, are carcinogenic in humans. There is no evidence of the occurrence of cancer induced by fibres in humans with respect to any of the three substitute products [investigated]". CSTE also notes that "pulmonary fibrosis is a well-known consequence of exposure to chrysotile [whereas], so far, no case has been reported among workers exposed to any of the three substitute products".

Question 26: The European Communities maintain that the Agreement on Technical Barriers to Trade does not cover general prohibitions on the use of the product. In the present case, Decree No. 96-1133 provides for the possibility of exceptions to the ban. Do the European Communities consider that the Agreement on Technical Barriers to Trade is also inapplicable to these exceptions and to the provisions relating to them?

99. The French Decree provides that in certain circumstances a limited number of products may contain asbestos (see Art. 2(I) of the Decree). The European Communities consider that, like the

length and diameter/thickness) that determines their carcinogenic effects. As the mode of action of the fibres is through inhalation, the fibrous nature of the chrysotile asbestos is essential. In legal

are very expensive as compared with asbestos fibres). With regard to para-aramid fibres, in 1998, France recorded a trade deficit of 400 tonnes or 26 million francs. Man-made mineral wools and fibres are mainly produced in France and principally intended for insulating buildings. It should be noted that less than one per cent of the output of these man-made mineral wools and fibres is now being used in products previously manufactured with asbestos.

Question 31: Are there statistical data available which indicate what are the positive effects of controlled use, the use of encapsulated products and the banning of chrysotile asbestos, respectively, as regards reducing the number of mesotheliomas and cancers of the lung?

(i) *Reply by Canada*

116. The sources of asbestos-related pathologies have been identified as utilization of amphibole varieties in friable products such as flocking or cases of exposure to high quantities of chrysotile. Controlled use, a practice that was gradually introduced in the 1970s, has eliminated these dangerous sources. However, since there is a latency period of some decades between exposure to asbestos and the appearance of disease, pathologies related to uncontrolled exposure occurring up to the 1970s will continue to appear for a few decades yet, even if the sources of that exposure have now disappeared. Furthermore, as long as the competent authorities do not ensure appropriate and systematic management of the flockings installed during the years of uncontrolled use, the associated problems will not be completely eliminated.

117. There are few statistics on the prohibition of flockings and the exclusive use of chrysotile at low levels of exposure. Data collected and compiled by the Asbestos International Association (AIA) in 1995 cover 28 countries with some 25,000 workers employed.⁶² In these countries, because of the introduction of controlled-use procedures and measures, the A.I.A. surveys show that 97.3 per cent of workers are exposed to less than 1.0 f/ml. These exposure levels satisfy the recommendations on worker protection made by the Group of Experts which met under the auspices of the WHO in Oxford, England, in April 1989. The findings of a similar survey conducted in 1997 will be available in the summer of 1999.

118. It should also be made clear that there is little data for assessing the positive effects of controlled and exclusive use of chrysotile asbestos, and that the reference period does not begin until the late 1970s when the current workplace controls were implemented (plants in a few countries for the manufacture of asbestos cement and friction materials).

119. Other data have also been published on groups of workers in chrysotile asbestos mines in Quebec, which feature both a sufficiently high number of workers and a sufficiently long observation period to measure the effects of asbestos exposure. The study covers cohorts formed in 1966 and monitored since then⁶³, including more than 11,000 workers born between 1891 and 1920. The most recent update, published in 1997, reports data until 1992. The findings for workers in this group who were exposed to chrysotile concentrations of up to 22f/ml for 40 years led the authors to conclude "from the point of view of mortality that exposure in this industry to less than 300 mpcf. years [i.e. equal to about 22f/ml over 40 years] has been essentially innocuous."

⁶² A.I.A., *A.I.A. Dust Measurement Records Report*, Paris (March 1997).

⁶³ Liddell FDK, McDonald AD and McDonald JC (1997), *The 1891-1920 Birth Cohort of Quebec Chrysotile Miners and Millers: Developments from 1904 and Mortality to 1992*, Ann. Occup. Hyg.41:13-35.

(ii) *Reply by the European Communities*

120. To the best of our knowledge, the only published study that enables the effectiveness of controlled use to be measured is that issued in 1996 by the Health and Safety Executive⁶⁴ in the United Kingdom concerning the risks of cancer incurred by asbestos workers after 1969, when the "safe" use of asbestos was adopted by the United Kingdom. This study shows that, despite strictly "controlled" use (since the study relates exclusively to workers making asbestos-based products), there is a significant net excess of cancers among those who worked only under the "controlled" use regime. It follows from this finding that "controlled" use does not make it possible to prevent deaths from cancer, even in specific industrial manufacturing sectors with a workforce which is relatively small and a priori easy to train and supervise.

121. For at least 40 years, the manufacture of asbestos cement has involved "encapsulating" asbestos in cement. This encapsulation does not guarantee the harmlessness of asbestos cement during use: in practice, when asbestos cement is used, in an occupational, para-occupational or domestic environment, it is generally sanded, crushed or sawn and releases carcinogenic fibres in the form of dust. The occurrence of mesotheliomas among workers exposed to asbestos fibres which, in the manufacturing stage, were encapsulated in cement clearly shows that this process offers absolutely no protection against the carcinogenic effects of chrysotile fibres released when products and materials containing "encapsulated" asbestos are worked. This is perfectly understandable considering the very high levels of exposure measured under these conditions. It is possible to encounter concentrations several tens, even several hundreds of times higher than the national statutory limits⁶⁵ and the internationally recommended levels.⁶⁶

122. The number of asbestos-related illnesses in a country is very strongly correlated with the amount of asbestos imported into that country. The most effective way of reducing, in the future, the number of asbestos-related illnesses is therefore to reduce asbestos imports. A ban with exceptions is the most effective means of achieving that result. France has demonstrated this, since imports fell very rapidly after the implementation of the ban (an estimated 1,200 tonnes in 1997, 200 tonnes in 1998, and a projected 55 tonnes in 1999 as against 35,000 tonnes in 1995). Thus, France could not afford to wait another 30 years in order to verify whether tighter controls on so-called "safe" use would make it possible to achieve the same results.

Question 32: With regard to substitute products is there a difference in potential or proven risk between fibrous and non-fibrous products?

(i) *Reply by Canada*

123. The replacement of fibre products with products containing no fibre might imply that the manufacture and use of the latter are risk free. This is not the case, at least for certain non-fibrous products being proposed as substitutes for chrysotile asbestos products. Only a comparative, case-by-case evaluation can yield relevant information. For example, let us take the alternative of PVC pipes. It should be realized that manufacture of the vinyl chloride monomer (a proven carcinogen which is later polymerized in PVC) involves the use of chlorine, an element which is later incorporated in an organic molecule. It has been well established that the synthesis of organo-chlorines is a significant source of dioxins, substances whose medium to long-term effects are very harmful, and regarding

⁶⁴ *Asbestos-related Disease*, S. Hutchings, J. Jones, J. Hodgson, Occupational Health Decenal Supplement, London, Health and Safety Service, 1996, pp. 127-152.

⁶⁵ A roofer using a grinder on corrugated asbestos-cement sheeting in the open air is subjected to a maximum exposure peak of 41 f/ml, i.e. 410 times greater than the French limit value.

⁶⁶ The permissible limit values under ISO 7337 are very considerably exceeded.

which the WHO has recommended a threshold of exposure not exceeding 10pg/kg./day (approximately 220ng/year).

124. The fact that the production of ductile iron also poses health risks recognized by the IARC as Group I is something which should not be concealed, since it entails greater energy consumption leading to the emission of carcinogens such as polynuclear aromatic hydrocarbons (PAH), etc.. These two examples clearly show that there are virtually no products or technologies that offer zero risk: one must learn to control and manage the risks within the framework of a policy of controlled and disciplined use. In any case, only a case-by-case analysis can answer the question asked.

(ii) Reply by the European Communities

125. The carcinogenic effect of asbestos is linked with its inhalation. In fact, not only does asbestos have a length to diameter ratio that enables it to penetrate into the pulmonary alveoli⁶⁷ but, in

products which are suspected of being carcinogenic (ceramic fibres) is strictly limited to applications for which there is at present no less dangerous substitute that would ensure equivalent performance. In any case, their use is regulated.

Question 33: Is the concept of necessity in Article XX:(b) of GATT the same as that in Article 2.2 of the Agreement on Technical Barriers to Trade?

(i) *Reply by Canada*

128. With regard to 'necessity', the text of Article 2.2 of the TBT Agreement is not identical to the text of Article XX:(b) of GATT 1994. Article XX:(b) uses the phrase, "necessary to protect [...]". Article 2.2 of the TBT Agreement evokes the concept of necessity in a more specific context: "not more trade-restrictive than necessary to fulfil a legitimate objective, taking account of the risks non-fulfilment would create". Article 2.2 in particular prescribes that account be taken of available scientific and technical information and the intended end uses of the products.

129. Despite the differences in textual formulation, the case law that has developed around analysis of Article XX:(b) can be helpful in determining the substance of the concept of necessity in Article 2.2. Conversely, the avenues for evaluating the 'necessity' of the measure contained in 2.2 (i.e. use of scientific information and consideration of end uses) may be relevant to analysis of necessity under Article XX:(b).

(ii) *Reply by the European Communities*

130. All the Panel reports that have examined the concept of necessity in the context of Article XX:(b) of GATT have concluded that it was not the necessity of the policy goal pursued by the measures at stake that was to be examined, but whether or not it was necessary to subject the imported products to the legal regime of the contested measure. In all cases a measure inconsistent with another provision of GATT was found to be not "necessary" if an alternative measure which the defending Member could reasonably be expected to employ and which was not inconsistent (or less inconsistent) with other GATT provisions was available to it.⁷² The same should apply as regards the concept of necessity in the context of Article 2.2 of the TBT Agreement. This results clearly from the ordinary meaning of the terms of Article 2.2 in their context, which state that: "For this purpose, technical regulations shall not be more trade-restrictive than necessary to fulfil a legitimate objective, taking account of the risks non-fulfilment would create". The sixth preambular paragraph to the TBT Agreement clarifies that Members have the autonomous right to determine the level of human health protection they consider appropriate in their territory. The necessity test, therefore, in Article 2.2 may only be applied in order to examine whether the technical regulations have been prepared, adopted or applied "with a view to or with the effect of creating unnecessary obstacles to international trade". An obstacle to trade will be found to be unnecessary, if another measure consistent (or less inconsistent) with GATT is reasonably available to the defending Member, to enable it to achieve the level of health protection which it has determined.

131. The fact that, in substance, the necessity test should be applied in the same way in both provisions does not, however, have the same procedural implications as regards, for instance, the burden of proof. Unlike Article XX:(b) of GATT 1994, where initially the burden is on the Member claiming its application to prove it, in the context of Article 2.2 of the TBT Agreement, the burden is initially on the plaintiff Member to establish that there has been a violation. Indeed, the plaintiff

⁷² See *United States - Section 337 of the Tariff Act 1930*, BISD 36S/386, paragraph 5.26 (adopted on 7.11.89); *Thailand - Restrictions on Importation of and Internal Taxes on Cigarettes*, BISD 37w bay

Member must first demonstrate the availability of an alternative consistent or less inconsistent measure which can achieve the level of health protection determined by the defending Member.⁷³ The European Communities have already explained that so-called "controlled use" is not "an alternative measure" because, *inter alia*, it does not provide the same level of protection as the French Decree. The European Communities would, moreover, recall that, as is clear from the factual part of their two written submissions, it is "in the real world" not feasible to make sure that controlled use is applied in all circumstances where people work with asbestos in such a way as to achieve the level of sanitary protection determined by France.

Question 34: Is the notion of "like product" within the meaning of Article III:4 of GATT 1994 identical with that of "like product" within the meaning of Article III:2, first sentence of GATT 1994?

(i) *Reply by Canada*

132. The case law of GATT and the WTO indicates that the concept of "like product" in Article III:2 is to be construed narrowly. However this narrow interpretation does not apply to Article III:4 where the concept of likeness must be construed more broadly, given the purpose and context of Article III:4. Consequently, Article III:4 encompasses a more extended "range of like products" than does Article III:2, first sentence.

133. The report of the Appellate Body in *Japan – Taxes on Alcoholic Beverages*, in its discussion of Article III:2 commented precisely on the relative character of likeness under various articles and under various agreements.

