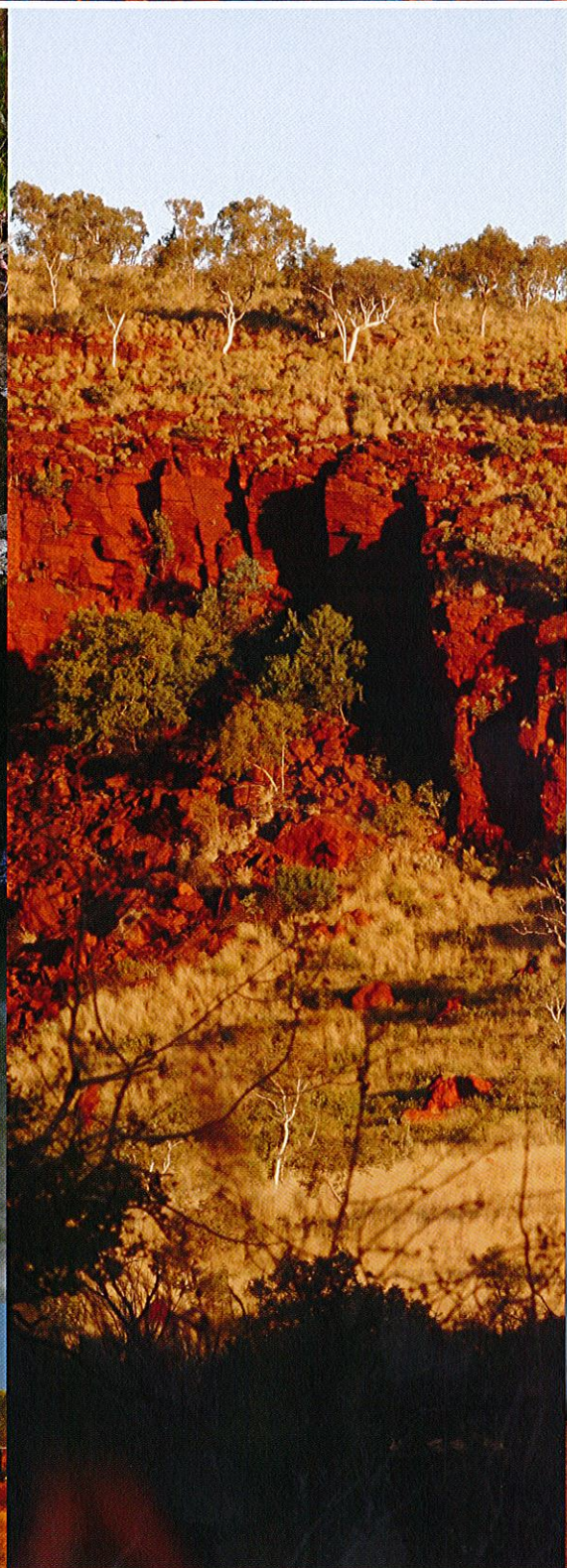


# SCREENING & MANAGEMENT OF ASBESTOS-RELATED DISEASE



RESOURCES FOR PRIMARY HEALTH CARE





With thanks to the following contributors:

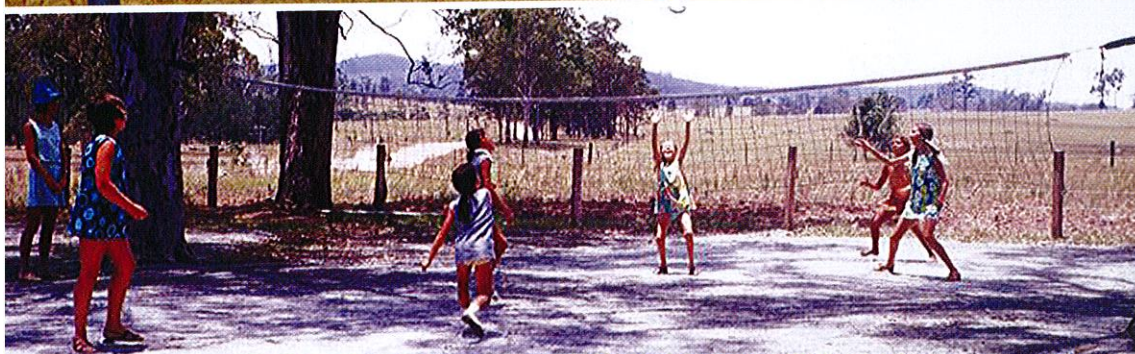
Mr Daniel Brown  
W/Prof. Nick de Klerk  
A/Prof. Jacinta Elston  
Ms Maggie Grant  
Ms Naomi Hammond  
Ms Sue Metcalf

Mr Scott Monaghan  
Prof. Richard Murray  
Prof. Bill Musk  
Mr Robert Vojakovic AM  
Ms Sandra White  
Dr Sally Young

And the staff of:

Mawarnkarra Health Service, WA  
Bulgarr Ngaru Aboriginal Medical Corporation, NSW  
Casino Aboriginal Medical Service, NSW  
Armajun Aboriginal Health Service Inc., NSW





Juluwarrup Aboriginal Corporation



State Library of Western Australia image No. BA1998/83





Welcome to 'Screening & Management of Asbestos-related Disease:  
Resources for Primary Health Care'

The need for this resource was identified and developed through a partnership to characterise the burden of asbestos-related disease within two Aboriginal communities. This project was undertaken between James Cook University, The University of WA, Mawarnkarra Health Service and Bulgarr Ngaru Medical Service.

