ANNEXURE J

Asbestos and James Hardie

Asbestos-Related Liabilities[1]

A. Asbestos Mineralogy

Asbestos is a family of crystalline hydrated silicates with a fibrous geometry and unique physical and chemical properties. Asbestos fibre is classified into two groups, serpentine and amphibole. Chrysotile (or "white asbestos") is the only member of the serpentine group. Crocidolite ("blue asbestos"), amosite ("brown asbestos"), tremolite, anthophyllite and actinolite are amphiboles. The amphiboles are characterised by long rigid fibres. Chrysotile fibres are curly and tend to break into smaller fragments. The general medical view was that white asbestos was of a lesser toxicity than blue and brown asbestos, although that has been recently questioned in light of an increasing experience of claims associated with exposure to chrysotile in the United States. 2

B. Industrial Use Of Asbestos

Asbestos has been used widely throughout history because of its strength, flexibility, durability and its resistance to heat, acids and alkalies. The majority of asbestos used in Australia was incorporated into asbestos cement, i.e. cement reinforced with asbestos fibres. There were two main categories of asbestos cement product, building materials and pressure and sewerage pipes. The building materials included corrugated sheeting, flat sheeting, roof tiles and moulded products such as gutters and telecom pits. High density asbestos cement was used for thermal and electrical insulation, such as in furnaces, bench tops, fume cupboard linings and switch gear. Asbestos cement poses fewer health risks than certain other types of asbestos-containing products because the asbestos fibres are firmly bound into a cement matrix.

The second largest category of asbestos use was as a filler or reinforcement. The main products within this category included asbestos-containing paper and millboard which were used in the manufacture of products such as roofing felts, clutch facings, brakes and gaskets. Asbestos fibres were added to paint to give various textured finishes, strength, heat resistance and opaqueness. Many plastic sheets and tile flooring products contained asbestos. Asbestos packings and seats were used in a wide range

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[1] Except where otherwise indicated, the material contained in this Annexure is in significant measure derived from a document prepared by Mr Attrill, then Litigation Manager for the James Hardie Group, which was provided to the incoming directors of the MRCF on 15 January 2001: Ex 2, Vol 3, pp. 456, 457. The note gives some content to the expression "asbestos related liabilities" and what is comprehended by that concept. Mr Attrill himself adapted the work of A.R. Johnson, An Analysis of the Cases of Malignant Mesothelioma Compensated by the Workers Compensation (Dust Diseases) Board of New South Wales, thesis for the degree of Master of Occupational Health and Safety, University of Sydney (1997), pp. 3–31. The Annexure has been prepared with reference to the expert evidence of Mr Whitehead (Ex 251) and Mr Wilkinson (Ex 256).

of products, for example, gaskets. Asbestos reinforced plastics were incorporated in automotive components, small machine parts, road signs and bearings.

Asbestos is an excellent insulation material. Fire resistant insulation boards were similar to asbestos cement products but had a much higher asbestos content, 25% to 40% versus 10% to 15% by weight. They were widely used for partitions and suspended ceilings as a barrier to fire or to protect structural steelwork. Asbestos lagging for thermal insulation was made in the form of rigid pipes, slabs, pre-formed sections or sprayed coatings. Sprayed on asbestos insulation was easier to apply, particularly on uneven or hard to get at surfaces. Pipe and boiler lagging was commonly used in ships, engineering works, power stations, factories, hospitals and other large buildings. Woven asbestos was used to manufacture asbestos quilts, mattresses, and blankets for thermal insulation. These were often used on ships. Asbestos cloths were made into protective clothing and safety curtains. Asbestos cord or rope was used for thermal insulation on small domestic and industrial pipe work. Asbestos yarns and fabrics had a high asbestos content, up to 100%.

Currently world usage of asbestos is confined to chrysotile and to four principal product categories; asbestos cement, friction materials, roof coatings and cements, and gaskets. Approximately 85% of chrysotile used worldwide is for production of asbestos-cement products (pipes and sheets), mainly in developing countries. In 1992, approximately 28 million tonnes of asbestos-cement products were produced in about 100 countries. About 10,000 tonnes of chrysotile asbestos is imported in Australia annually for use in friction products. The use of asbestos is being progressively phased out across the world.

