Article

Surviving blue asbestos: mining and occupational disease in South Africa and Australia

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Abstract
Australia and South Africa are the only countries to have mined crocidolite or blue asbestos. Crocidolite was mined in the Northern Cape for one hundred years and at Wittenoom in Western Australia from 1944 until 1966. Mining has left a pandemic of asbestos disease in the Northern Cape and although production levels were modest Wittenoom has become the site of Australia’s worst occupational health disaster. The labour regimes in South Africa and Australia were very different, yet the rates of asbestos disease among miners and their families were probably similar. The hazards facing miners arose from the nature of the labour process, the technologies of production, the rapacity of employers, and the limitations of state regulation.

Introduction
The global asbestos industry was born on the mines of northern Italy in the final decades of the nineteenth century. By 1920 mines in Canada, South Africa, and Southern Rhodesia, were supplying fibre for the manufacture of a range of products in Western Europe and North America. In what was an early twentieth century example of vertical integration the larger companies such as Turner & Newall (UK), Gefco (UK and South Africa), Eternit (Switzerland) and Johns-Manville (USA) operated mines, usually in the developing world, and factories in the metropoles. Manufacturers promoted asbestos as a wonder mineral which enhanced the quality, longevity and safety of any product into which it was incorporated. The industry was so successful that by 1950 asbestos had become an essential ingredient in the commodities around which post-war prosperity was built. Unfortunately asbestos has also proven to be an efficient carcinogen.
Asbestos causes three major diseases: asbestosis, lung cancer, and mesothelioma, a primary cancer of the lining of the lung or the abdominal cavity.\(^1\) Asbestosis is a dose related occupational disease usually confined to the workplace. On average it takes five or more years of heavy exposure to produce the disease which is progressive and untreatable. The lung cancer associated with asbestos is indistinguishable from the cancer suffered by cigarette smokers and is just as lethal. Like asbestosis the disease is dose related. In contrast mesothelioma can result from trivial exposure which means the risk of injury crosses the boundary which usually distinguishes occupational from environmental hazards. Each of the three diseases caused a crisis for the industry: asbestosis in the 1930s, lung cancer in the 1940s, and mesothelioma after 1960. The industry was able to survive each of those episodes without being forced radically to improve conditions in the workplace or entirely lose its markets. It was a remarkable achievement due largely to the industry’s success in influencing medical discovery (see Castleman 1996, Tweedale 2000, Johnston and McIvor 2000, McCulloch 2002). Julian Peto (1999) has estimated that in the UK asbestos will have killed around 250,000 men and women between 1995 and 2029. In addition to the burden of disease the costs of litigation especially in the US and Australia have been staggering.

The mines of South Africa produced all three commercial varieties of asbestos, namely chrysotile (white), crocidolite (blue) and amosite (brown) which were marketed in more than 50 countries.\(^4\) Chrysolite, or white asbestos was also mined in Canada, which supplied more than half of the world’s needs, and in Swaziland and Zimbabwe where a single company, African Associated Mines, still operates mines at Zvishavane and Mashava. At its peak asbestos represented only three per cent of the value of South Africa’s minerals industry. South Africa was, however, the major producer of blue asbestos accounting for 97 per cent of global output. The rest came from a mine at Wittenoom in Western Australia which operated from 1944 until 1966. The mines were hazardous and despite their diverse locations, the risks of occupational disease in Australia and South Africa were probably similar. The discovery of the asbestos disease mesothelioma by JC Wagner in the Northern Cape in 1959 led to the closure of Wittenoom mine in Australia six years later. South Africa continued to mine and export crocidolite until 1996.

The tide of litigation which began in the US in the late 1970s saw the major North American companies take refuge in bankruptcy. Litigation soon began
in Australia where a significant number of cases are settled each year. Wittenoom miners and their families have the highest known incidence of mesothelioma in the world and 40 years after the mine’s closure the threat from environmental pollution is so high that the state government is presently seeking to relocate the town’s 17 remaining residents.

The hidden costs of mining in Southern Africa have until recently been paid for by labour. That historical pattern was ruptured in March 2003 when two class actions involving thousands of former South African miners against the mining companies Cape plc and Gencor (Gefco) were settled out of court in London and Pretoria. After six years of legal argument Cape plc agreed to pay 7.5 million pounds in compensation to 7,500 workers and Gencor/Gefco agreed to set up a trust fund for its workers, worth R448 million (37.5 million pounds) (The Guardian (London) March 14, 2003 – ‘Black workers to receive 45 million asbestos settlement’). The Gencor case is the first action of its kind in South Africa for occupational disease contracted in the mining industry. The Cape plc case is the first time South African miners have succeeded in a common law action against a parent company outside South Africa.3

Asbestos miners faced many of the same problems as miners elsewhere including low rates of pay, dangerous conditions, and intractable management. There were also technical factors which made asbestos mining particularly dangerous. The methods of extracting asbestos ore have varied from open cut to depth mining but the aim of processing fibre is always the same, namely to preserve the mineral’s physical properties. For that reason asbestos is milled dry. After arriving at a mill ore is fed into primary crushers, then crushed and sorted. The ore is then crushed again, and the fibre lifted off by suction. The further into the milling process the more dust is generated. The most hazardous jobs at Thetford (Canada), Penge (South Africa), Wittenoom (Australia), and Shabanie (Zimbabwe) were in the bagging rooms where fibre was pressed, often by hand, into hessian sacks. Between a third and a half of mill hands developed asbestosis (see Slade 1930).