"No one approach to exercising judgement will be appropriate for all cases. The criteria in border tax adjustments should be examined, but there can be no one precise and absolute definition of what is "like". The concept of "likeness" is a relative one that evokes the image of an accordion. The accordion of "likeness" stretches and squeezes in different places as different provisions of the WTO Agreement are applied. The width of the accordion in any one of those places must be determined by the particular provision in which the term "like" is encountered as well as by the context and circumstances that prevail in any given case to which that provision may apply."⁷⁴

134. In the same report, the Appellate Body commented on the helpfulness of a "case-by-case" examination and pointed out the narrowness of the "accordion of likeness" in the first sentence of Article III:2

"This approach should be helpful in identifying on a case-by-case basis the range of "like products" that fall within the narrow limits of Article III:2, first sentence in GATT 1994. Yet this approach will be most helpful if decision-makers keep ever in mind how narrow the range of "like products" in Article III:2, first sentence, is meant to be, as opposed to the range of "like" products contemplated in some other provisions of GATT 1994 and other multilateral trade agreements of the WTO Agreement."⁷⁵

135. Using the analogy of the accordion of likeness, the Panel in *Japan – Taxes on Alcoholic Beverages* pointed out that the same interpretation of the term "like product" in Article III:2 and Article III:4 would give a different scope to two paragraphs in the same Article. Two paragraphs of

or "directly substitutable" add to the term "like product" in defining the scope of Article III:2, interpreting "like product" in III:4 in the same way as in III:2 would give a narrower overall scope to Article III:4 than to Article III:2. In *Japan – Taxes on Alcoholic Beverages*, the Panel wrote:

"6.20 The Panel noted that the term "like products" appears in various GATT provisions. The Panel further noted that it did not necessarily follow that the term had to be interpreted in a uniform way. In this respect, the Panel noted the discrepancy between Article III:2, on the one hand, and Article III:4 on the other: while the former referred to Article III:1 and to like, as well as to directly competitive or substitutable products (see also Article XIX of GATT), the latter referred only to like products. If the

(ii) *Reply by the European Communities*

140. The European Communities consider that for the purpose of the present dispute the reply to

"Although Article X:3(a) of GATT 1994 and Article 1.3 of the Licensing Agreement both apply, the Panel, in our view, should have applied the Licensing Agreement first, since this Agreement deals specifically, and in detail, with the administration of import licensing procedures".

143. The same idea was revisited by the Panel in the *Indonesian Automobiles* case, when it was dealing with the issue of simultaneous application of the Agreement on Trade-Related Investment Measures and Article III of GATT (see the report, paragraph 14.62). With regard to the order in which the Agreements should be considered by the Panel, since Article 2 of the TBT Agreement deals in a more specific and detailed fashion with the preparation, adoption and application of technical regulations and standards, giving due regard to what WTO Members consider to be an acceptable balance between the various interests protected by the general provisions of GATT 1999, it seems to us that the TBT Agreement must be examined first. This position is in keeping with the approach adopted by the Appellate Body in the *Bananas III*⁸¹ case and by the Panel in the *Indonesian Automobiles* case.⁸² Therefore the TBT Agreement should be examined first.

(ii) *Reply by the European Communities*

144. GATT and the TBT Agreement are two legally distinct Agreements. The General Interpretative Note to Annex 1A to the WTO Agreement clarifies that, in the event of conflict between the two, the provisions of the TBT shall prevail to the extent of the conflict. The object and purpose of the TBT Agreement, like its predecessor Agreement, is "to further the objectives of GATT 1994" (second preambular paragraph) in the areas of international standards and conformity assessment systems so as to ensure that technical regulations and standards do not create unnecessary obstacles to international trade (third to fifth preambular paragraphs). The European Communities consider that the legal relationship of the two agreements as explained above does not dictate any particular order in which the Panel should examine the claims and arguments of the parties in this dispute. The two options of examining first GATT and then the TBT Agreement or vice versa are both theoretically available.

145. The European Communities note, however, that several important concepts (such as the concept of like products, the principle of non-discrimination or the concept of necessity) are found in both Agreements, but there is very little case law and practice of the Members under the TBT Agreement on which the Panel may draw. It may therefore be more prudent, from the interpretative point of view, to proceed first with an analysis under GATT, especially when the two parties disagree on the applicability of one of the two agreements, in this instance the TBT Agreement. This approach is, in any case, not unusual, as is shown by the *US Gasoline* Panel and Appellate Body reports. The choice of the order by which the claims of the parties under these two Agreements will be examined does not appear to have any particular or significant implication for this dispute, other than that the Panel should ensure consistent interpretation of the provisions of the two Agreements. As regards the separate issue of allocation of the burden of proof, see the European Communities' reply to Canada's written question No. 8.

Question 36: Do the exceptions provided for in Article XX of GATT 1994 apply to violations of provisions of the Agreement on Technical Barriers to Trade? Could this question have any bearing on the present dispute?

(i) *Reply by Canada*

146. No, the exceptions provided for in Article XX of GATT are not intended to apply to violations of the provisions of the TBT Agreement. Article XX is not applicable outside GATT 1994 unless there is a specific stipulation to the contrary, as in the TRIMs Agreement. The text of the TBT Agreement makes no reference to Article XX of GATT.

that the latter should meet the requirements of the definition of "technical regulation" in Annex 1 to the TBT Agreement (see Article 1.2 of the TBT Agreement).

153. In the present case, none of the international standards invoked by Canada define the characteristics which asbestos or products containing asbestos must have. They deal, for instance, with the way in which asbestos and asbestos-containing products must be handled in the workplace and the relationship between employers and employees. They are, therefore, not "relevant" in the meaning of Article 2.4 of the TBT Agreement. In any case, even if they were relevant (which they are not) they would be completely ineffective and inappropriate to fulfil the legitimate objective of France, which is to protect human health in its territory.

Question 38: In the context of the Agreement on Technical Barriers to Trade, is a Member free to determine, for the purpose of drafting and adopting a technical regulation, the level of protection it considers appropriate?

(i) *Reply by Canada*

154. Yes, but in compliance with the obligations of the TBT Agreement. For example, a Member's freedom to adopt a regulation for the protection of human health, at the levels it considers appropriate, is mentioned in paragraph 6 of the preamble to the TBT Agreement. However, this freedom is circumscribed. First, it is subject to the requirement that the technical regulation does not constitute either a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail or a disguised restriction on international trade. Second, it is subject to the technical regulation being otherwise in accordance with the provisions of the TBT Agreement.

(ii) *Reply by the European Communities*

155. Yes. Article 2.2 of the TBT Agreement provides that protection of human health and safety is a legitimate objective. The preamble to that agreement confirms that "no country should be prevented from taking measures necessary to ... protect human ... life or health, at the levels it considers appropriate (...)".

Question 39: Article 2.4 of the Agreement on Technical Barriers to Trade envisages the situation in which the relevant international standards or the relevant parts of them would be "an ineffective or inappropriate means for the fulfilment of the legitimate objectives pursued, for instance because of fundamental climatic or geographical factors or fundamental technological problems". What other types of situation would be liable to make the standards or some of their parts "ineffective or inappropriate" within the meaning of this article?

(i) *Reply by Canada*

156. Situations that might render international standards or certain parts of them ineffective or inappropriate, other than those situations explicitly mentioned in Article 2.4, should be examined in the light of the ordinary meaning of the terms in this article, taken in their context. The text of Article 2.4 states that they must be "fundamental" factors or problems.

157. For Article 2.4 not to be stripped of its meaning, it requires that, in order to set aside an otherwise relevant international standard, the Member must provide real and tangible evidence of a "fundamental" consideration and not a mere allegation that certain standards are not appropriate.

(ii) Reply by the European Communities

158. The most obvious examples are when the latest scientific evidence suggests that the scientific basis of an international standard is inaccurate or obsolete, or when the level of protection that could be achieved by the international standard is lower than that determined by a Member in its territory. In the present case, the relevant scientific evidence that became available, in particular in the late 1980s and early 1990s, indicates that: (i) there is no doubt at all that chrysotile asbestos is a proven carcinogen; (ii) there is no safe exposure limit (threshold) for chrysotile asbestos and products containing asbestos; (iii) so-called "controlled use" is not applicable in all circumstances and for all types of persons that may come in contact with asbestos or asbestos-containing products and, in addition, does not eliminate all the risks; and (iv) there are substitute products that are safe, or safer than chrysotile asbestos.

159. Under these circumstances it is clear that an international standard that would permit the use of asbestos or asbestos-containing products or would set an exposure limit or would recommend "controlled use" would be ineffective or inappropriate to achieve the level of health protection determined by France.

4. Questions by Canada to the European Communities

Question 1: The first written submission of the European Communities states that "mesothelioma is a pleural cancer for which the only known cause is the inhalation of asbestos". Are we to take this assertion to mean that the European Communities are unaware of the scientific data identifying x-rays and erionite, *inter alia*, as causes of mesothelioma?

160. Erionite is indeed an indisputable cause of mesothelioma (as was made clear in the INSERM Report: see pages 125-126); however, exposure to the fibres of erionite, a mineral of natural origin, has to our knowledge been documented only in the Turkish region of Cappadocia. For that reason, in Section 4(a) of the first submission by the European Communities, a more complete form of words was used: "apart from exposure to asbestos, no other causal factor present in the industrialized countries has been established or even seriously suspected". As for the other factors mentioned by Canada, such as x-rays, none has been positively confirmed up to now, even though presumptions exist in the case of some; none of them is classified in Group 1 of the International Agency for Research on Cancer as a proven carcinogen with regard to mesothelioma.

Question 2:

(a) In paragraph 238 of their first written submission, the European Communities conclude that the controlled use policy is inapplicable. Was France applying a policy of controlled use of asbestos at the time when the workers referred to in the study by Y. Iwatsubo were exposed? If not, how can this policy be found to be inapplicable?

161. The study by Iwatsubo *et al.* concerns workers who developed mesothelioma in recent years (1987-1993) and who have therefore been exposed to asbestos during a period dating back at least 20 or 30 years, when so-called controlled use was not applied. However, the study in question (like others cited in the European Communities' submission, which were carried out in different countries), confirms that the vast majority of such cases of mesothelioma occurred in a wide variety of trades, particularly in the construction industry.

workers a day in France carry out isolated operations on materials containing asbestos) that they are in practice largely unrealistic although every effort must be made to encourage such procedures given the enormous quantities of asbestos that have been imported for decades and which remain in place. Moreover, the prevailing unawareness that the materials concerned contain asbestos makes it even more difficult to introduce such work procedures systematically; it would mean in practice putting a supervisor behind every worker in the construction trade and numerous other sectors of activity which use heavy equipment covered by the ISO 7337 Standard, and prohibiting any operation until checks have been carried out on the presence of asbestos. Specifically, that would mean having to send a sample of the material on which a sometimes very brief operation is to be carried out (such as drilling or sawing) to an approved laboratory and awaiting the laboratory findings. It is clear that the procedures described above cannot be applied on such a broad scale, uniformly and continuously, i.e. over a period of decades given the continued presence of asbestos.

Question 2:

(b) Could the European Communities specify the varieties of asbestos to which the persons covered by the study by Y. Iwatsubo *et al.* were exposed?

163. The study by Iwatsubo *et al.* does not distinguish between the varieties of asbestos to which workers suffering from mesothelioma were exposed. However, France has used chrysotile almost exclusively: the share of amphiboles in asbestos imports into France has not exceeded 3 per cent since 1945, and France has never produced amphiboles domestically. Amphiboles were used mainly for specific purposes: it is therefore highly likely that the great majority of workers with mesothelioma covered by the study by Iwatsubo *et coll.* were never exposed to any variety of asbestos other than chrysotile.

Question 3: The European Communities acknowledge in Section 4(a) of their first written submission that there is a difference between the toxicity of chrysotile and that of amphiboles. Do the European Communities therefore acknowledge that assessment of the risk from exposure to chrysotile exclusively must be based solely on data concerning chrysotile exposure, and not on data concerning exposure to amphiboles or mixtures of asbestos containing amphiboles?

This question calls for two preliminary comments:

- The European Communities pointed out in their first written submission that, while it is true that amphiboles appear to be a more important cause of mesothelioma than chrysotile, that is not the case for lung cancer. However, lung cancer has caused a higher number of asbestos-related deaths than mesothelioma (many authors consider that for every death from mesothelioma there is at least one or even possibly two deaths from cancer of the lung due to asbestos). It is therefore impossible to accept the wording of the question by Canada which, once again, seems to be seeking to ignore this fact.
- Canada does not explain what is meant by "*exposure to chrysotile exclusively*": the chrysotile produced by Canada is contaminated by tremolite (a variety of amphibole asbestos with a very strong carcinogenic potential in respect of mesothelioma). This argument has also been widely used by the "defenders" of chrysotile to dispute the fact that the latter could cause mesothelioma (the reasoning being that the traces of tremolite contained in Canadian chrysotile were solely responsible for the many cases of mesothelioma observed among workers exposed to Canadian chrysotile asbestos). This theory of the harmlessness of chrysotile in relation to mesothelioma has been rejected by the scientific community, as is pointed out in the submission of the

European Communities. It is hard to see what Canada is recommending when it suggests that assessments of the risk associated with "*exposure to chrysotile exclusively*" should not be based on exposure to mixtures of asbestos containing amphiboles.

164. Canada suggests in its question that the assessments of the risk from exposure to asbestos carried out up to now (by INSERM and by all the other official bodies which have performed such assessments) are wide of the mark as they are all based on increases in cancer risk observed in different studies where workers were exposed to different types of asbestos. The models used are in fact based on the average dose-risk ratios observed in the main studies available, the validity of which has been deemed adequate. Those ratios differ widely in "extreme" studies, and this may reflect the statistical uncertainty associated with each study and/or genuine differences in risk due, for example, to the conditions of exposure or the nature or morphology of the fibres.