C. The Australian Asbestos Industry

Mining

For much of the 20th Century, with the exception of the early 1980s, most of the asbestos fibre used in Australia was imported.[3] Until the re-opening of the Woodsreef mine at Barraba in 1970, the only mine of note was the Wittenoom mine in Western Australia which produced blue asbestos from about 1937 until 1967. The Woodsreef mine produced white asbestos and approximately half of its production was exported. Asbestos mines were operating around 1918 in Tasmania and at Baryulgil in NSW. Small mines produced crocidolite in South Australia from as early as 1916 until the 1950s but never in large amounts. Australian Blue Asbestos Pty Limited (a subsidiary

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[2] Wilkinson T 3340.15–22, 28–39

of CSR) started production at Wittenoom in the Pilbara region of Western Australia in 1938. The mine ceased production in 1966 as it was unprofitable. In 1997 to 1983, Woodsreef operated at Barraba, NSW, the largest chrysotile mine in Australia. Australia was never a large producer of asbestos fibre; in 1952 it produced only 0.2% of world production.

Asbestos Fibre Production and Use in Australia

The bulk of asbestos used in Australia during the 20th Century (perhaps over 90%) was used to produce asbestos cement.[4] Asbestos cement refers to cement that has been reinforced with asbestos fibres to produce a much stronger and more useful product. The presence of asbestos can also render the product harder and more fire resistant.

Prior to 1916 asbestos cement products were imported from England and Europe. In 1916 the Wunderlich company (later part of CSR) opened a factory in Cabarita, a Sydney suburb. Other factories (including those operated by James Hardie) soon followed. The peak period for the industry was following World War II when demand outstripped supply. For example, it became necessary to order pipe for large civil projects many years in advance and State Governments rationed supply.

Asbestos cement sheeting was liberally used in housing during this time. Between 1945 and 1954 more than 70,000 homes were built using asbestos cement cladding in NSW, 57% of the homes built in the State. In Australia as a whole 25% of new houses were built with asbestos cement. The bulk of asbestos fibre used was chrysotile from Canada. The addition of amphiboles helped speed up the rate of production and strengthen the product. Amosite was the major amphibole used and was imported from South Africa, some crocidolite from the Wittenoom mine (operated by a CSR subsidiary) in Western Australia was also used. Crocidolite's use was limited as it was more expensive and added a blue discolouration to the product.

Consumption

Australia has been one of the largest consumers of asbestos in the world. During the 1950s Australia was the fourth largest consumer of asbestos cement products and the highest per capita user of asbestos in the world (predominantly chrysotile). There was a rapid increase in the use of asbestos in Australia for the 30 years from 1940 to 1970, followed by a relatively stable volume during the 1970s. The decline in usage was even more rapid than the increase, with consumption dropping to relatively small

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[3] Whitehead Ex 251, para. 3.5.14, Figure 3.3: Volume of Asbestos Mined in Australia and Imported

[4] Whitehead Ex 251 para 3.5.19

amounts by 1985 and to very small amounts by the end of the 1980s.[5] The use of asbestos in Australia was effectively banned from the end of 2003.[6]

Because industrial and commercial use of asbestos was widespread in Australia to up to the 1980s, recipients of claims have included government bodies (e.g. the Royal Australia Navy, State Rail Authority, Land & Housing Commission, Pacific Power), manufacturers (e.g. JHIL, Coy and Jsekarb, CSR Limited through its subsidiary Seltsam), employers (e.g. major construction companies) and occupiers of sites where asbestos was used (e.g. power station operators).

D. Asbestos Exposure

Asbestos fibres can cause various diseases when inhaled. The risk of disease depends on the type of fibre the concentration of asbestos in the inhaled air and the period of time over which the person was exposed. Long thin fibres (typical of amphiboles like crocidolite) are generally more carcinogenic than shorter thicker ones (typical of chrysotile), possibly because amphibole fibres are not cleared as quickly from the lungs. Fibres less than 5 um in length are mostly removed by the lungs' own clearance mechanism. Fibres longer than 5 um are mostly deposited in the respiratory and terminal bronchioles and it is these fibres that may subsequently cause disease.