Wittenoom and South Africa’s mines had many things in common. The landscapes and climates are similar as are the histories of the national and regional economies which have been driven by minerals. The fibre, the host ore and the problems of milling were almost identical. The mines competed in the same markets, and their owners benefited from a similar lack of state regulation. In both cases the mines were staffed with a migrant and racialised
labour force. The rates of occupational and environmental disease were probably much the same in both places; as was labour’s lack of knowledge about the risks of exposure. The mills at Wittenoom and the Northern Cape were almost the perfect environments to produce asbestos disease and almost the perfect setting for hiding it. The major difference between the two sites is that one industry lasted for over a century while the other survived for barely 20 years.

A comparative history of asbestos mining in South Africa and Australia raises many questions. Why did the industry operate such hazardous mines, why did labour put up with the conditions of work and why did state authorities not regulate the workplace? Why did Wittenoom close in 1966 yet South Africa continue to mine and export blue asbestos until 1996? To answer those questions it is necessary to examine the labour process, the emergence of medical knowledge, the role of government and regulatory authorities, and the technologies of production.

The South African mines
The blue asbestos fields of the Northern Cape stretch over 250 miles from just south of Prieska on the Orange River to the Botswana border. The Pietersburg fields in the Limpopo Province are less extensive and the seams that contain amosite and crocidolite are spare, except at Penge where they can be several feet thick. The first crocidolite mines opened near Prieska in 1893 and Msauli, the last of South Africa’s chrysotile mines, which lies near the Swazi border, closed in 2002.

The industry was dominated by the British firms Cape Asbestos Pty, Turner & Newall (T&N), and the Griqualand Exploration and Finance Company Limited (Gefco). Eternit, a Swiss firm, also operated mines in the Northern Cape and asbestos cement factories in Johannesburg and Cape Town. The initial demand for South African asbestos was erratic and the Great Depression saw the UK and US markets collapse. Recovery was slow, and it was not until World War Two that the industry’s position improved. Crocidolite and amosite, which are known as amphiboles, were the preferred lagging on ships and with the outbreak of war asbestos became a strategic material. By the end of the war Cape Asbestos had a dozen small mines over an area stretching from Prieska to Kuruman. Cape’s success in the post-war era can be gauged by the rise in its capital base. In 1938 the company had assets of 589,000 pounds; by 1945 that had doubled. Six years later Cape was worth in excess of 4,000,000 pounds. The industry was vertically integrated
but the major companies derived the bulk of their profits from mining rather than manufacture. In 1957 T&N recorded a net profit of nearly six million pounds, of which over half came from its Southern African mines (*Turner & Newall Annual Report 30 September 1957*). The sale of fibre was just as important to Johns-Manville and as production levels at its Quebec mines rose so too did the amount of asbestos it sold, at a handsome profit, to competitors (*Johns-Manville Corporation Annual Report 1951*).

In South Africa mining methods varied from place to place. At some sites, cross-cut adits or small shafts were driven into hillsides. At others, there were incline shafts. Occasionally, open-cast methods were used. The mineral lay close to the surface and during the tributer period which lasted until around 1950, the basic labour unit was the family. Using simple tools men dug fibre from surface deposits, which was then hand processed or cobbled by women, while children sorted the fibre into lengths and stuffed it into bags. The fibre was then sold to company stores.

The host ore in South Africa and at Wittenoom is so abrasive that milling often accounted for more than half the cost of production (Stander and La Grange 1963). The ore tore holes in ducting, damaged machinery and filled the mills with dust. To reduce the amount of host ore entering the mills the mining companies used women to produce cobs and teams of sorters to remove the host rock. The Blackridge mine in the northern Cape produced feed for the mill at Prieska which was between 80-85 per cent pure fibre so that virtually no banded ironstone entered the crushers. Those methods saved the machinery and they also produced a higher quality product.4

Asbestos was blended at Prieska from 1927. The mill was the town’s largest building and it was also the major employer. Schalk Lubbe, who worked for Cape Asbestos, remembers that during the 1950s dust was visible as it came out of the mill chimneys. In summer Lubbe and his family often slept outside to escape the heat and in the mornings their bedding would be saturated with fibre.5

The mines were in poor regions where there was little employment. There were few opportunities for women to earn money and still meet their family obligations. White households paid low wages for domestics. For black and Coloured women fortunate enough to find such work it meant long periods of separation from their children. Asbestos provided one of the few avenues through which families could generate sufficient income to survive yet avoid the calamity of migrant labour. Cobbing was done in the open air and at a pace dictated by the workers themselves. Families could divide their time between...
asbestos, food production and seasonal fruit picking. Women comprised around half of the labour force. Their employment was usually in contravention of the various Mines Acts, which from 1911 specifically forbade women working in dusty or dangerous occupations. Employers told the women who cobbled asbestos nothing of the dangers they faced.

Mining began at Penge on the Pietersburg fields in 1914. The majority of claims were held by small companies which relied upon tributers to provide them with cobs. At adits high up on the mountain sides, women cobbled the ore by hand which was taken to the mills by donkeys or overhead rope ways. Tributers exercised little control over their workers and in contravention of the Mines Acts the use of explosives was left to black miners (De Wet 1949). On the smaller mines there were no compounds, medical care or rations and employment records were poorly kept (Labuschagne 1951). The mines were isolated and no inspector could arrive unannounced. When inspectors from the Department of Mines or Health were due tributers would slow down their mills and use water to reduce the dust. When they left the mills were put back into full operation and the clouds of dust returned. In 1940 at Cape’s Penge mine, which was one of the few to use heavy machinery, a quarter of the work force were males under 16 years of age. They were usually employed as sorters or to sweep the mills. By 1949, there were as many as 14,000 labourers on the Pietersburg fields (De Wet 1949).