165. The decision to use a single average value in order to set up a dose-dependent risk model is the most realistic option when it is wished to assess the risk to the general population of a country, which is exposed under highly variable conditions, particularly in terms of the nature and morphology of the asbestos fibres encountered. While a "detailed" assessment may be justified in specific and well-known exposure situations, a "universal" risk assessment is broadly speaking a more plausible option in most situations. If it was nevertheless wished to assess the risk associated with "*exposure to chrysotile exclusively*", difficult problems would be faced. The dose-risk ratios observed in the main studies available on exposure to chrysotile are extremely variable: for example, in the case of lung cancer, the dose-risk ratios are more than twenty times higher in the textile asbestos industry than in the asbestos mining and milling industry. Generally speaking, higher lung cancer risks are found in studies concerning exposure to chrysotile than in those concerning amphiboles.⁸⁴ Which of the dose-risk ratios does Canada consider should be chosen for risk assessment purposes?

Question 4: Do the data from the study by Peto *et al.* (1998) cited by the European Communities concern exposure to chrysotile only or exposure to amphiboles or mixtures containing amphiboles?

166. The data from the study by Peto *et al.* concern none of the specific varieties of asbestos: they are based exclusively on statistical models for mesothelioma mortality data actually observed in the European countries concerned. The study therefore deals with the fatal effects of asbestos in all its forms. However, in order to evaluate the role of each of the different varieties of asbestos in this health catastrophe, it should once again be recalled that chrysotile accounts for the overwhelming forms. However, the data from the study by Peto *et al.* (1998) concern none of the specific varieties of asbestos: they are based exclusively on statistical models for mesothelioma mortality data actually observed in the European countries concerned. The study therefore deals with the fatal effects of asbestos in all its forms. However, in order to evaluate the role of each of the different varieties of asbestos in this health catastrophe, it should once again be recalled that chrysotile accounts for the overwhelming forms.

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- National Research Council (USA, 1984)
- Ontario Royal Commission (Canada, 1984)
- Health and Safety Commission (United Kingdom, 1985)
- Environmental Protection Agency (EPA, USA, 1986)
- Health Effects Institute (USA, 1991)

171. INSERM carried out a thorough review and careful analysis of the risk levels used by these different groups of experts, who had already made assessments of the risk of lung cancer caused by exposure to asbestos.⁹⁰ Selecting an average level is a complex matter given the sharp variations observed in the different epidemiological studies (once again, it should be noted that the highest values are usually observed in studies concerning workers exposed to chrysotile asbestos). It is observed⁹¹ that four of them selected the same value as INSERM (+1 per cent); another selected a lower value, albeit combined with a range of variation with a very high upper limit; another selected a higher value (+ 2 per cent). It can be seen, therefore, that the choice made by INSERM is consistent with that of the expert groups of other countries, and no attempt was made to exaggerate the risks from asbestos.

Question 8: Do the European Communities acknowledge that they bear the burden of proof under Article XX(b) of GATT 1994 and Article 2.2 of the TBT Agreement?

172. The burden to establish a prima facie violation of a provision of the GATT Agreement is on Canada. When the prima facie case has been made, the burden of proof passes to the defending Member, which must in turn counter or refute the alleged inconsistency, for instance by claiming the application of Article XX(b) of GATT. The burden of proof and the concomitant burden of persuasion continue, however, to shift back and forth ("like a pendulum") throughout the entire Panel proceedings. The case law on the burden of proof that has been developed under Article XX(b) is not, however, applicable in the context of the TBT Agreement (in particular Article 2.2 thereof), as Canada's question seems to suggest. Article 2.2 cannot be described as an exception to another provision of the TBT Agreement. The case law of the Appellate Body in the *Hormones* case (paragraphs 99 to 109) is more relevant in this context⁹², taking into account the structure and context of Article 2.2 of the TBT Agreement.⁹³

Question 9: Do the European Communities maintain that the chemical composition of fibres is a relevant criterion in determining the likeness of products under Article III:4 of GATT?

173. Chemical composition is certainly relevant to the extent it affects or influences the nature, properties and qualities of the product in question. According to GATT practice and case law, a product's properties, nature and quality are extremely important in determining "likeness" under Article III:4 of GATT. Since the chemical composition of the fibres contained in a product is almost certain to influence its characteristics (including its potential health effects), the European Communities consider that criterion indeed relevant. In addition, it is not unreasonable to assume that the chemical composition may also affect or influence the nature or quality of the product and, consequently, consumers' tastes. It is hardly open to doubt that any informed consumer would very probably refuse a product proved to be carcinogenic. Please see also the European Communities' reply to question 27 of the Panel.

⁹⁰ See pages 193 to 202 of the INSERM Report – see also our reply to question 3 by Canada.

⁹¹ INSERM Report, Table 4, p. 202.

⁹² AB-1997-4.

⁹³ The European Communities note that the case law of the Appellate Body in the case *Japan – Measures Affecting Agricultural Products* (AB-1998-8, paragraph 126) is also relevant by analogy, where it was held that the burden lies on the Plaintiff Member to establish that the measure at issue is more trade-restrictive than necessary to fulfil the legitimate objective, taking account of the risks non-fulfilment would create.

Canada feels compelled to inform the European Communities of the considerable body of evidence contradicting their statement that "asbestos in all forms (amphibole and chrysotile) is the only known factor that can cause mesothelioma or pleural cancer". A number of studies suggest other potential risk factors that may have been underestimated in epidemiological studies in industrialized countries. We take this opportunity to correct the European Communities' simplistic definition of mesothelioma: "mesothelioma is a cancer of the pleura ... ". In fact, malignant diffuse mesothelioma is a cancer of the mesothelial cells of the pleura, the pericardium and the peritoneum. Furthermore, peritoneal mesothelioma is much more typical of exposure to amphiboles than pleural mesothelioma.

179. A number of artificial fibres cause mesothelioma when they are injected into the pleura and peritoneum of laboratory animals. It should also be noted that the International Agency for Research on Cancer (IARC) has classified refractory ceramic fibres as probable carcinogens, partly because of instances of mesothelioma induced by inhalation and injection in animal studies. The SV 40 virus readily induces mesothelioma when injected into animals; studies suggest that the virus contaminated anti-polio (poliomyelitis vaccines) from 1955 to about 1963 and may induce mesothelioma with or without the help of asbestos fibres. Some studies of humans report the presence of the simian SV 40 virus in the biological tissue of mesothelioma victims. Ionizing radiation used in cancer therapy, as well as, perhaps, occupational exposure to radiation have induced mesothelioma.⁹⁵ In addition, a large proportion of mesothelioma cases (as high as 25 per cent) are not attributable to exposure to asbestos; they may have been caused by hidden (unidentified but real) exposure to asbestos, but the figures suggests that there are other significant causes that cannot be countered by targeting exposure to asbestos alone. For example, erionite has been shown to be even more toxic than crocidolite in causing mesothelioma: it has killed large numbers of villagers in Turkey. Erionite is a mineral fibre but does not belong to the asbestos family, which suggests that fibres with similar physical characteristics could pose a health threat to other population groups. Finally, we wish to remind the European Communities that the issue at hand is the ban on chrysotile products and that there are mesothelioma risk factors other than chrysotile, particularly all the amphibole Tj T* -0.8361 4(uni7sd8u o the ash
 p79 to find out if a ph 95: 1 li 2 5 6 6 9 80c-0014275 Tj 17.25 0 TD /F1 11.25 Tf -0.1514 Tc 1.2496 Tw

181. The risk may become detectable in cases of long-term exposure to high levels, but it is then by no means certain whether the chrysotile acts as a direct carcinogen or by causing the formation of pulmonary fibrosis, which would be a precursor of neoplasia. In other words, exposure must be sufficient in intensity and duration to induce pulmonary fibrosis, which predisposes the pulmonary parenchyma to a higher risk of cancer. Regarding asbestos-related mesothelioma, a number of studies have demonstrated cogently that this type of cancer is almost exclusively linked to exposure to amphiboles. Cases of mesothelioma in chrysotile asbestos miners in Quebec are relatively rare - in a cohort of 11,000 workers who were very carefully monitored (in the McDonald study), there were at most fifty or so cases over several decades. Exhaustive research into their employment history revealed that most of the cases were related to short-term exposure to commercial amphiboles. For example, during the Second World War, some of the miners with mesothelioma had worked in plants manufacturing products for the allied forces and amphiboles imported into Canada had been used to make a variety of products, including gas masks, to assist in the war effort.⁹⁷

Question 5: How does Canada explain the fact that the risk of mesothelioma is seven times higher than average for women living near chrysotile mines in Quebec? (Note that this population group was the subject of a special study because, in its case, the exposure is environmental, not directly occupational).

182. The women in the towns of Thetford Mines and Asbestos have been continuously exposed from birth to asbestos concentrations of 1 f/ml. or more. Given that the risk of mesothelioma increases by approximately the power of 3 in relation to the time that has elapsed since exposure, these women have had more time to develop a detectable risk of mesothelioma than many workers in other parts of the asbestos industry. Even so, their risk level seems to be at least 20 times lower than predicted by the Environmental Protection Agency (USA) and INSERM models.

183. More specifically, it should be borne in mind that some 75 per cent of the women in this study⁹⁸ lived with an asbestos worker, of whom a small minority worked with amphiboles, particularly crocidolite. Furthermore, some 5 per cent had themselves already worked in the asbestos industry as "sheddeuses" or "gobeuses" or had worked in workshops for repairing jute sacks which had contained crocidolite or had worked at home for the asbestos industry repairing jute sacks used to transport amphiboles. Finally, the results to which the EC refers concern deaths from pleural cancer. Since then, researchers have compiled and checked the diagnosis in pleural mesothelioma cases, thus providing a better measurement of the risk arising from asbestos. The authors of the study have collected but not yet analysed the exposure histories of cases of pleural mesothelioma in women (more than ten so far, and not merely the seven mentioned in the 1997 publication).

184. Preliminary analyses indicate that a certain number of mesothelioma cases were exposed to crocidolite or amosite more than thirty years before the onset of the disease (Camus and Siemiatycki, personal communication, 1999). The other mesotheliomas may be attributable to a long period of induction, following a massive build-up since childhood, of continuous environmental exposure or exposure in the home (living with an asbestos worker) to commercial chrysotile exceeding 1 f/ml. The women's cumulative exposure was equivalent to between 100 and 300 fibre years/ml. for asbestos workers.

Question 6: Does Canada disagree that most cases of mesothelioma occur in industrialized countries in occupations involving intermittent exposure to asbestos, specifically those where the worker has to work with asbestos containing materials?

⁹⁷ McDonald JC *et al* (1989) *Mesothelioma and Asbestos Fibre Type*, *Cancer* 63: 1544-1547.

⁹⁸ Camus M. Siemiatycki J., Meek B., *Non-occupational Exposure to Chrysotile Asbestos and the Risk of Lung Cancer*, *N. Eng.l J. Med.* 1998; 338: 1565-71.

185. Nowadays, most cases of mesothelioma in the industrialized countries occur in occupations other than mining and manufacture of asbestos products because workers in those occupations are exposed to amphiboles in poorly controlled work areas. The workers who remain at risk, working in

- (f) products composed of or containing asbestos for use to simulate ashes or embers.

Question 11: The enormous amount of work in France on airborne particles in the workplace has shown no evidence of chemical changes in chrysotile asbestos fibres released during high-speed machining of materials containing asbestos. Can Canada provide evidence of changes in the chemical composition of chrysotile asbestos during high-speed machining?

192. Canada is surprised that this question should be asked, because the answer was given at the first substantive meeting of the Panel, with relevant supporting references. In any case, given that the question concerns fibres released during dry, high-speed machining of high-density materials, the operations concerned clearly do not comply with controlled-use safety procedures.

Question 12: Can Canada state exactly when the "modern" use of asbestos began? How does Canada characterize the so-called "modern" characteristics of chrysotile cement products?

193. The advent of the use of "modern" asbestos products was a gradual process that began in the 1970s with the phasing out of uses in which asbestos fibres could readily be separated from the finished product, as in the case of friable insulating materials and flockings, toys and unprocessed textiles. The manufacture of products containing amphibole-type fibres was also phased out because they were recognized as more harmful. In short, a distinction must be made between two periods: the first is characterized by the use of amphibole fibres and uses in which asbestos fibres could be easily separated from the finished product; the second is characterized by the prohibition or restricted use of amphibole asbestos and by the advent of non-friable products, i.e. products in which fibres are firmly bound to a matrix and are highly unlikely to be released in biologically significant concentrations. The distinction is a fundamental one. It should nonetheless be noted that non-friable products in

196. Regarding the health and safety of workers specializing in maintenance and repairs (plumbing, electricity, air-conditioning, etc.) in buildings containing asbestos flockings, the CSST is in the process of implementing a programme for the prevention of occupational diseases associated with exposure to asbestos. The programme is aimed at management and employees in this sector of activity and its purpose is to inform them about the required prevention measures and give them the appropriate training.

197. In addition, the Regulation on Air Quality and the Regulation on Solid Waste, issued by the Department of the Environment of Quebec, state respectively the environmental measures to be taken regarding airborne asbestos and the standards governing burial of waste containing asbestos. Officers of the CSST and the Department of the Environment monitor and enforce the application of all these measures as part of their regular duties, in the same way as they enforce provisions for the control of other substances considered to pose a public health risk and a threat to the health of workers. The measures make it possible to control asbestos throughout its useful life, from the time it is mined to the time it is buried.

(b) What monitoring mechanism did Canada set up to check whether the applicable ISO standards were being followed in Canada and in countries with companies that signed the "Agreement"?