Occupational Asbestos Exposure

Exposed to asbestos fibres from products or manufacturing processes is said to occur in various ways.[7] Exposure usually occurred at work, although cases of domestic exposure (a wife washing her husband's work clothes, for example) are not uncommon. Claims have also been received from waterside workers who allege exposure to raw asbestos while unloading or handling bags of asbestos fibre which has been imported or shipped.

Raw asbestos is used in asbestos cement manufacture. The asbestos dust levels generated in asbestos cement manufacturing factories was generally lower in comparison with other manufacturing processes involving asbestos. Progressive introduction of control measures from the late-1950s helped reduce dust levels in factories. A medical surveillance scheme for James Hardie workers was established in the 1960s and a full-time doctor was employed from 1967 to advise on all aspects of asbestos health related issues.

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[5] Whitehead Ex 251 Figure 3.2: Annual Average Decadal Usage of Asbestos Fibre in Australia

[6] Whitehead Ex 251 para. 3.5.11

[7] Whitehead Ex 251 Figure 3.4: Relative Consumption of Asbestos by Industry; see also para. 3.5.50–51 (Categories of persons who might have been exposed to asbestos)

Most asbestos products destined for the construction industry did not undergo any further manufacturing operation between the factory and the construction site. However flat and corrugated asbestos cement sheets and asbestos cement pipes were cut, drilled or processed on site and these processes could release asbestos fibres and dust which were then inhaled by workers or bystanders. From 1978 Coy's asbestos cement products carried warning labels. Prior to this Coy provided use instructions which recommended that users take steps to keep dust down (such as wetting the product while cutting it).

Exposure to asbestos in friction products occurred in the manufacture and maintenance of those products, particularly amongst motor mechanics. However, the risk of contracting an asbestos-related disease from exposure to brake linings is not high due to the fact that friction products only contained chrysotile and because of the low and intermittent exposure to asbestos experienced by mechanics.

Environmental Asbestos Exposure

Due to the widespread use of asbestos in industrialised countries some exposure to asbestos is probably universal, particularly in urban areas. Asbestos fibres have been found in water supplies and food products. Asbestos fibres are commonly found in the lungs of city dwellers. Whether asbestos exposure in the general population at these low levels causes disease is contentious and, on present scientific evidence, is most unlikely. That is, exposure to a greater than background level of asbestos is necessary to develop disease.

E. Diseases Associated With Asbestos Exposure

There are four principal asbestos-related diseases:

(a) **Mesothelioma –** a disease in which cancer (malignant) cells are found in the sac lining the chest (the pleura) or abdomen (the peritoneum);

(b) **Asbestosis –** a progressive scarring of the lungs which is potentially fatal;

(c) **Lung Cancer –** which may in certain circumstances be caused by exposure to asbestos; and

(d) **Asbestos-related Pleural Disease –** a range of non-malignant conditions similar to asbestosis which are caused by inhalation of asbestos fibres. ARPD can range from asymptomatic pleural plaques to extensive pleural fibrosis causing severe breathlessness.

Malignant Mesothelioma. Malignant mesothelioma is the most serious asbestos-related disease. The typical life expectancy from diagnosis is six to nine months. It is a diffuse malignant tumour usually of the pleura or peritoneum. Although it can take

30 years or more to manifest itself from the person's first exposure to asbestos, once the tumour starts growing it is unusually aggressive.

The connection between asbestos exposure (crocidolite) and mesothelioma was first established by Wagner in South Africa in 1960. The relative risk for developing mesothelioma is dependant on fibre type, dose and time since first exposed. Thus, those exposed at younger ages are at higher lifetime risk. However, mesothelioma is associated with a wide range of exposure duration and pulmonary asbestos burdens, including sometimes seemingly small exposures.

Families of asbestos workers exposed to asbestos on hair and clothing have been found to be at risk, as are employees who worked in the same vicinity as asbestos workers. The risk of mesothelioma in workers exposed to chrysotile is much lower than the risk in workers exposed to amphiboles (especially crocidolite) or to mixtures of fibres containing amphiboles.