In 1947 a survey of conditions in the Northern Cape was conducted for the Department of Native Affairs by OT Jannasch. It was a time of transition between tributing and industrial mining. Jannasch noted that for almost 50 years Cape Asbestos had used a contract system of labour (Jannasch 1947:8). Local non-Europeans mined or extracted asbestos as best they could; when a mine got too deep or dangerous they simply moved to another site. That form of labour appealed to workers because it enabled them to avoid the kinds of disciplines imposed on gold and diamond mines. ‘The relationship of employer and employee was non-existent’, Jannasch wrote, ‘so that the Company during this period could largely be regarded as a receiving and distribution depot, and were not mining in the strict sense of the word’ (Jannasch 1947:9). Jannasch said nothing about occupational health.

The tributer system offered the mining companies a number of advantages. In an unstable marketplace, tributing reduced the commercial risk. When the price fell or the market contracted, Cape and Gefco stopped buying fibre. Miners were paid piece rates and so the costs of ‘dead mining’ were borne
by labour. The system required only a small permanent staff of supervisors who checked the fibre grade and issued stores, thereby further reducing the costs of production. Most important of all, the informality of tributing meant that miners and their families fell outside the provisions of the Mines Acts. As a consequence, Cape Asbestos and its competitors avoided having to provide compounds, rations or medical care.

After 1950, the exhaustion of surface deposits and the increased demand for asbestos saw a gradual shift to industrial mining. The bigger companies sank deep shafts, built new mills, introduced wage labour, and constructed compounds. Industrial mining also saw a dramatic rise in production. Between 1950 and 1960 the value of South African output almost trebled (DoM 1961:40, 1960 Report). By 1960, the mines were employing 1,000 white and more than 20,000 black and Coloured workers. Production reached almost 200,000 tons per annum, of which half came from the northern Cape. Each year in the period from 1950 until 1976 Cape Asbestos, like its competitor T&N, returned an annual dividend to its shareholders in excess of 20 per cent. South African production peaked at 379,000 tons in 1977, but thereafter fell (Snyman 1988). South African producers, like the Department of Mines, dismissed medical evidence about the dangers of asbestos, and blamed Canadian and Russian interests for seeking to have their chrysotile take over the markets vacated by amosite and crocidolite. Cape Asbestos sold its mines in 1979 to Gefco which continued to export crocidolite to dwindling markets in the Middle East and North Africa until 1996.

The labour intensive methods used during the tributer period were carried over into industrial mining. There was a severe drought around Kuruman in 1975 when Veronica Thokomelo began working at Coretsi mine. Many of the women from her village of Ga-Mopedi were employed at Reries, Merencor, or Coretsi. A bus took them to work each morning at 05:00. Prior to employment there was an x-ray for tuberculosis but neither Veronica Thokomelo nor her fellow workers were told that asbestos is dangerous. At Coretsi there were three conveyor belts with different sized stones which the women would sort. Water sprays helped them to distinguish between the fibre and the host rock and also reduced the dust. It was hard work as the heavy rocks had to be removed quickly as the ore passed into the mills. The women had no gloves and the sharp fibres got into their hands forming asbestos corns. They were not allowed to talk while working and there was no sick pay. Children also worked at the mines after school and in the holidays.
Mining and occupational disease in South Africa and Australia

Miners also took fibre home on their clothes. William Nakaphala worked at a mine near Mathabatha, on the Pietersburg fields, during the 1970s. At the end of each shift he would be covered in fibre. As he later recalled: ‘If you cannot wash (there were no showers at work) that night you go to bed just like that and the blanket will do the washing. Then you wake up in the morning looking better because all the fibre has been trapped in the blanket’ (Nakhapala 1998:37). When Marianne Felix visited the Pietersburg fields in the 1980s she found 19 tailings dumps in the villages of Mafefe, some of which extended to the banks of the Mohlapitse River (Felix 1997). Women washed fibre-impregnated clothes in the river, the main source of drinking water for those living downstream. Women mixed tailing with mud to plaster the walls of their homes and the floors of courtyards. Tailings were also preferred to river sand in making house bricks. Children used the tailings dumps as play areas. In addition to unemployed miners Cape Asbestos and Gefco left behind un-reclaimed mine sites which continue to expose local communities to airborne fibre.

Wittenoom: creating a mine

Wittenoom lies in the heart of the Pilbara, in Western Australia (WA) a thousand miles north-east of Perth. The region is one of the hottest in Australia with summer temperatures often in excess of 40 degrees Celsius. Asbestos mining began in the Pilbara in 1908 with individual tributers gouging ore from surface outcrops and processing fibre by hand. In 1930 Lang Hancock, who later became a leading figure in WA’s minerals industry, discovered blue asbestos at Wittenoom Gorge but it was a further eight years before he began to mine the deposit. From 1938 Hancock and a partner, Albert Wright, worked the site paying individual miners for the fibre they recovered. The output was so small that Hancock made more money from shipping supplies in back freight from the coast (McCulloch 1986:70). The situation changed when the Colonial Sugar Refining Company (CSR) approached Hancock and Wright about the mine’s development.

The Colonial Sugar Refining Company was founded in 1885 on the Queensland sugar industry. The company also had plantations in Fiji where it employed indentured labour from India. In 1936 CSR established a pilot plant for fabricating wallboards from bagasse, the residue from sugar processing. Although the venture was unsuccessful, CSR remained committed to diversification and in 1941 it established a plaster mill at Concord, in Sydney. The investment at Wittenoom was intended to provide
fibre for CSR’s plants. As a result of negotiations in 1943, CSR purchased five per cent of the Wittenoom lease, and formed Australian Blue Asbestos (ABA). For the next five years Hancock and Wright managed the operation, while CSR provided finance. When Hancock and Wright sold their share in 1949, the company became a fully-owned subsidiary of CSR. From that date until its closure in 1966, Wittenoom was the largest asbestos mine in Australia, producing blue fibre for both the domestic and export markets.