198. In their respective areas of jurisdiction, the regulations of the Canadian Government and the provincial governments

201. Numerous contacts have been established with the governments of chrysotile importing countries to raise their awareness of the work being done by the producers, often with the assistance of trade unions and the Government. In this way, signatories to the Agreement can be assured that non-compliant businesses cannot obtain supplies from other sources. As a result, some countries have decided to issue import licences so as to ensure that every user complies with national regulations.

types of asbestos or products containing asbestos by other materials or products or the use of alternative technology, scientifically evaluated by the competent authority as harmless or less harmful; ...". The concept of substitution approved by WHO is identical to the one conveyed here: it must be proven that the substitute products are harmless or less harmful. The fact is that the scientific community still questions the harmlessness of most of the substitutes. Thus, INSERM stated that "any new fibre proposed as a substitute for asbestos or for any other use must be suspected, a priori, of being pathogenic because of its structure but that this does not preclude [the requirement] for analysis of the possible consequences of its physico-chemical characteristics."¹⁰²

207. Given the substantial latency period (between 15 and 45 years for asbestos) between exposure to a pathogen and the development of disease, it is impossible to make a definitive assessment of the carcinogenic potential of substitute fibres which came on to the market only recently. However, a number of recent studies cast doubt on the harmlessness of these fibres. As long ago as 1993, in a report entitled *Selected Synthetic Organic Fibres*, the World Health Organization's International Programme for Chemical Safety (IPCS) identified the para-aramid fibre as being respirable and biopersistent, two criteria associated with toxic potential in a substance. The same applies to most replacement fibres. Given the lack of knowledge on the subject, it would be premature to press on blindly with substitution.

Question 18: Why has Canada not instituted similar proceedings against other countries that have imposed similar bans on asbestos, such as Iceland, Norway, Denmark, Switzerland and New Zealand?

208. Canada could have taken action and is entitled to take action against similar measures previously introduced by other countries, and in particular by seven other members of the European Communities. However, it has decided, for the time being, to confine itself to the "model case" of France, basically for the following reasons:

- France is the first European country to have banned asbestos since the creation of the WTO and the introduction of the new dispute settlement rules;
- France has switched from a policy of controlled-use of asbestos (precisely the one advocated by Canada) to a diametrically opposite one – a total ban – even though there is no new scientific data; and
- the procedures under the Agreement do not include any mechanism for combining similar or identical legal action.

B. QUESTIONS AT THE SECOND SUBSTANTIVE MEETING

208.

In the case of the obligation concerning national treatment, we consider that Article 2.1 of the TBT Agreement and Article III:4 of GATT contain the same type of prescription: not to treat imported products less favourably than like national products. The only difference between the two provisions is that Article 2.1 applies only to technical regulations while Article III:4 of GATT applies to "all laws, regulations and requirements [...]". From that it follows that the concept of like products in the meaning of Article 2.1 of the TBT Agreement is identical to that contained in Article III:4 of GATT and that the criteria which are used to identify the range of like products under Article III:4 of GATT are the same as those which are used to identify the range of like products in Article 2.1 of the TBT Agreement. These criteria do not include the effects of the product on human health and we consider that they are not relevant in this case.

210. According to the Appellate Body in the case of *Japan – Taxes on Alcoholic Beverages*¹⁰³, the report of the working group on *Border Tax Adjustments* set out the principle for interpretation of the formula "like products" in general in the various provisions of GATT 1947. It must be interpreted on a case by case basis using criteria such as the product's end-use in a given market, consumers' tastes and habits, which change from country to country, and the products properties, nature and quality.¹⁰⁴ This approach has been followed in almost all Panel reports which have been adopted since the one concerning border tax adjustments.¹⁰⁵ We have followed this principle in developing our arguments that chrysotile fibre and cellulose, PVA, glass fibres as well as chrysotile-cement and fibro-cement are like products pursuant to Article III:4 of GATT and Article 2.1 of the TBT Agreement.¹⁰⁶ In the same case, *Japan Taxes on Alcoholic Beverages*, the Appellate Body implied that other criteria can also be utilized to identify the range of like products within the context of a particular provision of the multilateral trade agreements of the WTO Agreement.¹⁰⁷

211. The example of another criterion frequently used in previous Panel reports to determine whether products are like is the tariff classification.¹⁰⁸ We have followed this example in the present case and invoked the uniform classification in the tariff nomenclatures of the harmonized system as a criterion to confirm that chrysotile fibre and cellulose, glass and PVA fibres, as well as chrysotile-cement and fibro-cement, are like products. The toxicity of a product, however, has never been taken as a criterion for determining whether products are like. Moreover, in this case, the effects of the substitute fibrous products on human health are too little known and uncertain to constitute a criterion which could assist the Panel in identifying the range of like products. Consequently, we are of the opinion that the Panel should only examine the criteria defined by previous practice of GATT on which we have relied in our arguments. We refer the Panel to our second written submission in which we stated that the effect of a product on human health is not a criterion that should be used to determine whether products are like.¹⁰⁹ Two products may be similarly toxic and not be like in the meaning of Article III:4 of GATT or Article 2.1 of the TBT Agreement. Conversely, assuming that it is clearly established that two products do not share the same toxicity, they may still be like for the purposes of Article III:4 of GATT or Article 2.1 of the TBT Agreement.

¹⁰³ Report of the Appellate Body, page 20.

¹⁰⁴ Report of the Working Group on *Border Tax Adjustments*, BISD 17S/110, paragraph 18.

¹⁰⁵ *Australian Subsidies on Ammonium Sulphate*, BISD II/204;

212. We reiterate our replies to questions 15 and 16 by the European Communities in which we explain that the scientific question of the pathogenicity of the fibres has no place in the context of an argument to show what is like pursuant to Article III:4 of GATT 1994 or Article 2.1 of the TBT Agreement. Instead, the broadest and most general criteria contained in the case law, such as characteristics, nature and quality of the product, tariff classification and product's end use should be applied.¹¹⁰ Chrysotile fibre is indisputably different from amphibole fibres when it comes to toxicity¹¹¹, but we consider that chrysotile fibre and amphibole fibres are like products. Just as chrysotile fibre and amphibole fibres are like products although amphibole fibres are much more toxic, so PVA, glass and cellulose fibres and chrysotile fibres are like products by virtue of their characteristics, nature and quality, even if we do not know, given the present state of scientific research, the actual toxicity of each of these substitute fibres.¹¹² In our view, the effects of chrysotile fibre on human health, in the same way as those of substitute fibres, which in most cases are not known, are not relevant to the issue. The Panel should not take them into account in the context of its examination of the various characteristics of these products to establish whether they are like pursuant to Article III:4 of GATT or Article 2.1 of the TBT Agreement.

(ii) *Replies by the European Communities*

(a) No, the concept of "like products" in Article III.4 of GATT is not identical to the concept of "like products" contained in Article 2.1 of the TBT Agreement for the following reasons.

213.

assessment procedures related to products or processes and production methods¹¹⁵ the concept of "likeness" is by definition narrower than that of Article III.4 of GATT as regards the legal context within which and the object and purpose for which the determination of "likeness" is to be made. In other words, the legal context as well as the object and purpose determine inevitably the coverage of the term "like": not all like products are covered by Article 2.1 of the TBT Agreement, but only those to which the technical regulation was intended to apply.

215. Secondly, the European Communities dispute Canada's claim that the French Decree in question lays down a technical regulation in the sense of the TBT Agreement. This is clearly not the case of the general, horizontal prohibition of any kind of asbestos as well as of the limited and transitional exceptions laid down in Article 2 thereof, as shown in our written and oral submissions. However, if we suppose, for the sake of argument, that the French Decree did lay down a technical regulation, such a regulation would only have been applicable to asbestos as such and to asbestos-containing products. Indeed, the French Decree in question has laid down no technical regulation whatsoever for the so-called "substitute" products as claimed by Canada. Canada's argument that the so-called "substitute" products are, for the purpose of Article 2.1 of the TBT Agreement, "like" asbestos and asbestos-containing products runs counter to the very object and purpose of the TBT Agreement and leads to unacceptable results from the regulatory point of view. This is because such an interpretation is likely to restrict unreasonably the regulatory freedom of the WTO Members and would introduce uncertainty and unpredictability into international trade for no valid reason. As a general rule, Members introduce technical regulations, standards and conformity assessment procedures for the purpose of achieving a legitimate objective (e.g. safety). The object and purpose of the TBT Agreement is to guard against "unnecessary obstacles to international trade" (fifth preambular paragraph) in the products covered by the technical regulation, not in the potentially vast category of alternative/substitute products, because normally no government is in a position to know in advance the category of products that are likely to be affected by the adoption of the technical regulation.¹¹⁶ The concept of "like" products cannot be given so broad a reach as effectively to underline the autonomous right of Members to determine their level of health protection. In other words, to interpret so broadly the concept of "like" products is bound to present Members' regulatory authorities with the dilemma of abandoning the pursuit of a legitimate objective (e.g. safety) for the

(b) As the European Communities have explained¹¹⁷ when it has been scientifically established that a product is dangerous to human health, this finding attributes a special internal and/or external characteristic to the product in question that should be taken into account in defining "likeness" in both Articles. Indeed, the scientifically established dangerous nature of a product (like that of any kind of asbestos) necessarily affects the normal criteria used by panels to define "likeness", because:

- The product's very properties, nature and quality are necessarily affected, in the sense that they are not the same as those of a safe or safer identical or alternative or substitute product. For example, an apple that contains a poisonous pesticide can never be "like" a safe apple of the same or different variety or a safe orange, when one would otherwise consider apples and oranges "like" products for the purpose of Article III:4 of GATT.
- The product's end uses are also different, because a product that has been scientifically shown to be dangerous to human health (e.g. an apple that contains a poisonous pesticide or any type of asbestos) usually does not have the same end uses as those of a safe or safer identical or similar or substitute product.
- The consumers' or end-users' tastes and habits are also bound to differ in the case of a product that has been scientifically shown to be dangerous to human health (e.g. an apple that contains a poisonous pesticide or any type of asbestos) and a safe or safer identical or similar or substitute product.

217. In reality, a product that has been scientifically shown to be dangerous to human health attributes to that product a specific characteristic that makes it unlike any other product of the same family or category (e.g. apple or asbestos) or similar or alternative or substitute products (e.g. orange or PVC fibrous product). That kind of dangerous product should not be put into international trade and no importing country should have to rely on Article 2.2 of the TBT Agreement, for example, or the exception provisions of Article XX to justify any restriction on imports.¹¹⁸ It follows that the dangerous character of a product to human health is of particular relevance in the context of Article III:4 of GATT in deciding "likeness". In the context of Article 2.1 of the TBT Agreement, the

Conceptually, then, it is possible that certain aspects of a particular measure are covered by the TBT Agreement, while other aspects of the same measure, which are not covered by the TBT

component of the aim pursued by the measure in question, as this emerges or becomes apparent from the measure itself.¹²⁵

221. Therefore, the reply to the question would depend on how significant and independent the "other elements" of the measure are, in other words, whether they are capable of attributing a distinct, different and additional aim to the one principally pursued by the measure in question. Only in such a situation may some elements of a measure fall under the provisions of GATT and other elements of the same measure fall under the provisions of the TBT Agreement.

222. Applying the above principles to the French Decree in question, the Panel should conclude that it pursues only one, single, uniform aim, that is to ban the use of any kind of asbestos for the purpose of protecting human health. As the European Communities have explained at length in their written and oral submissions, this sole object of the Decree flows from the ordinary meaning of its terms in their context, the design and structure of the measure and the history of the preparatory work. The essential object and purpose of the Decree is to lay down a general, horizontal ban on the use of asbestos and asbestos-containing products. It does not relate to the preparation, adoption, and application of a technical regulation of any kind, in the sense of the TBT Agreement. Neither does it lay down a process and production method for asbestos and asbestos-containing products, simply because it bans their use.

223. One may wonder whether the limited and temporary exceptions laid down in Article 2 *et seq.* are a sufficiently important or independent element as to attribute another, separate and different aim to the Decree. As the European Communities have already explained, this is clearly not the case. Article 2 *et seq.* of the Decree state expressly that "exceptionally and on a temporary basis" certain products may continue to use chrysotile asbestos in order to ensure "an equivalent function" and so long as there exists "no substitute" for chrysotile which can ensure a lower level of risk and guarantee the same level of safety to users. This is an exception to the general ban, and exceptions by definition are to be interpreted narrowly. Article 2 *et seq.* explicitly state that the exception is temporary and will be phased out when substitute products become technically available. As the European Communities have already shown, the practice followed since the adoption of the Decree in 1996 confirms the ephemeral nature of these exceptions.¹²⁶ Consequently, these exceptions are not an essential, but rather an ancillary, accessory or subsidiary element of the Decree. They lay down no technical regulations or standards in the sense of the TBT Agreement and, therefore, cannot render the entire Decree subject to the TBT Agreement. And even if we were to assume that the exceptions do lay down technical regulations (which they do not), at best only those exceptions would fall under the scope of the TBT Agreement. But Canada does not claim that those exceptions constitute a violation of the TBT Agreement. Therefore, the question of whether some elements of the Decree (in this case the temporary exceptions) can fall within the TBT Agreement is, from a strict legal point of view, totally irrelevant to the outcome of this case.¹²⁷

¹²⁵ This is, for example, the way the issue of the relevant legal basis and of the applicable EC treaty provisions are determined in European Community law: see, for example, judgement of 11 June 1991, Case C-300/89, Titanium Dioxide [1991] ECR I-2867. For the problem of characterization in general under international law see, for example, J.A. Salmon, *Some Observations on Characterisation in Public International Law*, in UN Law/Fundamental Rights, Two Topics in International Law (ed. A. Cassese, 1979), page 3 *et seq.*

¹²⁶ The EC notes, that in fact, the number of exceptions has fallen rapidly since the adoption of the French Decree prohibiting all kinds of asbestos. Thus, in 1997, 87 enterprises used 1,200 tonnes of asbestos under all the permitted exceptions. In 1998, only 63 enterprises used 200 tonnes, 40 per cent of which was used by a single enterprise to produce "waterproof seals" (Latty-Soffa seal). In 1999, the number of enterprises fell to 25 with a volume of only 50 tonnes, 80 per cent of which was used by a single enterprise to produce chlorine (HBC) and titanium dioxide. In 2000, the number of enterprises fell to 14 and the volume to 27 tonnes, 40 per cent of which was used by a single enterprise to produce titanium dioxide.