Asbestosis. Asbestosis refers to interstitial pulmonary fibrosis resulting from asbestos exposure. The more intense the dose, the earlier and ultimately more severe the fibrosis. During the 1920s and 1930s asbestosis was common and often took as little as seven to eight years to develop in a worker. Regulation of the industry and voluntary dust suppression measures lowered exposure levels and decreased the incidence of the disease. The diagnosis of asbestosis requires sufficient past exposure to asbestos to place the individual at substantial risk. Asbestosis is unlikely to occur unless there has been exposure to at least moderate concentrations of asbestos for more than a few years. Chrysotile can cause asbestosis, and again the disease may take 20 or more years from exposure to manifest.

Lung Cancer. Asbestos is a known carcinogen and the incidence of lung cancer is higher among asbestos workers. All lung cancer types occur in asbestos workers. An estimated 5.7% of all lung cancers in men in the West of Scotland (an area which had a large shipbuilding industry) are asbestos related. The latency from first exposure is in excess of 20 years.

The relative risk for developing lung cancer depends on a number of factors, dose, fibre type, job type, smoking history and presence of pulmonary fibrosis. The general view is that there is approximately a multiplicative effect of smoking and asbestos exposure. That is, although both asbestos and smoking in their own right increase the risk of lung cancer, asbestos and smoking together increase that risk many-fold. At present, the Courts require evidence of asbestosis, or of exposure to asbestosis sufficient to cause asbestosis, before attributing a lung cancer to asbestos exposure.

Asbestos-related Pleural Disease – Pleural Plaques. Pleural plaques are the most common manifestation of asbestos exposure. Macroscopically, pleural plaques appear as shiny, white, slightly raised areas on the parietal thoracic wall and diaphragmatic pleura. Microscopically they consist of fibrous tissue. Asbestos fibres are rarely found in pleural plaques. Pleural plaques are probably not, *per se*, associated with an increased risk of lung cancer or any other disease. Rather, they are a marker of asbestos exposure. They occur some 15 years after exposure, and are associated with the duration and amount of exposure. Generally pleural plaques are asymptomatic (and are therefore non-compensable), but occasionally a person with plaques will claim damages for pain or for the fear of contracting a more serious disease.

Asbestos-related Pleural Disease – Benign Pleural Effusions. Benign pleural effusions occur in a small percentage of asbestos workers, usually less than 20 years after initial exposure to high concentrations of asbestos.

Asbestos-related Pleural Disease – Diffuse Pleural Thickening. Diffuse pleural thickening can severely impair ventilation and cause significant restrictions on lung function. Restricted lung function with a preserved diffusing capacity is the expected pattern.

Asbestos-related Pleural Disease – Rounded Atelectasis. Rounded atelectasis refers to a peculiar infolding of the pleura. These lesions can occur many years after exposure to asbestos and are probably sequelae of benign pleural effusions. The peripheral infolding of the lung is the result of the associated pleural thickening and can be mistaken for a tumour. They have a characteristic appearance on computed tomography of a 'comet tail' of vessels and bronchi leading into the lesion and associated pleural thickening, maximal adjacent to the lesion. Once formed they tend to persist relatively unchanged.

F. James Hardie's Involvement with Asbestos

Coy's was the dominant consumer of asbestos in Australia, averaging approximately 70% (60,000 tonnes) of all asbestos fibre consumed annually.[8] Coy's primary business was the manufacture of asbestos cement products. These came in the form of building products and asbestos cement pipes. Prior to the mid-1980s, Coy manufactured asbestos cement flat and corrugated sheets for internal and external wall cladding in buildings and for roofs, asbestos cement water and sewer pipes. Building products were originally imported from Italy but by the 1920s local production started at the

[8] Whitehead Ex 251 para. 3.5.41, Figure 3.5 Relative Consumption of Asbestos by JHG vs Others; Wilkinson T 3391.26–30

Camellia factory in NSW. Production started soon after at factories in Victoria (Brooklyn) and at Newstead in Queensland. At a later stage the Rivervale plant in Western Australia was built and a joint operation in association with Wunderlich was established in Adelaide in the 1950s. In 1960 Coy became the sole operator of the South Australian business when it bought out Wunderlich's interest. Prior to 1974 Coy also manufactured asbestos insulation materials in a joint venture with CSR Limited, and also in its own right prior to 1964.