Mining at Wittenoom began slowly and during 1944 its output was valued at less than $A20,000 (WAP 1944). In that year a boarding-house was erected, a site cleared for the homes of future miners and a road from the town to the mine was built by the Main Roads Board. Throughout the war years Australian industry had difficulty in securing materials and finance but in the case of Wittenoom government backing was granted immediately (Joosten Trial 1979:374 – evidence Keith Brown). The national government was anxious that Australia should become self-sufficient in fibre as a safeguard against a failure in supplies from overseas. It also hoped that the mine’s development would help populate an isolated region seen as vulnerable to Australia’s northern neighbours. The WA government rightly believed that Wittenoom possessed one of the largest crocidolite deposits in the world and it hoped that asbestos would provide much the same stimulus which gold had given the regional economy 50 years earlier (The West Australian April 17, 1945, ‘Asbestos: world production’). Wittenoom never lived up to those expectations. It was unable to produce fibre competitively against imports from South Africa and the mine recorded losses for most years of its operation. At its closure in 1966 Wittenoom had accumulated debts of $A2.5 million (Layman 1984).

The mine was isolated and transport and maintenance costs were particularly high. Mining held little appeal to the small number of Aboriginal workers in the Pilbara who in any case preferred employment on cattle stations where women could also find work as domestic labour. To attract workers from Perth required generous wages which in turn impacted upon the mine’s profitability. There were also technical problems at Wittenoom which were never resolved. The extremely hard host ore and the narrow seams meant that the yields per ton were as low as 8 per cent (Shepherd 1951).

To guarantee the mine’s success the state government provided amenities for the town and subsidised freight from the shipping depot at Port Samson (Telfer 1946). As the mine continued to struggle CSR applied for further assistance and, in September 1947, the state agreed to construct a fuel depot,
and extend the subsidy. Those arrangements followed a request from CSR to the then Prime Minister, Chifley, and to the State Premier, McLarty, both of whom were involved directly in negotiations (DoM 1947). The commitments by state and federal authorities made it difficult for the Departments of Mines or Public Health to suggest that Wittenoom should be closed because it was unsafe.

The mine was mechanised except at the rock face where the drives were too cramped to allow the use of heavy machinery. The broken ore was fed by a conveyor belt to the adjacent mill. The first or Old Mill which was put together from scrap had three stories. The primary level contained the picking belt, where a team of six men hand sorted the material. The ore then moved to a crusher, where some fibre was separated, with the main process of dividing the fibre taking place at the third and lowest level. Once extracted the asbestos was packed into 100 lb bags and dispatched in grades according to length. The packing of the longest grades was done manually with workers pressing asbestos into bags with wooden paddles. Those employed directly below the conveyor belt were showered with fibre which fell on them constantly from above. The production target in 1945 was 1,000 tons. That was raised to 4,000 in 1953 and peaked at 15,000 tons in 1962 (Joosten Trial 1979:326 – George King, former deputy manager CSR). With every increase in output, the dust levels rose.

The host ore was so abrasive that after as little as two hours holes would appear in ducting, thereby spreading dust throughout the mill (Joosten Trial 1979:250 – evidence Allan Osborne). The holes were bound with rubber patching or hessian to allow work to continue, with major repairs being carried out at weekends. Spare parts often had to come from Sydney, which meant repairs could take months to complete. The CSR board had close contacts with mining companies in South Africa and George King, a deputy general manager with ABA, was sent to the Northern Cape on a number of fact-finding tours. He found that ABA had nothing to learn from the Cape mines (Joosten Trial 1979:328 – evidence George King). According to ABA’s managing director Keith Brown: ‘The South African methods of milling blue asbestos ore were not directly applicable at Wittenoom because in South Africa a good deal of preparation of the ore is carried out by hand by natives’. Miners in South Africa were paid only 45/- per week while the base rate at Wittenoom was 30 pounds (Joosten Trial 1979:54 – evidence Keith Brown). The South African labour system could not be duplicated in Australia.
Labour
Almost half of the 6,950 men and women who worked at Wittenoom were Europeans. Migrant labour was the key to Australia’s post war industrial development and in that sense the miners who came from Britain, Yugoslavia, Italy and Germany were typical of their generation. The strategy of ABA was to retain a permanent core of managers, foremen, shift bosses and skilled workers supplemented by a pool of around 200 wage and contract labourers who stayed at the mine for brief periods (Cappelletto and Merler 2003). The elite were generally Anglo-Australians and the lower strata was comprised of immigrants. Miners at the ore face received the highest wages while jobs in the mill attracted lower pay. The lowest paid work of all, the loading of hessian bags onto trucks, was done by Aborigines. Under WA law they received rations of tea, sugar and tobacco rather than wages. The median period of employment was four months and 60 per cent of men stayed for less than seven (Cappelletto and Merler 2003). The high labour turnover is understandable given the severity of the work conditions, the cost of living and the town’s isolation. Unfortunately, because the symptoms of asbestosis would not show up for some years (and lung cancer or mesothelioma for more than 20 years) it meant that new miners did not learn about the risks of occupational disease from the men they replaced.

The economic goal of most migrants was to save enough money to buy a house or a farm and their attitude to work conditions was framed in terms of that ambition. Working at the mine was just something they did to get a start in life (Merler et al 1999). The heavy gambling at Wittenoom meant that it was not such an easy goal to achieve.

Frederick Harmpell was living in a village in the north of Italy when he saw an advertisement for jobs in a hydro-electric scheme in Australia. In his village alone, 27 young men signed on for what seemed an opportunity to travel and make good money. On reaching Darwin some men were offered work in Tasmania and the others went to Wittenoom. Harmpell recalls that on arriving at the mine many of the men were shocked by the heat and isolation. One group telegrammed the Italian Consulate in Perth demanding repatriation. Most stayed under a scheme whereby their wives and children were to join them after 12 months’ service. The conditions were harsh and the language barrier made life more difficult. Initially Harmpell left, after only a brief period, to work in timber mills in New South Wales. But the pay was never as good as at Wittenoom so he returned to the mine. When the weekly wage in a Perth factory was around seven or eight pounds, Harmpell could
earn seven pounds a day working a double shift at Wittenoom.