Appellate Body and the Panel in *United States – Standards for Reformulated and Conventional Gasoline* can be seen also as an extension of the Panel's decision in *United States – Section 337 of the Tariff Act of 1930*. It should be recalled that in that case, the Panel had rejected the basic American claims that the disputed provision met the test of necessity under Article XX(d) of GATT 1947 "because of difficulties with service of process on and enforcement of judgement against foreign manufacturers."¹³⁶

228. Concerning the dispute between Canada and the European Communities regarding measures concerning asbestos and products containing asbestos, Canada's position in relation to the problem of practical difficulties in implementation hinges on two points. Firstly, we maintain that to achieve its objective of protecting human health, the French Government had available to it an alternative less trade-restrictive measure. Instead of acting in haste and under pressure from its public opinion, it could have introduced a regulatory framework under which prohibitions and authorizations of products containing asbestos would have been established in a rational manner on the basis of two guiding principles: (i) assessment of the risks on a product-by-product and use-by-use basis; (ii) analysis of the feasibility and effectiveness of controlled use for each product. Canada maintains that such a regulatory framework would not be difficult to implement in practice and that it would not be impossible to introduce. In that light, Canada maintains that there is a less trade-restrictive and reasonably available alternative measure to achieve the objectives pursued by France. Secondly, Canada maintains that in any case and as a general rule, any practical difficulties in implementing a measure are not a factor to be considered in assessing whether the measure is reasonably available and applying the test of necessity under Article XX of GATT, unless it is clearly established that these practical difficulties make implementation absolutely impossible. Canada's position relies partly on the cases of *United States – Standards for Reformulated and Conventional Gasoline* and *United States – Section 337 of the Tariff Act of 1930* and, secondly, on the conviction that taking account of the practical difficulties of implementation in applying the test of necessity would weaken the GATT disciplines by indirectly rewarding laxity and inefficiency.

Reply 3(b)

229. The European Communities and Canada agree that: (i) Article 2.2 of the TBT Agreement contains a test of necessity; (ii) the analysis involved in this test of necessity is similar to that relating to the test of necessity in Article XX:(b) of GATT. Consequently, our reply to question 3(a) on Article XX of GATT applies equally to Article 2.2 of the TBT Agreement. In particular, the principles formulated by the Panel and the Appellate Body in *United States – Standards for Reformulated and Conventional Gasoline* cited in Canada's reply to question 3(a) are wholly applicable in the context of the test of necessity in Article 2.2 of the TBT Agreement.

(ii) *Reply by the European Communities*

230. All the Panel and Appellate Body reports that have examined so far the test of "necessity" under Article XX:(b) of GATT have come to the conclusion that a restrictive measure taken by a Member is not necessary if an alternative measure, which that Member could reasonably be expected to employ and which is not inconsistent with other GATT provisions, is available to it.¹³⁷ A careful look at the rationale of the Panels demonstrates that the alternative measure must be: (i) effectively available to the Member in question; (ii) reasonably expected to be employed; (iii) not inconsistent or less inconsistent with other GATT provisions; (iv) capable of ensuring the Member's desired level of health protection. Thus, in the *Section 337* report the Panel held that "neither Article III:4 nor Article XX:(d) puts obligations on contracting parties specifying the level of protection that they

¹³⁶ Report of the Panel, paragraph 5.30.

¹³⁷ See, e.g., *Section 337* Panel report, BISD 36S/345, para. 5.26; *Thai Cigarettes* Panel report, BISD 37S/200, paragraph 75; *Reformulated Gasoline* Panel report, WT/DS2/R, paragraph 6.22-6.28.

United States had not satisfied its burden of proving that it was "not feasible" to establish individual baselines for foreign producers, or that there were any reasons that "precluded the effective use" of individual baselines, or that there were "any particular difficulty" sufficient to warrant the method of establishing baselines used by the United States (paragraphs 6.23-6.26). It also found that the United States did not meet its burden of showing whether the "gaming" concern "would actually occur", and that slightly stricter overall requirements on non-degradation of gasoline could not be implemented by the United States "at any time" (paragraph 6.27). The Panel also found that "the imposition of penalties" on importers was "an effective enforcement mechanism" used by the United States in other settings, because the United States had not demonstrated that the data available from foreign refiners was "inherently less susceptible" to established techniques of checking, verification, assessment and enforcement than data for other trade in goods subject to United States regulation (paragraph 6.28).¹³⁹

233. In consequence, in order to decide whether an alternative measure is reasonably available, panels have looked at the specific facts of each individual case. In all the three Panel Reports mentioned above, the Panels identified specific alternative measures that were objective, effective and constantly available to the Member applying the inconsistent measure in question. They also found that theoretical or potential measures, i.e. measures that were not real, feasible and as effective in practice as the measure applied, were not enough. The Panels and the Appellate Body appear, almost invariably, to have judged a measure not necessary, simply on the grounds that the same or an equivalent measure was not applied to products of domestic origin. They also found that the effective alternative measure should be clearly capable of achieving the pursued legitimate objective (i.e. achieve the desired level of health protection). It follows that objective difficulties in the effective application of the possible alternative measure that risk compromising the desired level of protection render the measure in question not reasonably available and one not reasonably expected to be employed by the Member.

234. To reply specifically to the Panel's question, objective difficulties in the practical application of a measure play a crucial and determining role in deciding whether that measure is a reasonably available alternative measure to the one actually applied by a Member. As the European Communities have already explained in their written and oral submissions, the possible difficulties in the practical application of a measure may be of a wide and diverse nature, e.g. practical, technical, legal, economic, scientific or a combination of two or more of these reasons. The European Communities have already identified in its submissions a large number of such objective difficulties. The scientific experts have also confirmed those difficulties, in writing and orally. The outcome of their evaluation was that all these difficulties render "controlled use" not feasible or practicable. In deciding whether an alternative measure is reasonably available, Panels have to examine whether it is objectively available, feasible, effective and proportional to the pursued legitimate objective of protecting human health. In so deciding, one should always keep in mind that Article XX:(b) of GATT clearly allows contracting parties to give priority to human health over trade liberalization.¹⁴⁰ Therefore, the result in this particular case is that so called "controlled use" does not achieve the level of health protection desired by France.

235. The same applies in the context of Article 2.2 of the TBT Agreement. Possible objective difficulties in the practical application of a measure play an equally crucial and determining role in deciding whether that measure is less restrictive on trade than the one actually applied. The text of Article 2.2 is clearer on this point because it provides that when applying the necessity test ("creating

239. These WHO findings have been fully endorsed by all four scientific experts chosen by the Panel. The available evidence and the experts consulted by the Panel concur with the European Communities in saying that so-called "controlled use" is not really feasible or practicable. Moreover, it is important to emphasize that the available evidence and the experts also confirm that even if "controlled use" were feasible in practice, in those cases where it might be applicable it is still inherently not effective because it cannot eliminate all risks. Canada has never argued that there was "no risk" at low levels of exposure, but merely that it becomes "undetectable". The available evidence and the experts consulted by the Panel (including one of the experts of Canada, Dr. McDonald) confirmed during the meeting with the experts on 17 January that the linear model is appropriate and that there is no scientifically established threshold of exposure below which there is no risk. The experts also agree with the European Communities that to apply "controlled use" would entail very serious health risks as well as technical, administrative and economic costs to France. They also agree that the application of administrative controls and fines do not act as a real deterrent, because too many and serious violations still occur very frequently in countries which do not prohibit asbestos completely but simply try to control its use. Therefore, the risks associated with asbestos in place and the measures taken to deal with them are not relevant in deciding whether the "controlled use" proposed by Canada is a reasonable alternative measure to the total prohibition of asbestos. In the Europeane

Existing legislation and regulations

241. The Quebec system of health and safety at work is the result of a broad consensus; it is the social contract which binds over two million workers and their employers in relation to occupational health and safety. In order to establish the rights and obligations of each, and to put in place the means to exercise them, Quebec passed the *Occupational Health and Safety Act (LSST)*¹⁴³, which covers prevention and the

performance filter, for grinding, cutting, drilling or sanding an asbestos-cement product. On sites where high-risk work is carried out on friable materials in place, the employer must comply with much stricter requirements. These include wearing breathing apparatus of the semi or full mask type, sampling of the concentration of respirable asbestos fibres in the air in the working area at least once a shift, provision of protecting clothing to workers, providing workers with lockers for work clothing and personal clothing, provision of a shower room, isolation of the working area and the locker room for work clothes from the remainder of the building by a sealed partition equipped with an extraction ventilation system. The Code also provides that before work is commenced that might result in the release of asbestos dust, the employer must train and inform workers on the risks, methods of prevention and safe working methods. The training and information programme must include the employers general obligations, the effects of asbestos on health, the applicable standards and the sampling to be carried out, the workers rights and obligations, personal and collective protection measures and equipment, tasks to be carried out and the equipment or tools to be used, safe working methods and procedures, and methods of prevention and control.

Role of the Occupational Health and Safety Commission (CSST)

243. The Occupational Health and Safety Commission (*Commission de la Santé et de la Sécurité au Travail*) fulfils its administrative functions in a variety of ways. It is concerned, *inter alia*, to prevent occupational injuries while at the same time playing the role of public guarantor for employers and workers alike. In addition, the CSST provides workers and employers with the services to which they are entitled. In the case of prevention it is involved in promoting occupational health and safety, assistance to workers and employers in their efforts to improve their working environment and eliminate hazards, and workplace inspections. The role of the CSST is mainly focused on prevention, specifically through the comprehensive analysis of the causes of occupational accidents and diseases. Consequently, when it investigates a work place, all the chemical and physical pollutants, including chrysotile asbestos, and all working constraints are taken into account. The CSST requires the employer to implement a prevention programme. The prevention programme also includes a health programme, which involves monitoring workers' health for the prevention and early detection of any medical condition caused or aggravated by work.

Implementation of controlled use

244. In workplaces where, *inter alia*, chrysotile asbestos is found, a variety of actions for implementing the legislation and regulations under ILO Convention 162 has been carried out in recent years. More specifically, we present data for which we have performance indicators relating to inspection, health services, training and information for workers in a variety of environments, in particular, the construction industry.

245. Inspection: When an inspector investigates a construction site or an industrial establishment, he opens an investigation file and visits the work site on one or more occasions. During his visit, he may find various breaches of the regulations concerning chemical and physical pollutants and other provisions on occupational health and safety. He may take a number of actions, including closing the site which means halting the work until the appropriate remedial measures are put in place. The record of activities of the inspection service of the CSST in the construction sector show that in Quebec in 1999, 14,928 inspections were carried out in all areas of economic activity, including 5,171 inspections of construction sites. These inspections gave rise to 234 occupational health and safety proceedings relating to asbestos. The main reasons for proceedings were the following: lack of lockers or showers, failure to isolate the working area and the locker room from the remainder of the building by means of a sealed partition equipped with a dust extraction and ventilation system (37 cases)¹⁴⁹, failure to dampen friable materials containing asbestos during removal works and failure

¹⁴⁹ *Code of Safety for Construction Works*, Article 3.23.16.

to use a dust extraction system equipped with a high-performance filter to remove debris containing asbestos (28 cases)¹⁵⁰, failure to provide disposable protective clothing or reusable protective clothing (27 cases)¹⁵¹, and failure to take daily samples of the concentration of respirable asbestos fibres in the air in the working area (5 cases).¹⁵² Eighteen sites were closed for non-compliance with standards. We should emphasize that in 1999, all asbestos-related occupational health and safety proceedings on building sites concerned exclusively friable asbestos products and not asbestos-cement products.

246. Training and information: The various training sessions developed and delivered by partner bodies in the occupational health and safety network are targeted at several types of client and, for that reason, the content and length varies. In 1997, the CSST took stock of its continuous training programmes for its inspectors and that led to the development of a specific training module on asbestos. As a result, in 1998 and 1999, the CSST delivered two types of training on chrysotile asbestos, a three-day course aimed at inspectors in the construction sector and specialists in the health network, and a two-day course for inspectors in industrial establishments. So far, the CSST has delivered eight two-day courses in which 77 inspectors participated. The three-day training sessions provided training for 80 construction sector inspectors and some 30 people from the health network. At the beginning of June 1999, in collaboration with its partners, the CSST launched the programme for the prevention of occupational diseases related to asbestos exposure. Aimed this time at workers and employers, the programme focuses on prevention measures to be taken not only on renovation and demolition sites, but also in repair and maintenance work. The objectives are to inform about appropriate working methods and suitable protective equipment for all work, which may give rise to the release of asbestos dust and ensure that they are used.