White asbestos (chrysotile) was by far the most common type of asbestos used by Coy, which at the time was thought to pose less risk of inducing mesothelioma than did crocidolite. Recent medical thinking suggests the conclusions about toxicity may not be correct. Chrysotile was mainly sourced its supplies from Canadian mines in Quebec and British Columbia. A James Hardie subsidiary, Asbestos Mines Pty Limited, owned and operated the small chrysotile mine at Baryulgil until its sale in 1975. However the total output of the mine was very limited. The major fibre used in the manufacture of asbestos cement products was chrysotile Brown asbestos (amosite) was not used in Coy products until the 1950s when new sources of the fibre were opened up in South Africa. The use of small quantities of amosite in asbestos cement products continued until about 1980. Coy used blue asbestos (crocidolite) in certain products from the mid-1950s until about 1968. The crocidolite was sourced from the CSR mine at Wittenoom. Because of its colour it was not able to be used for all products; its main use was in pressure pipes and building products that were not able to be seen in detail, such as roofing products. The use of blue asbestos was discontinued on the recommendation of James Hardie's medical officer, Dr S.F. McCullagh, in 1967–68.

The asbestos content of Coy's asbestos cement sheet and pipes ranged from 8% to 15%, and was predominantly chrysotile with small amounts of crocidolite (to 1968) and amosite.

Production of asbestos cement pipes began in 1926 but the use of asbestos cement pressure pipe for water and sewerage use did not become widespread until autoclaving of pipes was introduced in the early 1950s. Asbestos content of pipes was approximately 15% of which about 12% was white asbestos and the remainder amosite. During the period 1956–1968 crocidolite was also used (about 2%).

Asbestos containing insulation products were first manufactured by Coy in the 1930s and by the 1950s Coy had established itself in the market with a product called 85% magnesia. In 1964 Coy formed a joint venture with CSR and Bradford Insulation known as Hardie-BI Company to make and market insulation products. Major products produced were 85% Magnesia and K-Lite. Both products contained about 15% amosite. The partnership was dissolved in 1974 and Coy ceased production of asbestos thermal insulation products.

Jsekarb manufactured brake linings for motor vehicles, railway wagons and locomotives. Coy had initially entered the brakes and friction products market in the early 1930s and had a well established business by 1950 under the brand name "Five Star". In 1963 Coy entered into the Hardie-Ferodo joint venture with Ferodo of the UK. Hardie-Ferodo carried out considerable product development work, particularly with regard to railway rolling stock brakes. With the withdrawal of Ferodo from the partnership in 1978, the business was renamed Better Brakes (later known as Jsekarb) and was ultimately sold to Futuris Corporation Limited in 1987. The only asbestos used in asbestos-containing friction products was chrysotile.

G. Litigation

Coy and Jsekarb, but particularly Coy, have been sued in respect of asbestos-related diseases in many cases in Australia.

The principal venue has been the Dust Diseases Tribunal of New South Wales, but not insignificant numbers of cases have been brought in the courts of other Australian jurisdictions.

In the course of such litigation it has been necessary for James Hardie to make admissions about its knowledge of the damage of asbestos at various times, and for findings to be made by courts on that quarter.

An example of admissions made is:

The Berry Admissions

Berry v Aultas Pty Ltd & Ors[9] where Coy made the following admissions in relation to the period 1949 to 1971:

1. It manufactured Hardie's 85 per cent Magnesia blocks, sections and plastic composition between 1949 and 1964.
2. It manufactured Hardie-BI Company 85 per cent Magnesia blocks, sections and plastic composition in partnership with CSR Ltd and pursuant to an agreement with CSR Ltd and Bradford Insulation Industries Pty Ltd between 1964 and 1971.
3. The composition of Hardie's 85 per cent and Hardie-BI Company 85 per cent Magnesia blocks, sections and plastic composition was approximately 10–15 per cent asbestos and 85–95 per cent basic magnesium carbonate.