Research from the project highlights the terrible toll experienced by Aboriginal peoples who worked with or lived near asbestos mines at Wittenoom and asbestos storage areas in Roebourne and Point Samson in WA and the Baryulgil mine and Baryulgil Square in NSW. Whilst the initial wave of asbestos related disease has passed for those who worked directly with asbestos, resulting in early death for many, there remains a continuing legacy of exposure for others in these populations today. Mawarnkarra and Bulgarr Ngaru health services both recognise the ongoing management needs for their patient populations and sought the development of a clinical pathway guideline to prompt the screening and management of asbestos-related disease and to provide background information to help orientate and support new and existing staff to the asbestos risk for patients.

This folder contains a range of information and resources including:

- A Clinical Pathway Guideline for the screening and management of people with asbestos-related disease – a 2 sided laminated sheet to use as a desktop reference for GPs and other health staff.
- Background information documenting the experiences of local Aboriginal people who worked with asbestos; a brief history of asbestos; and other useful information – such as the interaction of smoking/asbestos exposure, as well as links to useful online information. Please familiarise yourself with this information.
- Tools for patient smoking cessation/education and spirometry. Smoking cessation intervention, education and support to attempt/stay quit is the single most important component of care which clinics can offer asbestos exposed patients who smoke. A useful protocol for screening for and supporting smoking cessation (in any patient) produced by the Kimberley Aboriginal Medical Services' Council is included as a practical guide.  
This project recommends spirometry screening to be considered in the annual adult Aboriginal health check – providing screening for smoking related obstructive lung disease and asbestos related restrictive lung disease. Results should be used to educate patients on lung health and smoking cessation.
- Readings for more information on asbestos related disease.

The 'Effect of Smoking on Lung Health' graph is included as a desktop tool for patient education (see last page of the Smoking Cessation protocol). It has also been prepared in A3 poster size for display in areas where spirometry is carried out and elsewhere in the clinic.

We trust you will find the information included in this folder helpful. We encourage your efforts to expand screening and support smoking cessation as a priority, as well as manage asbestos-related disease within your patient population.



# **SCREENING & MANAGEMENT OF ASBESTOS-RELATED DISEASE: Background Information**

**AN ORIENTATION DOCUMENT FOR:**

**BULGARR NGARU ABORIGINAL MEDICAL CORPORATION,  
DHARAH GIBINJ CASINO ABORIGINAL HEALTH SERVICE ABORIGINAL CORPORATION,  
ARMAJUN ABORIGINAL HEALTH SERVICE INC,  
IN NEW SOUTH WALES  
&  
MAWARNKARRA HEALTH SERVICE,  
IN WESTERN AUSTRALIA.**

# SCREENING & MANAGEMENT OF ASBESTOS-RELATED DISEASE: Background Information

## CONTENTS:

1.	History of asbestos	3
1.1	Asbestos timeline with Australian benchmarks	4
1.2	Baryulgil - New South Wales	6
	Experiences of Aboriginal people working with asbestos at Baryulgil	6
1.3	Wittenoom - Western Australia	7
	Experiences of Aboriginal people working with asbestos in the Pilbara	8
1.4	Banning Asbestos in Australia	8
2.	Asbestos-related disease	9
2.1	Types of asbestos-related disease	9
2.2	Interaction between tobacco smoking and asbestos exposure	10
2.3	Disease risk by asbestos fibre type	10
2.4	Rates of asbestos-related disease	11
3.	When is asbestos safe?	12
4.	Suggested readings	12
5.	Useful online references and websites for more asbestos information and smoking cessation resources	14



Chedding Community near Roebourne, WA



Pilbara, WA

## 1. HISTORY OF ASBESTOS

Asbestos is a generic name for several naturally occurring mineral silicates that form fibrous crystals<sup>1</sup> renowned for their strength, flexibility, resistance to fire and chemical attack and insulation qualities<sup>2</sup>. Although there are several types of asbestos, there are two major subdivisions - the amphibole group that includes crocidolite (blue) and amosite (brown/grey) and the serpentine group containing chrysotile (white) asbestos. Depending on the asbestos product and whether it is in good condition, asbestos can be described as either *friable* (this means it is able to be pulverised by a human hand and releases fibres easily eg insulation, pipe coverings) and *non-friable* (cannot be pulverised by human hand and does not release fibres easily eg roofing products, asbestos cement in good condition)<sup>3</sup>.

People have used asbestos for over 4,500 years - initially to mix with clay to plug gaps in the walls of log huts, then as wicks for lamps. It was also woven into fabric, nets and even headdresses for women in early times<sup>4</sup>. The arrival of the industrial age in the 1800's saw the bloom of the global asbestos industry<sup>5</sup> and with the commencement of the Second World War, demand for asbestos expanded rapidly as the manufacture of tanks, planes, battle ships, helmets and gasmasks increased<sup>6</sup>.

Within Australia, asbestos was used extensively in numerous materials and building products in the construction industry and within items for the home between 1945-1980<sup>7</sup>. Common forms of asbestos include flat asbestos cement sheeting 'fibro' used in internal and external walls and ceilings, and the corrugated asbestos cement sheeting known as 'super six' or 'super eight' found in roofs and fences. Asbestos was also used in external gutting, downpipes and vent pipes; backing for electrical switchboards in a black product known as zelemite; vinyl sheeting and vinyl tiles used for flooring; thermal and acoustic insulation, air conditioning ducting and pipes; gaskets to pipes and pipe joins; certain paints eg Galbestos; vehicle brake and clutch pads; adhesives and glues behind wall tiles and vinyl; waterproofing in windows; woven textile seals in old ovens, grillers and kitchen appliances eg crock pots; carpet underlay<sup>8</sup>; hair dryers; electric blankets; fire screens and stove mats<sup>9</sup>. Even some talc powder made from magnesium trisilicate - in which asbestos can occur naturally, may have contained asbestos until regulation in 1973 required it to be asbestos free<sup>10</sup>. Blue asbestos was even added to the manufacture of Kent 'Micronite' cigarette filters during 1952-56!<sup>11</sup>

James Hardie consumed around 70% of the asbestos fibre used annually in Australia. With asbestos litigation beginning in the United States in the mid 1970s, many major asbestos producers were forced to take refuge in bankruptcy and reinvent themselves as non-asbestos companies.