The cost of living in such an isolated town was high and for many of the miners and their families wages were insufficient to allow them to save. In 1959 a four-gallon drum of kerosene cost 25/-, and miners had no choice but to pay the price demanded at the company store. A bottle of beer which cost 3/- in Perth sold for four times that amount at the Wittenoom Hotel. Meat was also expensive as were vegetables. For a time, some of the men formed a syndicate shipping beer and other supplies from the coast, but the company soon put an end to the practice which threatened its monopoly.

The patronage enjoyed by ABA was such that most of the housing was built at public expense by the State Housing Commission. An agreement reached in 1959 between ABA and the Commission saw the company take responsibility for the management and maintenance of all domestic dwellings (DNW nd:67). The local Anglican priest, Father HD Middleton, questioned the agreement whereby the Commission used ABA as its agent and miners lived in ‘tied cottages’ (DNW nd:63). At the least that arrangement increased the company’s hold over the work force. Not only did ABA control employment, transport, and basic services such as electricity and water, but from 1959 it had a monopoly over housing.

**Dust and disease in South Africa**

It was not until after World War Two that the problem of dust in South African mines appeared with any regularity in official correspondence. As part of the first survey of the Pietersburg fields by the Silicosis Medical Bureau in 1949, Dr Gert Schepers visited Penge. He found the mills polluted and children working in clouds of fibre (Schepers 1965). Cape Asbestos which ran Penge, was British-owned and therefore, in Schepers’ view, should have been aware of the dangers of asbestosis. From 1931 Cape’s metropolitan factories had been subject to the British Asbestos regulations. Schepers’ report had no effect, and a Department of Health survey of Penge from November 1955 found widespread disease.  

The shift to industrial mining saw the introduction of pneumatic drills which increased output but also created clouds of dust. By the early 1950s work conditions were so hazardous that miners were contracting asbestosis after less than six months employment (Peacock 1952). The men and women who worked in the industry went unprotected by mining legislation. Until 1956, the mining companies were successful in arguing that their employment fell outside of the various Mines and Masters and Servants Acts (McCulloch
2002:120-32). In the absence of medical records or dust readings we can only guess at the rates of asbestosis. The attitude of the mining companies toward their employees can be gauged by the regular outbreaks of scurvy and pellagra at Cape mines during which a number of men and women died (McCulloch 2002:105-12). To prevent asbestos disease would have been far more expensive.

There were some improvements in work conditions during the 1960s as Cape and Gefco invested in dust extraction equipment. But the first major improvements in health standards only came with the emergence of black trade unions in the 1980s when the industry was already in its twilight. Even so the mills remained hazardous and subsequent research has confirmed that mine workers continued to contract asbestosis until the mines closed (Botha 1986).

From the 1920s it was common knowledge in the northern Cape that if a man or woman got water on the lung they would soon die. What the communities had identified was a key symptom of mesothelioma, which went undiagnosed until the late 1950s (Marchand 1991). At Prieska many families have suffered for generations from asbestos disease. The incidence of asbestosis was masked by a number of factors. Prior to the 1960s, the mines were infrequently visited by Department of Mine or Health officers and few records were kept of employees. Half of the workforce was female yet women were often omitted from departmental labour returns (McCulloch 2003). On the Pietersburg fields only one in five workers was a local man or woman, and no checks were made of the fate of migrant labour. Finally, the practice of sacking workers the moment they became ill removed the most obvious cases from the gaze of the Department of Health. Over a period of 30 years a few dedicated officers from the Departments of Mines, Native Affairs and Health protested at the dust in the mills, the outbreaks of scurvy, the lack of rations and medical care and the housing provided for miners and their families. But senior officers in the Department of Mines sided with employers.

**Dust and disease at Wittenoom**

Work conditions at Wittenoom were always hazardous but the combination of poor ventilation and increased production levels proved fatal (McNulty 1968a:451). In the period from 1943 until 1953 output rose from a few hundred to more than 4,000 tons per annum. With the rise in production the dust outside the mill became so thick that the flying doctor, Dr Eric Saint, found the pollution an aid to navigation. As Dr James McNulty recalled: 'He used
to fly in and see the blue dust from the mine and mill. He used to joke about it and say that the local airline used to glue this on the landscape as a homing sign for the township.\textsuperscript{18} The story may be apocryphal, but it is consistent with the testimony of former miners.

The poor ventilation in the mill in part arose from the use of the major access tunnel as the primary airway (Major 1968:470). All traffic, including the conveyor belt, passed down that tunnel and, although water sprays were placed at various points near the belt, they made little difference. Dust from the mill also tended to enter the mine through the main air duct (Major 1968:472). According to Cecil Broadhurst, the general manager of CSR’s mineral fibre division, most of the milling problems were due to the constant enlarging of the plant to fill higher production quotas (Joosten Trial 1979:444 – evidence Cecil Broadhurst). Dr JC McNulty attributed the dust in the mine and mill to ABA’s lack of expertise.\textsuperscript{19} The company tended to draw senior personnel directly from the sugar industry. Those men had no experience in running a mine and they would have seen few career prospects in becoming expert in CSR’s asbestos division.