247. For its part, the joint sectoral association for occupational health and safety in the construction sector (ASP-Construction) has, since 1992, been offering a four-hour training course for construction workers. The course on asbestos safety meets the requirements on Article 3.23.7 of the Code. The participants in this course are mainly general labour, insulation appliers, pipe fitters, electricians, fire protection engineers, demolition workers etc.. The following table shows the annual distribution of data for this course provided by the ASP-Construction Consultants:

Year	Number of Courses	Number of Participants
1999	67	946
1998	34	509
1997	60	532
1996	31	350
1995	36	407
1994	12	136
1993	39	698
1992	16	245
TOTAL	295	3,828

248. Concerning information activities, the following table shows the annual breakdown of ASP-Construction data for the distribution of the *Prevention Guide for Asbestos* and notices to be placed at the entrance to every site when moderate or high risk works are carried out:

¹⁵⁰ *Idem.*, article 3.23.9 and 3.23.10.

¹⁵¹ *Idem.*, article 3.23.15 and 3.23.16.

¹⁵² *Idem.*, article 3.23.16.4.

Year	Number of Guides	Number of Notices
1999	2,044	931
1998	936	410
1997	1,342	811
1996	857	415
1995	855	415
1994	614	560
1993	1,002	349
1992	1,272	723
TOTAL	8,922	4,614

249.

251. The preventative measures in place in these establishments include regular medical supervision, environmental monitoring, respiratory protection and information on health risks. All of these actions are encompassed in each establishment's prevention programme.

Controlled use in France and the United States

252. We note that the French system for registering asbestos in place does not require the inclusion of chrysotile cement products.¹⁵³ It appears that France, in its approach to management of the risks related to the use of asbestos, is not concerned with chrysotile cement products which do not present any detectable risk to health. The INSERM data are quite clear about the efficiency of controlled use in the French manufacturing industry. Of 2,480 people working in the asbestos processing sector in France in 1994, only two (0.1 per cent of workers) were exposed to concentrations of over 0.6 f/ml.¹⁵⁴ Consequently, it is difficult to talk of the impossibility of controlled use in the processing industry when compliance with exposure standards throughout the territory of France required only one intervention concerning two workers. The American experience also shows the effectiveness and practicability of implementing a controlled use policy. As pointed out by Canada at the second substantive meeting, the OSHA in the United States only recorded 16 cases of exceeding the maximum exposure levels of 0.1 f/ml throughout America in the year 1998-1999.¹⁵⁵ It should be noted, furthermore, that those exposures were related to friable materials, whose use is proscribed under the principles of controlled use as set out in international standards and by Canada. Yet again, hard to speak of ineffectiveness and the impossibility of controlled use.

Conclusion

253. All the above data shows that there have been many and varied preventative activities relating to chrysotile asbestos used in various working environments, including the construction sector. They effectively take account of the various provisions contained in the legislation and regulations. It is difficult in the case of asbestos to use medical performance indicators because of the latent period of the various pathologies related to exposure to chrysotile. But all these preventative measures make it possible to monitor exposure and to react in cases where limits are exceeded as the result of an incident, of whatever nature, in the working environment.

(ii) Reply by the European Communities

254. In France, the implementation of measures relating to the use of chrysotile asbestos and its various applications was completed in several stages, starting from the date when the carcinogenic nature of asbestos was recognized by the IARC (International Agency for Research on Cancer), in 1977. The first phase, covering the 1970s, was centred on the production sector, in the course of which France: (i) laid down specific rules for asbestos processing sector in

- improved procedures for asbestos removal: the power conferred on labour inspectors

stop the risk spreading. The reasons for this are as follows: (i) chrysotile is carcinogenic and it has not been shown that there is a threshold below which it is harmless; (ii) the vast majority of mesotheliomas appear among "secondary users", particularly, in the construction sector, which means a very large number of people exposed in a very wide variety of situations in which the so-called "safe" use is inapplicable. Protection measures in force prior to the decision to impose the ban, even if technically the tightest possible, proved inadequate to reduce the risks in all situations to the lowest possible level. That being the case, if the French authorities had not imposed a ban, they would have knowingly allowed the volume of asbestos in place to increase, thereby increasing the risk to workers' health, particularly that of "secondary users" (workers in the repair and maintenance sector and do-it-yourself enthusiasts).

2. Question by the Panel to Canada

Question 5: With respect to Articles III:4 of GATT and 2.1 of the TBT Agreement, Canada states that it is not invoking the argument of likeness of non-fibrous substitute products and neither does it extend the argument of likeness to substitute fibres other than glass fibre, cellulose fibre, PVA fibre and fibro-cement products containing such fibres (reply to question 15 of the Panel). Could Canada clarify if it considers that the Panel should limit its stiel to Canada

270. Following the results of the collective INSERM report on asbestos substitute fibres, the French authorities launched a plan of action on artificial mineral fibres (in particular glass wool and ceramic fibres) which provides for: (i) monitoring of the compliance of labelling of the various fibres, in particular, glass wools; (ii) monitoring of exposure levels; (iii) improving knowledge in the area of toxicology and epidemiology.

Question 7: Canada claims that France should have used two guiding principles to determine which chrysotile asbestos products should be used: (i) risk assessment product by product and use by use, and (ii) demonstration of the feasibility and effectiveness of "controlled use" for each product. Could the European Communities comment on these arguments?

(i) *Reply by the European Communities*

271. Both Canada's arguments are incorrect for the following reasons.

272. First, neither GATT nor the TBT Agreement lay down any rule whatsoever on how to perform a risk assessment. Even the SPS Agreement, which is not applicable in this case and which contains specific provisions on risk assessment, does not require the performance of a risk assessment in the way suggested by Canada.¹⁷¹

273. Secondly, there are in fact no internationally agreed and binding rules on how to conduct a risk assessment for dangerous substances like asbestos. In addition, neither national nor international practice (e.g. by WHO, IARC, FAO/Codex Alimentarius, etc.) support the views of Canada on the two "guiding principles". It is common practice to assess the risks posed by chemical substances or other potentially dangerous products by evaluating in general the physico-chemical properties, toxicological and other relevant data on the pharmacologically active parent compound and its metabolites, and the possible ecotoxicological effects where this is likely to be relevant to the assessment of the risks posed by the substance in question. When the risk assessment indicates that an Acceptable Daily Intake (ADI) and a Maximum Residue Limit (MRL) can be set for the substance or product in question, they can subsequently be used without further examination on a product by product and use by use basis, contrary to what is incorrectly suggested by Canada.¹⁷² Risk assessment, however, is a very complex and interactive process and no one particular technique or

275. Fourthly, the risk assessment carried out by WHO is very similar, if not identical, to the one performed by INSERM and confirms on all essential points the results of the INSERM Report.

276. Fifthly, as regards substances that have been classified as proven human carcinogens, such as chrysotile asbestos, and for which there is no scientifically established threshold of exposure, the two guiding principles suggested by Canada are in fact totally irrelevant, because any exposure to

the procedural aspects of dispute settlement; rather, they are set out in the texts of the WTO agreements, in this case the TBT Agreement, in particular. In imposing the ban, France did not "take into account the special development, financial and trade needs" of Brazil or Zimbabwe, as required by Article 12.2. Nor did France ensure that the ban "[did] not create unnecessary obstacles to exports" of chrysotile from Brazil, as required by Article 12.3. This is why Brazil has asked the Panel to scrutinize the ban closely, especially as it applies to the chrysotile exported by Brazil. The ban's unwarranted effects on Brazil and Zimbabwe provide a supplemental reason why the ban is inconsistent with France's obligations under the TBT Agreement.

Question 2: To what extent can modern controlled use in both current and recent past practice ensure adequate safety standards throughout the life-cycle of products containing chrysotile asbestos?

280. Current controlled-use policies are available to guarantee safety throughout the life-cycle of chrysotile products. First, as a preliminary matter, Brazil notes that the most current research indicates that chrysotile alone does not present significant health risks. (Please refer below to Brazil's response to the EC Questions

(c) Disposal/Recycling

283. Disposal/recycling of asbestos cement products and "waste" should be handled with measures similar to their manufacture end-use - proper wet controls and cutting or breaking methods. Please recall that the EC focus on remediation of flocking is not at issue. Rather, the issue here is the disposal/recycling of encapsulated used chrysotile cement products and waste. In cement products, the chrysotile remains encapsulated. Indeed, when buried, for example, in a landfill, the fibres are as inert (or more inert) as they are in naturally appearing ores containing asbestos.

(d) Personal Protection Equipment

284. At each stage, proper controls reduce exposure and health risks to *de minimis* levels. With the use of personal protection equipment (PPE), exposure can be reduced to zero. PPE absolutely guarantees no exposure and thus no risk to health. PPE could constitute "deep sea diver suits." However, for any modern application involving chrysotile products, a simple air filter, coupled with proper working procedures, will eliminate exposure. In addition, Brazil refers the Panel to Brazil's answers to EC Questions 10 (flaws of the linear risk model), 16 (safety of modern uses) and 22 and 23 (chrysotile that is not mixed with or accompanied by any amount, even a trace amount, of amphibole or substitute fibres presents no risk; modern uses of chrysotile present no risk).

2. Questions from Canada to Brazil

Question 1: What is Brazil's position on the relative health effects of chrysotile, amphiboles and man-made fibres?

285. In considering the question of relative health effects, one must keep in mind four basic truths. First, as accepted and employed by the EC in its rulemaking (see Brazil's response to EC Question 7), the toxicity of fibres is defined primarily by reference to the size, shape and durability and duration in the lung of the fibre in question. Thus, experts posit that any fibre with characteristics similar to chrysotile (due to its having been engineered to substitute for chrysotile) must be a suspected carcinogen.¹⁷⁵ Chrysotile has been proven safer than amphibole asbestos. As INSERM concedes and the studies cited by Brazil in response to EC Question 5 establish, this fact is not subject to question. Equally incontrovertible is the proposition that some man-made fibres have been proven more dangerous than chrysotile or even amphibole. See the discussion and the studies cited at Brazil's response to EC Question 7. Recent research demonstrates that chrysotile presents no health risk. Please refer to the discussion and studies presented at Brazil's responses to EC Questions 22 and 23. Scientists now suspect as a result of recent studies that health effects once associated with chrysotile are due to the fact that the past studies examined subjects exposed to chrysotile and amphibole and that the amphibole was responsible for the health effects.¹⁷⁶

¹⁷⁵ Pott, F. and Roller, M., *Relevance of Nonphysiological Exposure Routes for Carcinogenicity Studies of Solid Particles*, International Life Sciences Institute Monographs, Toxic and Carcinogenic Effects of Solid Particles in the Respiratory Tract, Washington, DC, at 112 (1994).

¹⁷⁶ See, e.g., Churg, A. and Vedal, S., *Fiber Burden and Patterns of Asbestos-related Disease in Workers with Heavy Mixed Amosite and Chrysotile Exposure*, Am. J. Resp. Crit. Care Med., Vol. 150, No.3 (1994); Albin, M. et al., *Retention Patterns of Asbestos Fibres in Lung Tissue among Asbestos Cement Workers*, Occ. Env. Med., Vol. 51, No.3 (1994); McDonald, J.C. and McDonald, A.D., *Chrysotile, Tremolite and Carcinogenicity*, Ann. Occup. Hyg., Vol. 41, No.

Question 2: What is Brazil's position as to whether and how chrysotile use can be controlled to guarantee safety?

286. For years, Brazil has controlled the mining, production and use of chrysotile and chrysotile products to guarantee safety. As explained by Brazil in response to Panel Question 2, controls exist for every part of the life cycle, from the time chrysotile is mined until chrysotile cement products are disposed of. Even as the EC presents the grossly exaggerated picture of workers equipped as "veritable deep sea divers," the EC provides the seed of an admission which, germinated, compromises its position. The EC concedes that use can be safe and, in doing so, admits that a ban is not the least trade restrictive remedy required to achieve its desired level of protection. But, in any case, the EC's picture is quite distorted. For a country that chooses to disturb flocked asbestos, guaranteeing worker safety by equipping workers as veritable deep sea divers may be rational; however, for modern controlled uses of chrysotile, the only relevant personal protective equipment (PPE) is a simple air filter, which reduces already safe exposure levels to zero.

Question 3: How does Brazil interpret the expression "current controlled use"?

287. The expression "current controlled use" is the key to this proceeding. Brazil is not defending past uses, e.g., flocking, the use of amphibole, or the use of naturally exposed asbestos in solution as a white-wash for buildings. Brazil is defending against France's ban a limited range of beneficial, safe uses: the use of chrysotile in asbestos cement products and friction products. Brazil has demonstrated

appreciably greater than of chrysotile ..."¹⁷⁸. Thus, amphibole is viewed widely as the source of toxicity that at one time in the past was associated with the use of chrysotile.