A 2007 cost estimate of Australia's liability for asbestos disease has been valued at around \$6 billion dollars (with the major share attributable to James Hardie). In 2001 James Hardie management shifted its headquarters to the Netherlands and transferred ownership of its subsidiary Amaca Pty Ltd to a second subsidiary, thereby creating a veil between the parent company and litigants. During that restructure James Hardie assured the NSW supreme Court that it would, if necessary, make available up to \$A1.85 billion dollars to cover its liabilities. In actual fact the company left only \$A293 million dollars in its Medical Research and Compensation Foundation for future claims<sup>12</sup>. James Hardie also failed to inform the NSW or Federal governments about the shortfall and as major users of asbestos insulation in trains, power stations and ships, those governments also face a potentially massive future liability<sup>13</sup>.

Many countries have mined asbestos and incredibly some continue to do so. Currently Russia is the world leader in asbestos production, followed by China, Kazakhstan, Brazil, Canada, Zimbabwe and Colombia. These six countries were responsible for producing more than 1.9 million tons of asbestos - 96% of world production in 2007<sup>14</sup>. In the past, Australia has mined asbestos in WA, NSW, SA and Tasmania and imported asbestos from Canada and South Africa<sup>15</sup>, causing devastating health effects in workers and their families and the worst industrial public health disaster Australia has experienced<sup>16</sup>. The table below provides a brief but chilling timeline of asbestos knowledge and the history of denial in Australia.



White asbestos, Baryulgil, NSW

**TABLE 1.1 ASBESTOS TIMELINE WITH AUSTRALIAN BENCHMARKS**

1st Century AD	Roman historian Pliny, notes that slaves wearing asbestos cloth sicken and die and describes the use of respirators made from animal bladders.	1938	<p>CSR Limited send Senior Executive, MG King to the US, Canada, South Africa and Europe to study asbestos mining and manufacturing. It is the start of regular contact between CSR and Johns Manville, including further overseas trips between 1947 and 1952.</p> <p>US adopt a "safe" dust limit of 176 particles of asbestos per cubic centimetre in the workplace.</p> <p>German researchers identify 6 cancer deaths in asbestos textile workers.</p> <p>Animal studies confirm asbestos dust kills mice.</p>
1898	British factory safety inspectors express concern about the "evil effects" of asbestos dust.	1939	WA Commissioner of Public Health & Chief Inspector of Factories find lung disorders in James Hardie workers
1906	British Parliamentary Commission confirms first asbestos deaths in factories, recommends better ventilation & other safety measures.	1940	<p>Hancock begins asbestos mining at Wittenoom. Plant opens in 1943 and CSR takes over in 1948.</p> <p>Wunderlich Ltd begin re-development of Baryulgil mine.</p>
1911	Royal Commission into working conditions in gold mines in Australia reveals widespread lung disease. Ventilation laws introduced.	1943	<p>Sarnac Lab in New York confirms link between asbestos &amp; cancer. John Manville suppresses the report.</p> <p>A report on an asbestos mill at Zeehan in Tasmania (owned and operated by a CSR subsidiary) says that asbestos dust is a health hazard &amp; discusses methods of eliminating it.</p> <p>First mill is installed at the Baryulgil mine.</p>
1918	<p>Chrysotile asbestos discovered less than a mile from Baryulgil Square in northern NSW &amp; a small quarry opens.</p> <p>Prudential Insurance Company in the US produces an actuarial study showing premature death in the asbestos industry. Other companies begin increasing premiums and refusing insurance.</p>	1944	<p>First warning of asbestos dust at Wittenoom - the WA Assistant State Mining Engineer reports on the danger of dust being generated. Mines inspector Adams reports on the "dust menace" at Wittenoom and discusses the need to reduce dust levels.</p> <p>James Hardie enters partnership with Wunderlich - forming Asbestos Mines Pty Ltd and securing a local source of asbestos (and a seat on Tariff Board, which allowed them to import asbestos fibre for manufacture without duty and still enjoy 25% protection tariff on imported asbestos product).</p>
1926	First successful claim for compensation by a sick asbestos worker to the Massachusetts Industrial Accidents Board. Over the following three years several hundred further claims are filed.	1946	<p>Known asbestos death toll reaches 235 in Britain, 16 in France and 30 in Italy.</p> <p>Wittenoom mine manager writes to head of office about first known asbestosis case - a man named Dignam.</p> <p>Residential settlement established in Wittenoom gorge 1 km downstream from mine &amp; mill. Wittenoom town building commences in 1947 10 km from the mine and mill.</p> <p>Mines Department Inspector Adams describes dust conditions at Wittenoom as "terrific".</p>
1927	Asbestosis is given its name.		
1929	<p>Johns Manville Corporation, the world's largest asbestos mine/manufacture served with 11 writs by asbestos victims. Claims settled out of court with secrecy order.</p> <p>Metropolitan Life Insurance Company in the US finds that half the men working for more than three years at Johns Manville plants develop lung disease.</p>		
1930	British Home Office Survey finds widespread asbestos disease in UK factories.		
1935	Inspector of Factories and Shops in Western Australia reports on the effect of asbestos dust on the lungs of workers in the James Hardie Factory in Perth.		
Late 1930's	Although Lang Hancock is credited with 'discovering' asbestos in 1936 in the Wittenoom area, Don McLeod in his book How The West Was Lost, describes how he liaised with UK partners & others regarding asbestos prices via telegraph messages sent through Lang Hancock (who was the station manager and post master at Mulga Downs station). Don credits local Aboriginal mining pursuits as alerting Lang to the existence of asbestos in the Pilbara, describing how he was very interested in the prices offered & quizzed Don on ways of ore extraction <sup>33</sup> .		