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[9] (1997) 14 NSWCCR 266

4. It manufactured Hardie's Caposite blocks and sheets between 1949 and 1964.

5. It manufactured Hardie-BI Company Caposite blocks and sheets in partnership with CSR Ltd and pursuant to an agreement with CSR Ltd and Bradford Insulation Industries Pty Ltd between 1964 and 1971.

6. The composition of Hardie's and Hardie-BI Company Caposite blocks and sheets was approximately 95–98 per cent asbestos bonded with sodium silicate.

7. It manufactured Hardie's High Temperature blocks, sections and plastic composition from 1950 to 1964.

8. It manufactured Hardie-BI Company High Temperature blocks, sections and plastic composition in partnership with CSR Ltd and pursuant to an agreement with CSR Ltd and Bradford Insulation Industries Pty Ltd between 1964 and 1967.

9. The composition of Hardie's High Temperature blocks, sections and plastic composition was approximately 12 per cent asbestos, 44 per cent basic magnesium carbonate and 44 per cent diatomaceous earth.

10. It manufactured Hardie's Asbestos Millboard sheets between 1950 and 1964.

11. It manufactured Hardie-BI Company Asbestos Millboard sheets in partnership with CSR Ltd and pursuant to an agreement with CSR Ltd and Bradford Insulation Industries Pty Ltd between 1964 and 1971.

12. The composition of Hardie's and Hardie-BI Company Asbestos Millboard sheets was approximately 10 to 15 per cent asbestos and 15 to 20 per cent cement mixed with diatomaceous earth and other inorganic fillers.

13. It manufactured Hardie's K-lite blocks, sections and plastic composition from about the mid-1950s to 1964.

14. It manufactured Hardie-BI Company K-lite blocks, sections and plastic composition in partnership with CSR Ltd and pursuant to an agreement with CSR Ltd and Bradford Insulation Industries Pty Ltd between 1964 and 1971.

15. The composition of Hardie's and Hardie-BI Company K-lite blocks, sections and plastic composition was approximately 10 to 15 per cent asbestos and 85 to 90 per cent hydrous calcium silicate.

16. It manufactured Hardie's Super High Temperature blocks, sections and plastic composition from the late 1950s to 1964.

17. It manufactured Hardie-BI Company Super High Temperature blocks, sections and plastic composition in partnership with CSR Ltd and pursuant to an agreement with CSR Ltd and Bradford Insulation Industries Pty Ltd between 1964 and 1971.

18. The composition of Hardie's and Hardie-BI Company Super High Temperature blocks, sections and plastic composition was approximately 12 per cent asbestos, 44 per cent basic magnesium carbonate and 44 per cent diatomaceous earth.

19. The type of asbestos fibre used in the manufacture of Hardie's and Hardie-BI Company 85 per cent Magnesia blocks, sections and plastic composition was amosite and possibly a small amount of chrysotile.

20. The type of asbestos fibre used in the manufacture of Hardie's and Hardie-BI Company Caposite blocks and sheets, High Temperature blocks, sections and plastic composition, Asbestos Millboard sheets, K-lite blocks, sections and plastic composition, and Super High Temperature blocks, sections and plastic composition was amosite.

21. No warning was printed, inscribed or otherwise attached to Hardie's and Hardie-BI Company 85 per cent Magnesia blocks, sections and plastic composition, Caposite

blocks and sheets, High Temperature blocks, sections and plastic composition, Asbestos Millboard sheets, K-lite blocks, sections and plastic composition, and Super High Temperature blocks, sections and plastic composition to the effect that they contained asbestos or that contact with asbestos dust and fibre could cause asbestos-related disease.

22. Hardie's and Hardie-BI Company 85 per cent Magnesia, High Temperature and Super High Temperature blocks and sections were packaged in light brown-coloured cardboard cartons measuring approximately 38" x 18" x 18".

23. Hardie's and Hardie-BI Company 85 per cent Magnesia, High Temperature, Super High Temperature and K-lite plastic composition was packaged in jute bags weighing approximately 40 pounds until the late 1950s when impervious five-ply kraft paper bags stitched at the top and weighing approximately 25 to 30 pounds were introduced.