Question 3: Could Brazil provide concrete written evidence supporting its allegation (e.g. paragraphs 4.3 and 4.9 of its written submission) that the French Decree at issue aims to deal exclusively with a public outcry, public pressure and to appease domestic sentiment and is not based on any scientific evidence, given the volume of internationally available scientific evidence documenting the risks of asbestos to human health?

290. Obviously, the French Government did not accompany the Decree with an official statement admitting the Decree was passed to appease the French public. No government would do such a thing. However, the facts preceding and surrounding the Decree and the INSERM Report, as well as the timing of the decisions taken, demonstrate that the Decree was not aimed primarily at protecting public health (for if it was, why are substitutes that are Class II carcinogens not banned?), but was designed to quiet a disturbed populace. In this regard, Brazil refers to Canada's arguments (contained in Section III.B.3 of this Report) which set out a chronology showing how a series of unfortunate decisions, coupled with the public's strong response, led the French Government to ban chrysotile, without scientific basis. The text of the INSERM Report also supports this conclusion. At page 140, INSERM notes that exposure to flocked asbestos in buildings is the "core of the current concerns," and emphasizes that the subject is "extremely controversial." INSERM states that French courts had wrestled with the issue and ignored science in tying sickness to indoor exposure. *Id.* at pages 141-2. Ironically, INSERM concludes that the data "do not confirm" that maintenance and service personnel in "asbestos-sprayed buildings" (flocked buildings) experienced an increased risk of respiratory abnormalities. *Id.* at pages 143-4.

Question 4: Could Brazil provide concrete evidence supporting the allegation (paragraph 4.3 of its written submission) that the INSERM report was merely a scientific "cover" for a previously taken political decision?

291. Brazil refers to the answer to EC Question 3. In addition, Brazil notes that the fact that the INSERM Report was merely scientific cover for the political decision is confirmed not merely by reference to the events of the time, but also by a review of the Report itself. Even a cursory review shows that INSERM ignored evidence that did not conform to the opinion it apparently was instructed to reach.

Question 5: Could Brazil provide written evidence supporting the allegation (paragraph 4.3 of its written submission) that "especially the spraying of brittle amphibole" caused the asbestos-

of radiographic asbestosis was found to be higher in the plant that handles more amphibole asbestos. " *Id.* at page 323. INSERM further concedes that "crocidolite has a greater fibrogenic effect than chrysotile." *Id.* at page 326. INSERM concludes that the studies demonstrate that the dose-effect relationship is much stronger with amphibole fibres than with chrysotile, as regards both asbestosis and the other pathogenic effects of asbestos. *Id.* at page 327. Anecdotal evidence supports the conclusion. INSERM explains the higher incidence of sickness in Australia and New Zealand by reference to the "widespread use of the crocidolite these two countries produce." *Id.* at page 158; [*sic*] *see also id.* at page 171 (concluding that, in Australia, "the incidence of mesothelioma is particularly high due to widespread crocidolite use"). This view is widely shared. In 1996, Health and Safety Executive of Great Britain concluded that:

"[v]ery few cases of mesothelioma can be reliably attributed to chrysotile despite the many thousands of workers who have had massive and prolonged exposures ... In contrast, mesotheliomas have been observed among some workers who experienced only brief exposures to amphiboles."¹⁷⁹

293. A U.S. Government official has expressed a similar view. According to Malcolm Ross, mineralogist for the U.S. Geological Survey, scientific studies show chrysotile is not as great a health risk as amphibole: "[t]here's no non-occupational risk with chrysotile. ... In the workplace, chrysotile should not show any noticeable increase of disease if it is controlled."¹⁸⁰

cumulative exposures of 30 fibres/ml-years. No chrysotile related increased risk was detected at

Question 8: In footnote 11 of paragraph 4.10 of its written submission, Brazil states that "because only the INSERM report preceded the Ban, the Ban must be supported by the report alone." Could Brazil explain why the INSERM report alone should support the ban given the volume of internationally available scientific evidence clearly documenting the risks of asbestos to human health? What provisions of the GATT 94 and/or the TBT Agreement (assuming this is applicable) support this proposition?

298. First, the Government of France ordered the INSERM Report precisely for the purpose of conducting a risk assessment and supporting the ban. In promulgating the ban, it relied on the INSERM Report as the risk assessment. For the ban to be legitimate, it must be supported by the risk assessment upon which it is based. That is a matter of logic, not of WTO rules. More importantly, however, INSERM and the French Government failed to conduct an unbiased risk assessment. The EC now appears before this Panel, suggesting that the actual risk assessment was not published, but occurred behind closed doors in a process in which French Government officials reviewed the INSERM Report and all of the relevant studies the EC concedes with this question that INSERM ignored. Then, and only then, suggests the EC, did the French Government issue its decision to ban chrysotile. There is no evidence that any such complex, thorough process occurred in the 24 hours between delivery of the INSERM Report and the issuance of the ban. Moreover, to countenance the EC's attempt to insulate the French risk assessment from examination would be to make a mockery of the TBT Agreement. It would allow any Member to conduct a secret analysis and issue its foregone conclusion that a ban was necessary, without any oversight or discipline, whatsoever.

Question 9: In paragraph 4.11 of its written submission, Brazil states: "Finally, INSERM concedes that, although the health data it applied to chrysotile is from past, massive and prolonged exposure to amphibole (...)". Could Brazil provide the exact location (page number) where INSERM has stated this?

299. Throughout the Report INSERM relies on data from human exposure and animal exposure (mostly rats and hamsters). All of the studies of human exposure focus on exposure that occurred 20, 30, 40, 50 and 60 or more (for the earliest studies) years ago. *See, e.g.*, INSERM Report at Tables 1 and 2 to Chapter 13, ifage numbs 321ear proce323 Ahitten supj T* ih80.1937 Tc u-0.1704008c 0.059 8Tw (

is a threshold fibre dose below which asbestosis is not seen ...".¹⁸⁶

Question 13: Could Brazil please provide all available information on the results of its "research into and confirmation of the health effects of chrysotile and its substitutes" foreseen in its Law No. 2350 (paragraph 4.18 of its written submission)? Please provide copies also of those results.

307. Two types of research are under way: epidemiological research and research on bio-persistence. The epidemiological research is far from completion, but tracks the health of thousands of asbestos workers in Brazil. Results or a summary thereof will be provided as soon as they are available. The preliminary findings on bio-persistence are presented in Dr. Bernstein's study,¹⁹³ provided by Brazil to the Panel. Moreover, as discussed in response to EC Question 7, research performed in the EC and elsewhere demonstrates that substitute fibres present significant health risks.

Question 14: The so-called Tripartite Agreements (paragraph 4.19 of its written submission), "make ABRA", the Brazilian Asbestos Association "responsible for providing the companies with technical assistance regarding controls and preventive measures." Has ABRA ever provided such assistance to French client companies of Brazilian chrysotile producers? If so, please provide evidence thereof.

308. Yes, ABRA provides assistance to those companies that join as members and request assistance. As the French Government well knows, among ABRA's members is Brasilit S/A, a French company that is one of the largest cement fibre producers in Brazil. (Other ABRA members are German and United States companies.) Moreover, ABRA is available to assist any French or EC company needing assistance after the ban is lifted.

Question 15: Brazil's written submission does not clearly explain what the Brazilian legal requirements and practices are regarding the waste generated by end-users of products containing asbestos, for instance when parts of asbestos-containing-products have to be cut off to fit certain uses or when buildings, installations, and other structures containing asbestos are demolished? Could Brazil please provide detailed information, including references to legislation, on this question?

309. Brazilian environmental legislation addresses "residues," including chrysotile residues. The Tripartite Agreements require zero residue or complete recycling of residues in the industrial processes for producing chrysotile cement products. Also, imports of amphibole were banned years ago and the asbestos Brazil produces is chrysotile. Because Brazilian asbestos use is limited to chrysotile and chrysotile products, no health effects have been associated with disposal of cut-off pieces of asbestos cement pipe or roofing. However, cement companies have adopted procedures where they accept and recycle "waste." End users are directed to return the waste to the point of purchase, which then returns it to the producer. The producer recycles the waste in its industrial process. Certainly, France has the ability to regulate chrysotile "waste," just as it regulates wastes from many other production processes.

Question 16: In paragraph 4.33 of its written submission, Brazil claims that what it calls "modern-day" products containing chrysotile do not contain loose, friable chrysotile fibres. Could Brazil provide the data it possesses on exposure levels occurring when these products are actually used in practice (for instance when cutting or sawing these products in workplaces or homes, or when demolishing the buildings and other structures in which they are present)?

310. The Brazilian Government has not conducted or sponsored any studies on workplace exposure levels. However, as the EC well knows, many studies document that exposure levels

¹⁹³ David M. Bernstein, *Summary of the Final Report on the Chrysotile Biopersistence Study*, 2 October 1998.

depend upon the controls used. Brazil directs the EC to the INSERM Report at page 70. There, INSERM sets out exposure levels for uncontrolled activities. The levels range from 10 f/ml for a person silly enough to change a friction element on a machine for making corrugated fibreboard and then clean it with a blow gun, to 0.15 f/ml for a person removing a false ceiling. Do-it-yourself activities such as cutting an asbestos seal, and drilling holes in sprayed asbestos fall in between these levels and for the most part are under 1 f/ml. But these values are for uncontrolled use. Controlled use would yield much lower exposure rates. Moreover, controlled use, plus, as INSERM terms it "protection measures" would yield no or *de minimis* exposure. Indeed, at page 70, INSERM refers briefly to a study (CORN) in which the concentrations of fibres for "work in buildings" ("dismantling false ceilings, cable passageways, electrical work and encapsulation"), ranged "between 0 and 0.228 f/ml." On the related topic of the safety of controlled use, INSERM makes several interesting points. These data are relevant, INSERM states at page 71, because:

"In the area of para-occupational exposure, related in particular to do-it-yourself activities, there are no data in the literature allowing documentation of the subject. In each basic operation - welding, cutting asbestos board, cutting or drilling asbestos cement and so on - it seems justifiable to consider the emission peaks to be identical to those found during industrial operations of the same type. The possible differences in exposure levels, in terms of inhaled doses, are eventually to be found in exposure times, as the do-it-yourselfer does not perform such operations as often as occupational workers."

311. Thus, experience with occupational exposure to asbestos is applicable to do-it-yourselfers, provided one recalls that exposure times are far less for do-it-yourselfers than for asbestos workers. The following discussion recounts INSERM's conclusion regarding occupational exposure. First, INSERM notes that mesothelioma stems from past occupational exposure. According to INSERM (page 182), "stringent worker protection measures" can eradicate mesothelioma: "[b]ecause of the occupational source of asbestos exposure, mesothelioma incidence is not rising in a few countries that implemented stringent worker protection measures at an early date." Regarding asbestosis, INSERM (page 327) notes that "[t]he current levels of exposure in industries that use asbestos directly should lead to an end of confirmed cases of asbestosis (Doll *et al.*, 1985)." INSERM (page 327) also cites

ensure that the Panel was informed that a similar issue already had been addressed and resolved under the SPS Agreement.

Question 18: Has the study by Dr. David M. Bernstein, cited by Brazil, been published in a peer-reviewed journal?

313. The study by Dr. D. Bernstein was planned in two phases. The first phase (now complete) involved the evaluation of the biopersistence and morphological disposition of chrysotile fibres following inhalation exposure. Dr. Bernstein presented portions of the first phase 10 November 1998 at the Giornata Scientifica sulle Fibre di Vitro in Rome. The second phase is currently under way and involves a similar study of biopersistence and morphological disposition of both short and long tremolite fibres following inhalation exposure. Dr. Bernstein has confirmed that these studies will be published in a peer-reviewed scientific journal when the results from Phase Two are available. In the interim, Dr. Bernstein has published or presented the following reports: (i) a publication providing the scientific basis leading the European Communities to incorporate fibre biopersistence as a key parameter in assessing fibre toxicity¹⁹⁴; a presentation of the chrysotile biopersistence and morphological disposition results at a scientific colloquium presented at the Universidade Federal de São Paulo (Brazil) 19 March 1999; and an abstract by Dr. Bernstein entitled *The Inhalation Biopersistence and Morphologic Lung Disposition of Pure Chrysotile Asbestos in Rats*

316. These conclusions led the WHO to recommend research on the effects of exposure limited to chrysotile without any exposure to amphibole.¹⁹⁶ This is precisely the type of research Dr. David M. Bernstein is conducting.

Question 20: Could Brazil elaborate on the relationship and possible limits of Article 12, in particular 12.3, of the TBT Agreement with the right of Members to take measures to protect human health in their territory?

317. No relationship exists, but this is not an issue in the present case. Brazil totally agrees that protecting public health is a legitimate objective. However, here France has taken a measure that is more trade restrictive than necessary to fulfil the purported objective of protecting public health. Moreover, France did not even consider the fact that Brazil mines and exports only chrysotile, not amphibole or a chrysotile/amphibole mixture. This is inconsistent with the TBT Agreement. (Please refer also Brazil's response to Panel Question 1.)

Question 21: Could Brazil please provide data, including scientific evidence, of the number of cases of mesothelioma observed and their evolution during the last 20-30 years in its territory?

318. No case of lung cancer or mesothelioma from exposure only to chrysotile has been reported (this currently is being confirmed in the epidemiological study). Only three cases total of mesothelioma have been reported in Brazil. All of these were in individuals with substantial exposure to amphibole.