1948	<p>Dr Eric Saint tells Wittenoom mine management that asbestos is extremely dangerous and that men exposed would contract chest disease inside six months. He writes to the Public Health Department in Perth that the mine will produce the greatest crop of asbestosis the world has ever seen.</p> <p>Over the following three years, dust levels at the mine and mill are regularly monitored and recorded as being at six to eight times "safe levels". Further warnings are given to mine management. No improvement in condition is noted.</p>
1950	<p>WA Commissioner for Public Health reports to his Minister that "Asbestos dust, if inhaled, constitutes a very grave risk and is, if anything, worse than silicosis".</p> <p>State Mining Engineer reports insufficient attention to safety regulations and ventilation at Wittenoom.</p> <p>Wittenoom town has 150 houses and population of over 500.</p>
1951	<p>WA has adopted a "safe" dust limit of 176 particles per cubic cm. Wittenoom readings are continually off the scale at 1000 particles. Mines &amp; Health Department take no action apart from issuing further warnings.</p> <p>Commissioner for Public Health writes to the Under Secretary for Mines that "The hazard from asbestos is considerably greater than that from silica...we have reason to believe that attention to this aspect of mining operations at Wittenoom has been inadequate in the past."</p>
1954	Mines Inspector Ibbotson describes conditions at Wittenoom as a "disgrace". The following year he threatens to close the mine.
1955	Dr Richard Doll in the UK releases most comprehensive survey to date linking asbestos dust with lung disease.
1958	<p>New mill replaces old at Baryulgil.</p> <p>New 'cleaner' mill opens at Wittenoom.</p>
1959	Western Australian Health Department Official Dr James McNulty discovers six cases of lung damage among Wittenoom workers. He warns the mine manager and writes the first of a series of warnings.
1960	<p>Wagner paper published a "new" disease, mesothelioma (fatal cancer of the lining of the lungs) discovered among people exposed to asbestos in South Africa.</p> <p>Annual report of WA Commissioner for Public Health cites working at Wittenoom is 30 times more dangerous than other mining.</p>

1961	<p>Britain cuts maximum asbestos fibre exposure level in workplace from 176 to 5 particles per cubic centimetre.</p> <p>First case of mesothelioma detected among ex-Wittenoom worker. The man dies.</p>
1961-65	More than 100 cases of lung disease diagnosed among Wittenoom workers and ex-workers.
1965	Local council warns tonnes of asbestos tailings being spread around Wittenoom may even threaten tourists.
1970	<p>Building unions at workplaces across Australia commence industrial action to ban asbestos use.</p> <p>Woodsreef asbestos mine opens at Barraba (NSW).</p>
1973	Wittenoom toll reaches 175. Twenty seven men are now known to have died.
1974	First public blue asbestos warning - Bulletin Magazine cover story, "Is This Killer in Your Home?"
1976	James Hardie involvement with Baryulgil ends with the sale of the mine to Woodsreef Mines.
1977	Cornelius Maas becomes the first mesothelioma victim to sue the CSR subsidiary that ran Wittenoom mine. He dies before the case gets to court.
1978	Phasing down of Wittenoom town begins.
1979	<p>Baryulgil mine closes.</p> <p>Wittenoom School Headmaster visits homes of Aboriginal people, advising risk of asbestos exposure and recommends they leave the area.</p>
1983-84	Parliamentary inquiry into the effects of asbestos mining on Baryulgil community.
1985	December 18th - Wittenoom primary school closes.
mid 1980's	Use of amosite (brown) and crocidolite (blue) asbestos is banned in Australia
1988	First victories in court for Wittenoom mesothelioma victims. Judge rules CSR acted with "continuing, conscious and contumelious" disregard for its workers' safety.
1989	Wittenoom death toll tops 500. NHMRC predicts final toll will be 2000.
1994-99	Baryulgil mine site rehabilitated in 1994 and then work begins to clean up Baryulgil Square and replace houses.
2003	Australia institutes a nationwide ban on importation and use of all forms of asbestos.
2006	WA Government finally close Wittenoom town. It is declared a contaminated site all government services are withdrawn. Wittenoom town is de-gazetted 2007.





Houses at Baryulgil, NSW

## 1.2 BARYULGIL – NEW SOUTH WALES

Chrysotile asbestos was found less than a mile from Baryulgil Square in 1918 and a small quarry was opened soon after, producing 2,500 tons of fibre between 1918-1924. In 1940 Wunderlich Ltd (now Selfsam Ltd, an entity of CSR Ltd) began re-development of the site, building a mill in 1943. James Hardie - needing to secure a local source of asbestos fibre, entered into a partnership with Wunderlich and the Asbestos Mines Pty Ltd in 1944. In 1953 James Hardie purchased the Wunderlich's share and between 1953-1976 Asbestos Mines Pty Ltd became a wholly owned subsidiary of James Hardie. From 1976 until its closure in 1979 Baryulgil mine was owned by Woodsreef Mines Ltd<sup>22</sup>.

The fibre from Baryulgil mine was railed to Sydney for processing but contributed less than 1% of the total fibre used by James Hardie in manufacturing asbestos products (Canada supplied the bulk of the fibre). However, Baryulgil was of strategic value giving the James Hardie company a seat on the Tariff Board. This allowed them to import asbestos fibre for manufacture without duty, but still enjoy 25% protection on imported asbestos product. The Baryulgil mine also provided a back-up supply of asbestos in case supplies from overseas were interrupted.

James Hardie gradually phased out asbestos from its domestic products after selling Baryulgil mine in 1976 to Woodsreef Mines. Although Woodsreef Mines undertook some improvements, such as repair / replacement of mill doors and pressurising the bagging room, production in that period increased from 5-6 tons to 11-12 tons per hour, without improvements to dust extraction capacity.