24. Hardie's and Hardie-BI Company Caposite blocks and sheets were packaged in timber crates measuring approximately 36" x 36" x 24".

25. Hardie's and Hardie-BI Company Asbestos Millboard sheets were packaged in bale-board crates measuring approximately 48" x 40" x 3" to 5" with the names of the product and the names Hardie's or Hardie-BI Company stencilled onto the crates respectively from 1950 to 1964 and 1964 to 1971.

26. Hardie's K-lite blocks and sections were packaged in light brown-coloured corrugated cardboard cartons measuring approximately 38" x 18"x 18" with green printing identifying the name of the product and the names Hardie's or Hardie-BI Company respectively from the mid-1950s to 1964 and 1964 to 1971.

27. It knew that Hardie's and Hardie-BI Company 85 per cent Magnesia blocks and sections, Asbestos Millboard sheets, Caposite blocks and sheets, High Temperature blocks and sections, Super High Temperature blocks and sections may have required occasional cutting with knives or hacksaw blades for the purpose of installation.

28. It knew that Hardie's and Hardie-BI Company 85 per cent Magnesia, High Temperature, K-lite, and Super High Temperature plastic composition required shaping when wet for the purpose of installation.

29. It knew that Hardie's and Hardie-BI Company K-lite blocks and sections may have required occasional skutching or cutting with knives or hacksaw blades for the purpose of installation.

30. It first became alerted during the mid-1940s to the suggestion that the inhalation of asbestos fibres could cause asbestosis, but only in circumstances involving the inhalation over a sufficiently lengthy period of time of considerable quantities of asbestos fibres contained in visible clouds of dust emanating from the handling of raw asbestos in its factory.

31. It first became aware during the mid-1950s that the inhalation of asbestos fibres could cause asbestosis, but only in circumstances involving the inhalation over a sufficiently lengthy period of time of considerable quantities of asbestos fibres contained in visible clouds of dust emanating from the handling of raw asbestos in its factory.

32. It first became aware in the late 1950s of the suggestion that the inhalation of asbestos fibres could cause lung cancer, but only as a rare complication of asbestosis in circumstances involving the inhalation over a sufficiently lengthy period of time of considerable quantities of asbestos fibres contained in visible clouds of dust emanating from the handling of raw asbestos in its factory.

33. It first became aware in the mid-1960s that the inhalation of asbestos fibres could cause lung cancer, but only as a rare complication of asbestosis in circumstances involving the inhalation over a sufficiently lengthy period of time of considerable quantities of

asbestos fibres contained in visible clouds of dust emanating from the handling of raw asbestos in its factory.

34. It first became aware in the mid-1960s that the inhalation of asbestos fibres could cause mesothelioma, but only in circumstances involving the inhalation of crocidolite fibres during processes involving the handling of raw crocidolite in its factory."

An example of a finding, which goes beyond the admissions in *Berry* is:

State Rail Authority (NSW) v Wallaby Grip Ltd[10] where Judge Curtis found that James Hardie had actual knowledge of the dangers of asbestos since 1938. His stated (at para. 108):

> 108 There is no evidence that between 1938 and 1950 the SRA had actual knowledge of the dangers to health posed by visible clouds of asbestos dust. Hardie did know. It is sufficient to refer to one exhibit only. SRA 26 revels that on October 1938 Hardie's asbestos factory at Brooklyn in Victoria was the subject of tests carried out by the Victorian Department of Health to determine the concentration of asbestos particles in the air. The results were sent to Hardie. The report stated that: "*Certain authorities regard 5,000,000 asbestos particles per cubic foot of air as the maximum concentration to which workers should be exposed*" and advised that where workers were exposed to such concentrations, even intermittently, they should wear suitable dust respirators. Any visible cloud of asbestos dust contains a concentration above 5,000,000 particles per cubic foot.

The finding of actual knowledge was not disturbed on appeal.[11]

[10] (1999) 18 NSWCCR 193

[11] Wallaby Grip Ltd v State Rail Authority of New South Wales & Ors; James Hardie & Coy Pty Limited v State Rail Authority of New South Wales & Ors [2001] NSWCA 105 (24 April 2001)