Surprisingly, the Department of Mines annual reports contain no criticism of ABA. In fact those reports consistently praise the company for its attempts to make the mine safe. As early as 1945 the Department of Mines was aware of the dust in the mill but attributed the problem to war-time conditions (DoM 1945:18). The annual report for 1950 noted that ABA was ‘cooperating to the fullest extent with the department in attacking all ventilation problems’ (DoM 1950:17). Ten years later with no improvement the department commented: ‘The company is making every effort to effectively control dust in both mine and the mill’ (DoM 1961:33).

The Department’s attitude is not difficult to explain. Wittenoom had the support of state and national governments who were keen for it to succeed. The Department lacked trained officers, reliable instrumentation and even transport, which made the regulation of outlying mines difficult (DoM 1946:9). As a matter of courtesy, inspectors usually gave ABA a month’s notice of impending visits so that accommodation at the hotel could be arranged. Former miners recall that the manager would deliberately slow down the mill to reduce the dust whenever inspectors were present.\textsuperscript{20}

Besides the technical problems in suppressing dust there were political barriers to identifying and then reducing the risks of occupational disease. Responsibility for monitoring conditions at Wittenoom was shared between the Departments of Public Health and Mines. Expertise about health and
hygiene lay with Public Health, but authority for the regulation of Wittenoom rested with Mines. That Department had powers of inspection, but little expertise, and the Department of Public Health had knowledge about disease but no authority (McNulty 1968b:466). John Fainchney, an inspector of mines, visited Wittenoom regularly during the 1950s to take dust samples. Like his colleagues, Fainchney was unaware of UK asbestos legislation from 1931. He was not even aware of the existence of the disease asbestosis (Joosten Trial 1979:106-9 – evidence John Fainchney). The Commissioner for Public Health was better informed and after high dust readings were taken in October 1951 he wrote to the Under Secretary of Mines: ‘Asbestos produces more rapid fibrosis of the lung than silicosis and is more liable to superimpose infection. It is therefore apparent on the data submitted that conditions are far from satisfactory and in the interests of the health of the workers, this department must investigate the matter further and press for immediate improvement of supervision and working conditions at Wittenoom’. The Department of Mines did not welcome what it saw as outside interference.

**Knowledge and risk**

Facilities for conducting medical research in Australia were modest but in the case of pneumoconiosis that lack of capacity was offset by the economic importance of mining. By 1925, the New South Wales Coal Board was well versed in the dangers of coal and silica dust and measures for preventing lung disease had been introduced on the gold fields at Kalgoorlie. The Department of Mines in Perth was familiar with the literature on miner’s phthisis three decades before Wittenoom opened.

Until 1953 CSR did not employ physicians at any of its plants and it was left to local managers to acquire whatever information was necessary to ensure the safety of employees (Joosten Trial 1979:371 – evidence George King). Dr Gordon Oxer who worked at Wittenoom during the early 1960s was the only physician in an area of thousands of square miles. Although he was not an ABA employee, his salary was guaranteed in an agreement between ABA and the Department of Public Health. Dr Oxer’s independence was further compromised by the arrangement under which the company collected fees directly from his patients, with the costs being deducted from the miner’s wages. It is not surprising that Oxer had no input into occupational health.

None of the miners I interviewed during the course of this research were
aware of the risk of asbestosis during their period of employment. That minority with mining experience knew about silicosis, but most feared tuberculosis which they thought could be contracted from the dust (see Cappelletto and Merler 2003). The high labour turnover meant there was no collective memory for miners to draw upon in assessing the risks they faced. A generation at Wittenoom spanned barely six months which was sufficient time for men to develop asbestosis but not sufficient time for the symptoms to become visible. The circulation of knowledge on site was further hampered by the language barrier which divided the community into various ethnic groups. The most obvious explanation for the compliance of labour lay in the rigid relationship between employees and management. Wittenoom was a company town and miners and their families lived in houses constructed for the company’s benefit with rentals collected by company officers; electricity and water were provided by ABA, which also ran the only store where food and other basic supplies could be bought. Most of the miners were indebted to ABA and they could not leave without the company’s permission. Any workman who objected to the conditions faced dismissal. Many of ABA’s employees were making high wages at a time when jobs were scarce which further discouraged them from criticising work practices.

In contrast to their South African counterparts, the miners at Wittenoom had the right to trade union representation. Most of the workforce was covered by the Australian Workers Union (AWU). In 1948 Charlie Oliver, an AWU official, approached the Mines Department about work conditions (The Kalgoorlie Miner May 13, 1948). Oliver’s complaint resulted in a successful wage claim, and a promise from ABA to improve conditions. The award introduced a dust allowance which gave the men a higher hourly pay rate as compensation for the dust. The Board accepted that dust was unavoidable and the allowance was re-negotiated several times. In 1956 the Board mandated an hourly rate for those employed in the mill and its surrounds. A year later the AWU went to the Board once more to have the dust allowance increased from 1/6 to 2/- per hour for men in the mill and workshop.

**Controlling knowledge**

The turning point for the global industry came in February 1959 when a young pathologist named Dr JC Wagner from the Pneumoconiosis Research Unit (PRU) gave a paper at a Johannesburg conference. Wagner had identified a pandemic of mesothelioma in the Northern Cape which he
attributed to asbestos (Wagner 1960:373-81). The disease, he argued, could result from trivial exposure thereby crossing the barrier usually separating occupational from environmental injuries. Wagner’s discovery could not have come at a worse time for the mining companies. Industrial mining had begun in earnest, the markets for asbestos were strong and evidence of asbestosis among miners had recently been acknowledged by the Department of Mines.