### EXPERIENCES OF ABORIGINAL PEOPLE WORKING WITH ASBESTOS AT BARYULGIL

The Bundjalung people are the traditional owners of the land on which the Baryulgil mine was situated. In 1840 Yugilbar Station was established and eventually employed around 100 Bundjalung people as stockmen and domestic servants. Accounts of when people moved the 10 km from Yugilbar Station to Baryulgil Square (known as 'the Square'), differ slightly between 1918 and 'the early 1920's'<sup>23</sup>.

Aboriginal people formed 'the core of the workforce' of the mine and mill throughout its operation. There were sufficient jobs to ensure both the full employment for the Baryulgil community, as well as other Aboriginal people who travelled from reserves at Tabulam, Muli Muli, Casino, Kyogle, Grafton, Yamba, and Kempsey. The mine also attracted a few Aboriginal Queenslanders and Torres Strait Islander peoples who came to work there, employing a total of 20 - 35 people at any one time. Visiting workers would

stay at Baryulgil Square Monday to Friday and then return to their home reserves on the weekend. Aboriginal people made up 95% of the Baryulgil workforce for the next 35 years<sup>24</sup>.

Full employment was a welcome relief from chronic poverty experienced by many other Aboriginal communities. Working at the mine and mill gave workers access to skilled industrial work including operating jack hammers, work as mill hands, powder monkeys, drivers, repairing machinery and construction of the new mill which opened in 1958. Working and living conditions were however far from idyllic.

Conditions at the open cut mine and mill were hard, wages were poor and there was no trade union presence until the late 1960's, (though even then it did little to inform workers of the dangers of asbestos). Workers suffered hot, noisy, dusty working conditions. Shoeless men worked to prise rock from walls with jackhammers and broke up larger rocks with drills and sledgehammers and manually sorted rock with fibre into bins for transport to the mill for crushing. Blasting the rock with explosives filled the mine with dust and the miners would return to work before it settled.

In the mill the ore was crushed progressively smaller and the fibre was extracted for bagging. Bags used to carry asbestos were often recycled from South African asbestos mines and were initially filled and sewn up by hand. Later, the operation of filling bags was partly mechanised - but workers still had to top up the bag, tamp it down and staple it shut. While respirators were issued from the early 1960s, it is unclear if the workers were provided instructions for their use or importance. Moreover they were uncomfortable to wear in the hot humid conditions and would clog up with dust within 5-15 mins.

Dust was a big problem, hanging so thickly in the air that men working side by side in the mill bagging asbestos, could barely see one another. The whole area outside the mill had a dust haze rising above it even on calm days. Dust would drift and blow over the Square covering people, vegetation, houses and everything in them.

Housing at the Square was generally single roomed and self-constructed from whatever materials people could obtain such as flattened kerosene tins for walls and crushed ant nests for flooring. Recycled asbestos bags were washed and made into floor coverings, bedspreads and window coverings to keep out the weather. There was no running water, no electricity and no sewerage. Education facilities were poor and health services non-existent at the Square.

With permission from the mine manager, asbestos tailings were made available for general use. Residents of the Square used



tailings to fill potholes in the dirt roads and to level the ground surface to grow grass around the homes - which became eroded or boggy in the high rainfall area. Tailings were also used to make play pits for children, in the foundations of the school and in the schoolyard. Conservative estimates suggest that around 20 truckloads of tailings per year - for 25 years, were used at the Square in this way. The process of spreading the tailings, or shivers, generated an extensive cloud of dust. When there had been no rain for some time, the surface soil and asbestos tailings would dry out and blow about, exacerbating the dust problem. Vehicles and people walking about would also stir up this dust and residents described seeing a dusty haze around, as well as inside, their houses, settling on window ledges, tables, plates etc. Others also accessed the tailings - the local Shire Council spread asbestos tailings on main roads near by and the general public from the town took trailer loads of asbestos tailings to use as a foundation for making 'a beautiful thick lawn'.

The practice of spreading tailings was discontinued in late 1977 and the tailings at the Square were covered over, to an extent, following a survey by the Division of Occupational Health and the exposé of the health hazards at the Square by ABC journalist Matt Peacock. A geological report in 1980 commented on the risk of tailings being exposed through erosion and ant activity bringing fibres to the surface.

The Department of Aboriginal Affairs (DAA) first became involved with the Baryulgil community in 1975 and provided small grants in 1976/77 (to Copmanhurst Shire Council) for rubbish removal, fence construction, provision of playground development, minor house repairs, road works and upgrade of the water supply at the Square. In 1977/78 the DAA began planning for a rebuilding program for 20 new houses, electricity, water and sewerage. However, amid growing concerns of the health risks from asbestos contamination and proximity to the mine, the rebuilding project was stopped while Commonwealth and State Health advice was sought. This led to the DAA and community discussing relocation and the establishment of the new township of Malabugilmah 6 km away - with the first house being built and occupied there in 1981.

Baryulgil mine closed in 1979 - thirteen years after the mine at Wittenoom in WA had been closed down amidst public pressure. After much lobbying, rehabilitation of the Baryulgil mine area was finally completed in 1994. Following an initial public works survey of the area and identification of asbestos hotspots, concrete roads were installed at the Square and then over the next four years 9 houses were demolished (requiring major clean up work at each site) and 13 new houses were built. Much of the clean up and rehabilitation work was carried out by the Baryulgil residents - with independent daily dust monitoring and a final visual inspection by the shire.

The 1984 parliamentary inquiry into the effects of asbestos mining on the Baryulgil community looked at surveys from a number of sources and found diagnoses of 2 cases of malignant mesothelioma, 1 case of lung cancer and chronic bronchitis within 70% of ex-mine workers<sup>55</sup>. Community members however recall far more illness and death from chest and heart problems among relatives in their late 30's and 40's who lived/worked in the area.