Question 22: In paragraph 4.14 of its written submission, Brazil states that "Recent research focusing on uncontaminated chrysotile demonstrates why it presents no health risk whatsoever". Could Brazil provide copy of this scientific evidence?

Question 23: In its oral presentation, Brazil stated that INSERM has not taken account of studies which show that there is no risk associated with what it calls "modern" use of chrysotile. Could Brazil provide copies of the studies concerned, including references to the relevant paragraphs?

319. Brazil has addressed these questions with one answer because they raise similar issues.

320. Brazil has provided a copy of Dr. Bernstein's study.¹⁹⁷ Please also refer to three other studies presented by Brazil,¹⁹⁸ which, in sum, "... support the hypothesis that adverse effects are associated rather with the fibres retained (amphiboles), than with the ones being cleared (largely chrysotile)."¹⁹⁹ These studies show that, and explain why, modern uses of chrysotile alone present no health risk. In addition, please recall that in 25 years of operation, the Capivari Chrysotile Cement Plant in Brazil has not experienced one case of mesothelioma (please refer to Brazil's presentation in Section IV of this Report). This health history is similar to that at other work sites using chrysotile (and even some in which chrysotile was predominant in a mix of chrysotile and amphibole). In the Executive Summary of The Workshop on Health Risks Associated with Chrysotile Asbestos,

¹⁹⁶ Id. at 145.

¹⁹⁷ David M. Bernstein, *Summary of the Final Report on the Chrysotile Biopersistence Study*, 2 October 1998.

¹⁹⁸ Cossette M., *Substitutes for Asbestos*, 4 December 1998; Brown *et al.*, *Mechanisms in Fibre Carcinogenesis*, Proceedings of a NATO Advanced Research Workshop on Mechanisms in Fibre Carcinogenesis, 22-25 October 1990, New Mexico, United States; Peraud A. and Riebe-Imre M., *Toxic and Chromosome-Damaging Effects of Natural and Man-Made Mineral Fibers in Epithelial Lung Cells in vitro*, Institute of Experimental Pathology, Hannover Medical School, Germany.

¹⁹⁹ Albin, M. *et al.*, *Retention Patterns of Asbestos Fibres in Lung Tissue among Asbestos Cement Workers*, *Occup. & Env. Med.*, Vol. 51, No. 3 at 211 (1994).

assessed dose-response relationship for asbestosis in a cohort of asbestos textile workers exposed only to chrysotile, found that 17 (5.5 per cent) of 308 deaths were due to asbestosis or pulmonary fibrosis. A second study reported data showing a linear relationship between cumulative fibre dose and morbidity. A third study reported a linear dose-response relationship between asbestosis and levels of asbestos dust. These data also support the hypothesis of no threshold, or low threshold for asbestos, since there is increased risk at cumulative exposures as low as 37 fiber-years/cc.²⁰⁹

322. Because of the carcinogenicity and asbestosis-producing effects of all asbestos types, the U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor do not distinguish among asbestos fibre types in their regulations.²¹⁰ In testimony in 1990, Richard Lemen, Assistant Director of the U.S. National Institute for Occupational Safety and Health, summed up the case against distinguishing among asbestos fibre types in public policy. We quote from his testimony:

"Recent reports have appeared in the scientific literature to suggest that different forms of asbestos are not equally pathogenic. ... However, there is a great deal of uncertainty associated with these findings and equally important contradictory evidence. Results from research involving animal bioassays present a strong case that there is no safe form of asbestos. ... Not only has chrysotile been found to be as potent as crocidolite and other amphiboles in inducing mesotheliomas when injected intrapleurally. ... it has been found equally potent in inducing pulmonary neoplasms through inhalation exposures (Wagner *et al.*, 1974). Chrysotile also appears to be more potently fibrogenic and carcinogenic than amphiboles, in relation to the quantity of dust deposited and retained in the lungs of rats (Wagner *et al.*, 1974).

... In fact chrysotile fibers are much more chemically and biologically reactive than amphibole fibers. ... These fibers are less readily detected in the tissue after the damage is done. ...

At this time, there is no compelling evidence to justify different public health policy for different asbestos fiber types..."

323. Lemen also notes that the Royal Commission study submitted by Canada to the Panel recommended that textile manufacturing using chrysotile be banned, and concluded that "all fibre types can cause all asbestos-related diseases."²¹¹

Question 2: In paragraph 4.47 of its submission the United States writes: "[s]pecification of work practices and other controls does not avoid all the risks associated with a hazardous materials such as chrysotile asbestos." Could the US please expand on this statement, and if possible provide (references to) the facts and data that support this viewpoint?

Anthophyllite and Actinolite: Final Rules", in volume 51 of the U.S. *Federal Register* at pp. 22615 to 22650 (51 FR 22615

324. In response to the statements throughout the Canadian submission that "controlled use" will bring the risk associated with chrysotile asbestos to "undetectable" levels, in its third party's submission to the Panel the United States has discussed the fact that "controlled use" will not completely eliminate the risk caused by asbestos. In 1994 OSHA reduced its permissible exposure

of the preamble to the OSHA rule²²⁴ could be used to estimate exposures to these unprotected persons as they periodically engage in repair activities such as those involving ceiling tiles, plumbing, roofing, and drywall, based on such factors as the frequency and length of these intermittent exposures.

Question 3: In paragraph 4.51 of its submission the US states: "The use of a linear model is appropriate for a quantitative estimation of the risks associated with low levels of exposure to asbestos". Could the US further elaborate on this statement, explaining why it considers the use of a linear model – which implies that there is no threshold below which there is no carcinogenic risk – appropriate?

328. As indicated in the U.S. third party's submission (footnote 4, paragraph 8, and Exhibit 15), studies of workers exposed to asbestos in the workplace (occupational exposures) link such exposures to high incidences of lung cancer and mesothelioma. However, since workplace exposures to asbestos are higher than general environmental exposures, these occupational exposures lead to an incidence of disease that is considerably higher than for the general population. The International Agency for Research on Cancer (IARC) and the World Health Organization's International Programme on Chemical Safety (IPCS) recognize that there is no conclusive evidence to demonstrate that there is an exposure level for asbestos below which there is no risk, i.e., there is no "threshold" for asbestos. Even the Report of the Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario stated: "Most epidemiological studies of asbestos workers that have demonstrated an excess lung cancer risk associated with the inhalation of asbestos have produced results consistent not only with a linear relationship between cumulative dose and mortality, but also consistent with the absence of a threshold."²²⁵ EPA uses a linear model to estimate the risks associated with low levels of exposure to asbestos because of the observed linearity of the response in occupational studies and because of the incomplete understanding of how asbestos causes diseases in humans. In order to estimate and project excess risks at the low level of exposures to which the general public is subject for asbestos, EPA utilizes a mathematical model that shows excess risks as simply proportionate to exposures at low levels (low-dose linearity). This procedure uses a curve to describe the excess incidence of disease observed at higher exposures (in the occupational setting) and takes a straight line to project from this excess to the lower-exposure environment of the general public. EPA believes that this approach is a reastindfety Arising from

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5. Questions from the European Communities to Zimbabwe

Question 1: In its oral statement, Zimbabwe appears to argue that the so-called controlled use, including all the protective measures relating thereto, is capable of "minimizing" risk to human health. Could Zimbabwe expand on what it means by "minimize", i.e. which level of risk – and thus chrysotile-caused diseases – would still remain and how much of that risk would be acceptable to Zimbabwe?

333. Zimbabwe first of all wishes to state that, being a natural product, chrysotile asbestos is present, for example, in the air we breathe and that some exposure is thus inevitable. There is therefore no question of eliminating exposure altogether. This said, Zimbabwe recalls that the 1998 Task Group has clearly stated that the risks to humans are conditional on exposure. The goal for responsible governments must therefore be to reduce exposure. It is the contention of Zimbabwe that as a result of the application of risk control measures the risk of exposure to asbestos dust can be minimized - so much so that the use of chrysotile asbestos can be considered safe. There is therefore no justification for a complete ban on the use of chrysotile asbestos. Zimbabwe submits that this conclusion is valid for both "primary" and "secondary" users of chrysotile asbestos. Regarding the former, Zimbabwe notes that the 1998 Task Group has confirmed that:

"Data from industries where control technologies have been applied have demonstrated the feasibility of controlling exposure to levels generally below 0.5 fibres/ml. Personal protective equipment can further reduce individual exposure where engineering controls and work practices prove insufficient."

334. In Zimbabwe the fibre levels at workplaces where chrysotile asbestos is mined, milled or processed are indeed below 0.5 fibres/ml/eight-hour period. The aim is to bring those levels down even further to 0.3 fibres/ml. It is thus entirely possible for a d -126Zimbabwe fir9m-23.25 ntrsaid, e to leve
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be, for instance, an asbestos warning message next to the evacuation instructions on a notice board of that building."

337. Zimbabwe has also stated in paragraph 4.81 of its written submission that:

"... products made from asbestos-cement are products of high density and thus chrysotile asbestos fibres are firmly blended into the final product [footnote omitted]. This reduces to a minimum the likelihood of fibres being released into the air and thereby posing a health hazard to human beings."

338. Contrary to what the EC tries to suggest, there is no contradiction between the two above-mentioned statements made by Zimbabwe in its written submission. The EC has contended that no measure was available to France other than a complete ban of chrysotile asbestos and of products containing chrysotile asbestos, if France were to achieve its public health objective. The EC relies, *inter alia*, on the argument that it may not be readily apparent to an inexperienced person whether he/she is handling or dealing with a product containing asbestos fibres. In its submission, Zimbabwe addressed this argument put forward by the EC and Zimbabwe pointed out to the Panel that France could have very easily required asbestos warning messages to be posted in buildings, for example, so as to alert "secondary users" of the presence in buildings of chrysotile asbestos, if and where appropriate. The EC's argument does therefore not provide a justification for a ban on chrysotile asbestos. It is true, as the EC rightly points out, that asbestos warnings in buildings are in principle unnecessary in view of the fact that chrysotile asbestos fibres today are encapsulated permanently in cement products. The EC nevertheless asserts that there could still be a risk of exposure to asbestos dust whenever the cement-products are installed, maintained or repaired. Zimbabwe has not contested this. Zimbabwe has, however, pointed out that there is a range of measures which would be available to France to effectively control such risks of exposure. All of these measures stop short of imposing outright bans. Thus, Zimbabwe's submissions are by no means internally inconsistent.

Question 3: Could Zimbabwe explain whether training courses and the certification referred to in paragraph 4.98 of its written submission are the only elements of the so-called "controlled

containing products. The French Government could also have laid down the precise work practices and technical appliances that must be used in all contacts with asbestos-containing products. To ensure compliance, the regulations could authorize the imposition of heavy fines or a custodial sentence in the event of a wilful disregard of the government's regulations. Needless to say, it is also open to a Member to run information campaigns. Thus, it emerges clearly from this statement that certification, which would be conditional upon completion of, *inter alia*, training courses, is not the only element of "controlled use". In any event, this statement must be read together with the paragraphs where Zimbabwe has set out the types of measures that together make up "controlled use". It might be added here that in Zimbabwe's view, periodical medical surveillance of workers can and should be an integral part of "controlled use", notably in the case of "primary" and occupational "secondary" users of chrysotile asbestos.

Question 4: Could Zimbabwe comment on the findings of the study by Cullen *et al.*, *Chrysotile Asbestos and Health in Zimbabwe, 1991 Am. J. Int. Med. 19, 171-182*, which establishes a net excess of mesothelioma cases of workers in mines and mills of chrysotile in Zimbabwe?

341. Zimbabwe disputes the assertion by the EC that the study by Cullen *et al.* establishes a net excess of mesothelioma cases of workers in chrysotile mines and mills in Zimbabwe. At page 178 of the study referred to it is stated that "[m]ajor x-ray abnormalities were rare in the population, with only four having evidence of TB and three having nodules or masses that potentially represented cancer." This could hardly amount to conclusive evidence in support of the assertion by the EC. In fact, pleural disease was also surprisingly uncommon in the population which was examined. Eighty-five of the subjects had parenchymal changes of whom 65 were in grade 0/1. The fact that the study in question does show a relationship between parenchymal change and cumulative doses merely confirms the need for risk control measures. In no way does it establish a case for a complete ban on the use of chrysotile asbestos. It is worth noting here that there is another study by Cullen *et al.* entitled *Chrysotile Asbestos and Health in Zimbabwe - Analysis of Miners and Millers Compensated for Asbestos-Related Disease Since 1980* (1991 *Am. J. Int. Med.* 19, 161 – 169). This study was not, however, specifically on workers of chrysotile mines and mills in Zimbabwe. This was a case study on cases certified as having pneumoconiosis by the Pneumoconiosis Board in Zimbabwe.

342. The fact that this study showed cases of asbestos-related disease does not mean that the origin of those cases can be traced back to chrysotile mines and mills in Zimbabwe. The two cases referred

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350. Lung cancer is caused, with a comparable carcinogenic effect, by chrysotile asbestos and by amphiboles asbestos. Chrysotile asbestos, on the other hand, presents a lesser risk than amphiboles as regards mesothelioma. In both cases these diseases are currently untreatable and fatal, and it is no less serious to die of lung cancer than to die of mesothelioma.