Within three months the Government Mining Engineer asked the PRU to coordinate a survey of mesothelioma in the Northern Cape.26 After some discussion it was agreed that the project would be funded by the asbestos industry, and supported by a small grant from the South African Cancer Association (PRU 1962:2). The PRU survey was carried out between November 1960 and February 1962. By April an interim report showed an alarmingly high incidence of mesothelioma and evidence that the disease was associated with asbestos (PRU 1962:3-4). Pollution in the mining towns was so bad that residents were contracting asbestosis from environmental exposure. The PRU survey confirmed Wagner’s finding thereby confronting the mining industry with a choice: it could either try to make the mines safe, shut them down, or suppress knowledge about disease. Having chosen the last of these options, the South African Asbestos Producers Advisory Committee (SAAPAC) stopped all funding thereby bringing the field work to an abrupt halt (PRU 1963). The interim report was suppressed. The director of the PRU, Dr IG Walters, later remarked that the Survey had been ended because of the industry’s concern that it would be unable to recruit labour to its mines (Walters 1964). Dr Wagner left South Africa six months later to pursue a career in the UK in part because of the pressure put on him by the mining industry and the Department of Mines.27 Drs Jennifer Tallent and Bill Harrison, who 15 years later did research at the PRU into mesothelioma among those same mining communities, were never told about the Survey. It was as if it had never existed.28 So complete was the secrecy surrounding mesothelioma that Guy Wilson and Jacoba Schnyders, who during the 1960 and 1970s held middle management positions with Cape Asbestos, were unaware of the existence of the disease until more than a decade after the Survey had been completed.29 That knowledge was even further removed from the men, women and children who worked on the mines.

The Survey results were known to the secretaries of the Departments of Mines, Treasury, and Trade and the matter was discussed at Cabinet level
in 1962. In its internal correspondence, the Department of Mines recognised that any form of exposure to asbestos was ‘extremely dangerous’ for those who worked on mines, and or lived near mills. It also acknowledged that in parts of the Northern Cape, a large percentage of the population was suffering from asbestos related disease. The correspondence suggests that the Department’s main concern was to protect the industry. It was aware that the discovery of mesothelioma had already damaged overseas markets for South African fibre and it feared that further bad publicity would destroy the demand for crocidolite. The Department of Mines threw its weight behind the industry and made no attempt to inform asbestos miners about the risks they faced.

The hazard at Wittenoom
Recognition of the hazard at Wittenoom emerged between 1957 and 1962 largely through the efforts of a physician named James McNulty. In 1957, Dr McNulty, a Belfast trained physician, was appointed as a mines medical officer with the Department of Public Health, at Kalgoorlie. Before emigrating to Australia, McNulty had worked with coal miners in the UK, and he was familiar with pneumoconiosis. Kalgoorlie is 400 miles east of Perth and the centre of WA’s gold mining industry. Kalgoorlie was also the centre of a state-wide monitoring programme designed to eradicate tuberculosis. A mobile unit based at Kalgoorlie Hospital travelled the state, x-raying miners. The technicians would send x-rays back to Kalgoorlie for McNulty to read. In early 1958 McNulty was advised that following surgery in Perth, a Wittenoom miner was found to have asbestosis. Coincidentally, the mobile unit had recently visited Wittenoom and sent McNulty the x-rays. They revealed a further five cases. The result was disturbing for such a small workforce and the five cases were mentioned during debate in state parliament. The latency period for asbestosis at Wittenoom appeared shorter than elsewhere, and the symptoms more severe. McNulty immediately read the literature on asbestos disease.

In December 1959, a former Wittenoom miner named Joseph Sawer died from mesothelioma. Soon after McNulty read JC Wagner’s study of mesothelioma. In an article published in 1962, McNulty concluded that the short period of Sawyer’s employment confirmed that mesothelioma could arise from transitory exposure. The brief latency period between exposure and diagnosis was also consistent with the comparatively brief periods of employment which were producing asbestosis at Wittenoom. McNulty
Jock McCulloch

concluded: ‘The experience in Western Australia confirms that blue asbestos is a very harmful and lethal fibre’ (McNulty 1962). McNulty sent a copy of his paper to CSR’s board.33

McNulty was convinced there was a serious hazard at Wittenoom and he tried a variety of avenues to change the work practices.34 Initially he raised the issue with his own Department and then with the Department of Mines. When that failed McNulty appealed to ABA’s management but it had no effect. He then wrote to CSR’s consultant physician in Sydney Dr Rennie. Rennie was president of the Australian College of Physicians and had access to CSR’s board but he refused to intervene. He wrote to the leading researchers including Selikoff (US), Wagner (UK), Mancuso (USA), and Sluis Cremer (South Africa) seeking information about environmental exposure to use as leverage. McNulty then approached the shire council over the use of tailings at the Wittenoom school. It finally took McNulty six years to persuade CSR to close the mine. The company’s decision was in large part based on the mine’s lack of profitability.

In South Africa the industry was able to survive by gaining control of the research process. The Department allowed the SAAPAC representation on key committees at the PRU/NCOH. From that position it monitored research proposals, and eventually established a right of veto over publications (McCulloch 2005a). The industry questioned every advance in knowledge thereby creating doubt and with it a counter-position which could be used as a reference point. The SAAPAC was able to stifle medical discovery to such an extent that in the 1980s scientific committees in Johannesburg were still debating whether or not asbestos is a carcinogen. That in turn rendered South African science irrelevant on the international stage. The industry also developed techniques for dealing with individual critics. The SAAPAC would seek to exhaust researchers by bogging them down in lengthy correspondence and intimidating those in public employment by making accusations of unprofessional conduct to their superiors. That method was used against Ian Webster who was the director of the NCOH during the 1970s and his successor Professor JAC Davies. It was also used against researchers at the University of Cape Town (McCulloch 2005a). No fiction was unthinkable and in addressing a national audience the industry linked criticism of asbestos to wider political agendas. In particular the SAAPAC, abetted by the Department of Mines, spun the fantasy that anti-South African sentiment over apartheid lay behind the opposition to South Africa’s crocidolite (Hart 1988).
The reasons why