Anyone who has lived, visited or worked in Baryulgil since 1940 has been exposed to asbestos. People who lived/worked there from 1940-80, especially those who mined milled asbestos or loaded it onto trucks or drove the trucks, are considered to have received the heaviest exposure to asbestos. People who lived or worked there since 1981, are considered to have received a light exposure to asbestos.

### 1.3 WITTENOOM / ROEBOURNE - WESTERN AUSTRALIA

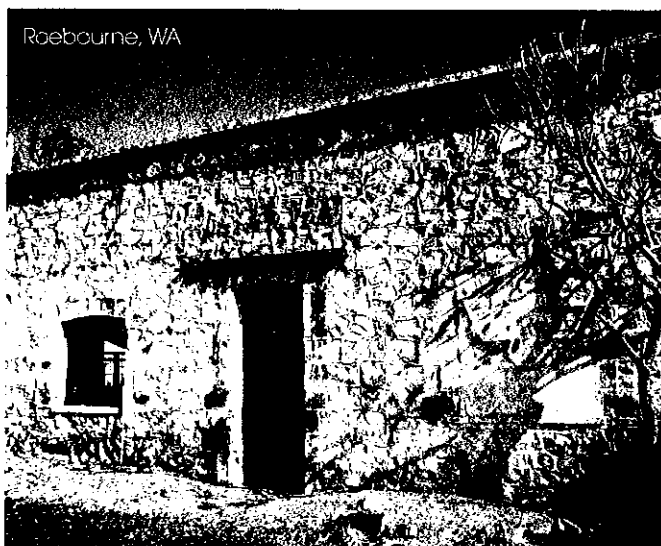
Blue asbestos was mined in the Wittenoom area of the Pilbara region from the late 1930s to 1966. Initially mining began in a small way during the Great Depression as unemployed men rushed to the area to knap and bag asbestos by hand<sup>56</sup>. Mr Lang Hancock, then from nearby Mulga Downs Station, claims to have discovered asbestos in the area at the age of ten. However Don McLeod disputes this, and describes how he liaised with overseas asbestos buyers by telegraph through Lang Hancock on Mulga Downs Station. Don credits local Aboriginal mining pursuits as alerting Lang to the existence of asbestos, noting that he was particularly interested in ways of extracting the fibre and the value it could attract<sup>57</sup>. Hancock staked a claim, established a small mine and milling operation in Wittenoom gorge in 1938<sup>58</sup>.

The Banyjima people, who are the traditional owners of the area, had a camp with a bough shed in Wittenoom gorge before this, which they used as a 'holiday place'. Once the mine started many of the men from the camp worked at the mine, separating the fibres from the rock and bagging the asbestos by hand<sup>59</sup>.

Lang Hancock sold a 51% share of his mining operations to the Colonial Sugar Refining Company (CSR) in 1941 and then the remainder of his holding in 1943. CSR formed a subsidiary company called Australian Blue Asbestos Pty Ltd (ABA) and retained Mr Hancock as the mine superintendent until 1948<sup>60</sup>.

Although CSR had no experience in mining, the Western Australian and Federal governments both encouraged and provided support to CSR with expectations that this would lead to a mineral boom that would rival the West Australian goldfields. It was also seen as a means of 'developing and populating the empty north', which was a prevailing concern at the time<sup>61</sup>.

With the high unemployment and housing shortages of the 1950s, working at Wittenoom seemed an attractive option with a newly established town that was set in a picturesque landscape. Up to 200 families lived in Wittenoom at any one time, with a total of 12,000 people estimated to have lived in the town during its lifetime. ABA employed 7,000 people in the mine and operations throughout the same period. The mineworkers were predominantly young, male, single and 'New Australian'<sup>62</sup>.





## EXPERIENCES OF ABORIGINAL PEOPLE WORKING WITH ASBESTOS IN THE PILBARA

The Banyjima people are traditional owners in the Hamersley range area of WA. Lang Hancock as manager of Mulga Downs station used the Banyjima people who lived and worked on the station as labourers, to mine asbestos at Vampire Gorge and later at Wittenoom<sup>23</sup>. This country is special to Aboriginal people and wanting to stay in the area and work, men women and children camped near the early mine. They helped to dynamite the rock, and then worked in teams to gather up the far flung asbestos by hand into buckets, loading it on to trailers or trucks<sup>12, 26</sup>.

A statement made to the Pilbara Asbestos Injuries Working Party in 1995 reported: *Family was at Ngampiku before white fellas come along. Lang Hancock started asbestos mining. They used to put all the asbestos on the mail truck then until they got the big trucks. Use to bring the asbestos to Tsakalos place to unload there. When they finish, white fellas took over - that was Kartitikunha (Vampire Gorge). Then they come around this side to Ngampikunha (Wittenoom)*.

After Hancock sold his remaining share to CSR, Aboriginal people were largely excluded from Wittenoom town and the gorge, except on race days and other community events.<sup>27</sup> All the same, Aboriginal people recall visiting Wittenoom for supplies, camping amongst the asbestos tailings at the races and playing as children, in the asbestos tailings. Once the mine closed and work on stations ceased in the late 1960's, some Aboriginal families returned to Wittenoom to occupy the vacant houses.<sup>28</sup>

Prevented from obtaining work in the mine, Aboriginal people were grateful of employment with J D Tsakalos, a trucking business in Roebourne that was used to transport the asbestos filled bags between Wittenoom, Roebourne and Point Samson. In Roebourne the bags were off-loaded to the now infamous Tsakalos's yard (currently a vacant block on Sholl St) for storage until they could be transported to Point Samson and loaded into the hulls of ships for transport to Perth for processing. Aboriginal people were involved in all these actions. The activity at Tsakalos's yard attracted small businesses to set up at the yard to service workers and other Roebourne residents. Many children visited the yard after school helping to move or play amongst the asbestos filled sacks and other townspeople visited the yard to go to the shops or simply catch up with friends. The yard was a hive of activity that inadvertently exposed many people to asbestos. Other asbestos exposures experienced by Aboriginal people occurred as they hitched a lift on the back of the loaded trucks and as the trucks drove through the old reserve to drop people off. Even sitting in the shade of the Point Samson jetty exposed people, as asbestos fibre filtered down through gaps in the jetty<sup>29</sup>.

Anyone who has lived, visited or worked in Wittenoom, Roebourne, Wickham or Point Samson since 1930 has been exposed to asbestos.

### Heavy exposure:

People who lived or worked in these areas from 1930 - 67, especially those who mined, milled or loaded asbestos onto trucks, drove/rode the trucks or loaded asbestos into the hull of ships.

### Moderate exposure:

People who lived or worked in these areas 1968 - 1998.

### Light exposure

People who lived or worked in these areas 1999 to now.

## 1.4 BANNING ASBESTOS IN AUSTRALIA

Many people have paid the ultimate price by losing their own lives, or loved ones, family members and community leaders, prematurely to asbestos-related diseases. The first recorded case of asbestosis in Australia was diagnosed in 1933 in a mill hand from NSW<sup>30</sup> and the first case of mesothelioma was diagnosed in 1962 in a worker at CSR's blue asbestos mine at Wittenoom<sup>31</sup>.

A 1995 report on malignant mesothelioma diagnosed within Pilbara Aboriginal people identified that in 8 of the 12 cases, the person had worked in the transportation of asbestos-filled hessian bags. This practice had been explicitly banned in asbestos-processing factories by the British Asbestos Regulation of 1931 and was strongly criticised again in the Chief Inspector of Factories Report for 1949<sup>32</sup>.

Tragically, the Australian general public were not alerted to the dangers of asbestos until the mid 1970s, even though it was known in the medical literature and widely accepted by medical practitioners. The asbestos industry and governments also knew of its dangers, both internationally and in Australia well before this time.<sup>33</sup>

Following the public exposure of the dangers through television and print media, asbestos mining in Australia was gradually phased out from the mid 1970's and industries began to replace asbestos with alternative products like fibreglass<sup>34</sup>. The use of amosite (brown asbestos) and crocidolite (blue asbestos) was banned in Australia in the mid 1980's and a nationwide ban on the importation and use of all forms of asbestos (including Chrysotile (white) asbestos) has been in place since 31st December 2003. However, this ban excluded asbestos materials/products already in use<sup>35</sup>, and so considerable asbestos containing products remain within the community today.



Roebourne, WA

## 2. ASBESTOS-RELATED DISEASE

The first documented case of mesothelioma in an Aboriginal woman from the Pilbara caused from environmental exposure to asbestos was diagnosed in 1995 and prompted a review of all known mesothelioma cases within West Australian Aboriginal people. The review found 12 mesothelioma cases in Aboriginal Pilbara residents 1975-1995, most of whom were involved in trucking, prospecting, pipe laying, lumping, playing in storage sheds or had visited Wittenoom. The review calculated the incidence of mesothelioma in the Pilbara Aboriginal population as 250 per million people aged 15 years or older, one of the highest population-based incidence rates ever recorded<sup>17</sup>.

Exposure to asbestos has had a massive effect on the health of people across the world and sadly, exposure is a continuing issue. The World Health Organisation (WHO) estimates that 125 million people are currently exposed to asbestos in their workplace and 107,000 people die annually from asbestos related lung cancer, mesothelioma and asbestosis resulting from occupational exposures to asbestos. One in every three deaths from all occupational cancers is estimated to be caused by asbestos and several more thousands of deaths can be attributed to exposure in the living environment.<sup>18</sup>

### 2.1 TYPES OF ASBESTOS-RELATED DISEASE

The following information has been prepared by Clinical Professor Bill Musk from the Department of Respiratory Medicine, Sir Charles Gairdner Hospital, Perth, WA and is included here with his kind permission.

#### PLEURAL PLAQUES OR PLEURAL THICKENING

This is thickening of the lining of the chest wall and is frequently observed in people who have worked with asbestos. It is often considered to be an indicator of asbestos exposure, but rarely interferes with lung function, is not malignant and does not develop into malignant mesothelioma or lung cancer. No treatment is necessary.

#### PLEURAL EFFUSION

Occasionally people with past asbestos exposure develop fluid in the pleural cavity (between the lung and the chest wall) that is not due to cancer. It may result in permanent and sometimes progressive pleural thickening which, when severe, may interfere with the expansion of the lungs. The fluid may require draining from the lungs, and this is done in hospital. It is not malignant and does not lead to cancer.

#### ASBESTOSIS

This is a form of pneumoconiosis (dust disease of the lung) caused by asbestos. Usual time from first exposure to first clinical signs is 10 to 20 years. Asbestosis is an inflammatory reaction in the lungs caused by inhaled asbestos fibres. Inflammation occurs throughout the lung tissues and leads to scarring (fibrosis) which stiffens the lung tissues, making the work of breathing harder, and impairs oxygen uptake from the air into the blood. The main symptom of asbestosis is breathlessness on exertion. Diagnosis is made from a history of asbestos exposure, the presence of crackling noises in the chest heard with a stethoscope, the presence of abnormal shadowing on the chest x-ray and abnormalities of lung function tests. There is no treatment for asbestosis. Asbestosis tends to progress with the passage of time.

## BARYULGIL MINE

This plaque is dedicated to the  
men, women and children of the  
Bundjalung People and the Baryulgil Community  
who worked in the Mine between 1944 & 1979.

It also records the efforts of the  
Fuller Earthmoving Team during the total  
rehabilitation of the site in 1995,  
using funds provided by the  
Dept of Mineral Resources and overseen by  
the Dept of Land & Water Conservation.