There were a number of factors that determined the work conditions in South Africa. There were few white miners and no trade unions, to act as a brake on foreign-owned companies. The mining regions were poor and isolated, and in the absence of legislative restraint, British companies chose not to apply the knowledge about the risk of airborne fibre already gained in their metropolitan factories. The failure of regulatory authorities in South Africa to reduce dust levels sealed the fate of miners and those who lived in mining communities. The issue of occupational and community health in the Northern Cape only emerged after 1995 through the actions of community groups such as the Concerned People Against Asbestos (McCulloch 2005b). That in turn suggests that a shift in national political structures was necessary to bring about a recognition of the disease burden. Even so change has been slow and it was not until June 2004 that the Minister for Energy and the Environment announced a ban on asbestos products (*The Cape Times* June 22, 2004 – ‘Asbestos products to become illegal, says Van Schalkwyk’). While the ban is to be phased in over a five year period it has caused some anxiety in Zimbabwe where chrysotile exports are the mainstay of a crumbling economy. South Africa has been an important customer at times consuming 40 per cent of Zimbabwe’s annual production for roofing of low-cost houses, brake linings and clutch pads for heavy vehicles (Mukumbira 2006, also *International Ban Asbestos Secretariat* November 18, 2006 – ‘Asbestos bans in Jordan and South Africa’).

The determination of state and federal governments that Wittenoom succeed contributed to the hazardous work practices in WA. So too did the high costs of production which discouraged CSR from investing in dust suppression and ruled out the labour intensive sorting of ore used in South Africa which inadvertently reduced dust emissions. Trade unions took little interest in occupational safety while migrant labour prevented the emergence of an oral tradition about lung disease. James McNulty believes the tragedy occurred in a kind of moral vacuum. There was no real malevolence at CSR’s head office and work conditions at Wittenoom were consistent with what was happening on the Kalgoorlie gold mines. The senior personnel in ABA and their families who lived on site suffered as much as anyone from mesothelioma. CSR’s failure to make money from mining ensured its withdrawal from asbestos manufacture. That was the principal reason for the mine’s closure in 1966. The 1970s and 1980s saw a sharp rise in the incidence of disease among the Wittenoom miners and their families which is not
expected to peak until 2023, when the 8,000 children who lived at the mine reach middle age.

For more than three decades South African miners were rarely if ever mentioned in the multi-million dollar cases involving US workers or consumers injured by South African amphiboles. That invisibility changed with the Cape Plc and Gencor settlement in 2003. South African mining communities have moved to centre-stage in what may prove to be a turning-point in the history of occupational health in Southern Africa. As well as bringing relief to plaintiffs, those settlements raise the possibility that in future parent companies operating in the region will have to conform to those standards of occupational safety that apply at home. Where they fail to do so employers may be held responsible for the behaviour of their subsidiaries.

Since Wittenoom’s closure CSR has paid out in excess of $A600 million in damages and compensation in Australia. Over the next 20 years that figure will continue to rise. Yet like the US conglomerate Johns-Manville to which it sold crocidolite, CSR has survived. In March 2003 CSR employed over 5,000 people in Australia, Asia, New Zealand and the US. The company, which nowadays processes sugar and sells asbestos-free building products, enjoys annual sales of over $A2 billion (CSR 2003).

Seventy years ago George Orwell commented that coal miners in Britain toiled underground so that civilised people could be warm. Coal miners did hazardous work for low wages and many of them developed lung disease. The asbestos story was arguably worse than that of coal: asbestos mining impacted adversely upon community health; the benefits it offered to consumers were spurious; and the profits the mines delivered to investors were tainted by the damage that they wrought on labour, insurance companies and even the state.

Notes
1. In addition to those three primary diseases, asbestos has been implicated in a variety of other disorders including cancer of the liver, brain and mammary glands.
2. The six types of asbestos are chrysotile, crocidolite, amosite, anthophyllite, tremolite and actinolite, but only the first three have been mined on a large scale. Crocidolite and amosite belong to the group known as the amphiboles.
5. Schalk Lubbe, interview.
7. ‘Letter from E.W. Lowe, Acting Director of Native Labour to Secretary for Native Affairs, Pretoria, 19/10/1940’ Department of Native Affairs NTS 2217 408/280.
8. The Department of Mines attributed the fall to the activities of ‘the international anti-asbestos movement which had singled out South African amosite and crocidolite’, the fibres which made up 70 per cent of exports (see DoM 1978:7).
10. Veronica Thokomelo interview.
11. Wittenoom fibre and South African amosite were interchangeable in terms of their quality but not in regard to cost. In the mid 1950s crocidolite from Wittenoom cost 144 pounds per ton as against amosite at 55 pounds. South African crocidolite cost 120 pounds (see Adamson 1954:132).
12. The Wittenoom Gorge mill operated for 13 years from 1944 until 1957; from 1956 there was a brief period when the two mills, the Old Mill and the new plant, were run simultaneously.
14. Frederick Harmpell, interview.
15. Interview with Dennis Flowers and David Nobbs, Perth, October 5, 1984.
19. Dr James McNulty interview.
22. ‘Memo Under Secretary of Public Health, 6 August 1963’ Department of Public Health file no. 5593/62, acc. no. 1540.
23. Dr James McNulty interview.
27. Interview with Dr Chris Wagner, Weymouth, Dorset March 22, 1998.
29. Interview with Guy Wilson, Johannesburg, July 5, 1999 and interview by Engela Venter with Willemina Jacoba Schnyders, Bloemfontein, April 7, 1999.
31. See Memo from Secretary for Mines, as in fn 30.
33. Dr James McNulty, interview.
34. Dr James McNulty, interview.
35. Dr James McNulty interview.

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