Yalgilbar

December 20, 1996

Baryulgil, NSW

#### LUNG CANCER

Lung cancer is a malignant tumour found within the lungs. Lung cancer caused by asbestos exposure can take 20 years or more from the time of exposure before the first clinical signs appear. The types of lung cancer that result from asbestos exposure are the same as those that are caused by smoking. Treatment is the same: surgery in suitable cases, radiotherapy or chemotherapy. Exposure to asbestos increases the risk of developing lung cancer, especially in people who smoke cigarettes. The risk of developing lung cancer in people who have been exposed to asbestos is reduced if they stop smoking.

#### MALIGNANT MESOTHELIOMA

Malignant pleural mesothelioma is a cancer arising from the cells covering the surface of the lung and lining the chest wall. Malignant peritoneal mesothelioma is a similar cancer arising from the surface covering of the bowel or the lining of the abdominal cavity (stomach). Mesothelioma is a rare form of cancer. Usually the chances of getting this disease are one to two in a million per year. This disease seems to occur after less exposure to asbestos dust than do other asbestos related diseases, and may take up to 40 years or more to show itself after first exposure. It is thought to be caused by the body's reaction to the needle like fibres of asbestos piercing the lining of the lung or abdomen. Malignant mesothelioma frequently results in the accumulation of large amounts of fluid in the chest or abdominal cavities. This tends to cause breathlessness or distension of the abdomen. The cancer cells also tend to invade the normal tissues of the lung and chest wall. In the chest wall this causes chest pain that may be severe<sup>19</sup>.



## 2.2 INTERACTION BETWEEN TOBACCO SMOKING AND ASBESTOS EXPOSURE

Both tobacco smoking and asbestos exposure cause lung disease and the health effects can interact. The most important direct interaction is in relation to the risk of lung cancer. A range of case-control studies as well as cohort and occupational studies have explored the interaction between tobacco smoking and asbestos exposure as risks for development of lung cancer. While there is some variability in levels of risk in study findings, the relationship between the two risk factors is best described as 'multiplicative'.<sup>49</sup> That means that the additional risk of lung cancer associated with being both a smoker and having had asbestos exposure is more than simply the sum of the two individual additional risks. The following table is a simplified summary of this interaction.

What this means is that compared to a person who has never smoked, someone with asbestos exposure may be around five times more likely to develop lung cancer than a person who has neither smoked nor had exposure to asbestos dust. Similarly, a person who has had no asbestos exposure may be 10 times more likely than a non-smoker to develop lung cancer. However, a person who has had asbestos exposure and who also smokes has up to 50 times the risk. The actual risks for individuals will obviously vary according to the intensity and duration of smoking and asbestos exposures.

The implications of this for patient counselling is that yes, asbestos can cause lung cancer (although that risk alone are not generally as high as for tobacco smoking alone). However, it is the combination of the two that is really dangerous. Therefore the most important thing that a smoker who has had past asbestos exposures can do for their health is to quit.

**TABLE 2: RISK-RATIOS FOR LUNG CANCER AS A FUNCTION OF SMOKING STATUS AND ASBESTOS EXPOSURE (APPROXIMATED FROM HAMMOND ET AL<sup>50</sup>)**

	Smoking status	
	Non-smoker	Smoker
Asbestos exposure	1	10
No exposure	5	50
Exposure*		

\* This exposure was described as heavy.

## 2.3 DISEASE RISK BY ASBESTOS FIBRE TYPE

Asbestos fibres are extremely resistant to destruction in body fluids and around 50% of inhaled asbestos fibre can remain lodged in the lungs, where many fibres are too long to be engulfed and removed by cells responsible for clearing debris from the lung. Different fibre types behave differently in the lung, with chrysotile (white asbestos) being rapidly removed, and fibres from the amphibole group (eg crocidolite (blue) asbestos) persisting. This difference probably accounts for the much greater disease potential of amphibole, compared with chrysotile asbestos.

Important determinants of asbestos toxicity include exposure concentration, duration and frequency - plus fibre dimension and durability. Long thin fibres reach the lower airways and alveolar regions of the lung and are more toxic than short wide fibres and particles (which are more likely to be deposited in the upper respiratory tract). Fibres of amphibole asbestos such as tremolite, actinolite and crocidolite (blue) asbestos are retained longer in the lower respiratory tract than chrysotile (white) asbestos fibres of similar dimensions.

Pleural fibrosis and plaques is likely to be linearly dependent from time since first exposure and is present for all types of asbestos fibres, though there are diagnostic uncertainties and misclassification makes it difficult to precisely describe the dose-response relationship.

Lung cancer risk appears to be linearly related to cumulative asbestos exposure, with an estimated increase in risk of 1% for each fibre/ml-year of exposure. All fibre types seem to exert a similar effect on lung cancer risk.

Pleural mesothelioma is specifically associated with asbestos exposure: the risk is about three times higher for amphiboles as compared to chrysotile. Environmental exposure to asbestos is also associated with mesothelioma risk.

Chrysotile asbestos has been proved to cause lung cancer, malignant mesothelioma of the pleura and peritoneum, cancer of larynx and certain gastrointestinal cancers. Risk of these diseases increases with cumulative lifetime exposure and rises with increasing time interval (latency) since first exposure. Non-malignant respiratory conditions which chrysotile can cause include pulmonary parenchymal & pleural fibrosis and asbestosis, small airway abnormality and conditions affecting the large airways such as chronic bronchitis and chronic airflow limitation.

Comparative analysis have established that chrysotile is 2 to 4 times less potent than crocidolite asbestos in its ability to cause malignant mesothelioma, but of equal potency of causation of lung cancer.

In summary, all forms of asbestos may cause pulmonary fibrosis, lung cancer and mesothelioma, but the degree of hazard depends on fibre type (greater with amphiboles than with chrysotile) and on the fibre size distribution (long fibres more hazardous than short). This means that meaningful comparisons of the incidence of disease between different occupational groups should consider differences in fibre type and in the airborne fibre size distributions.



Baryulgil School, Baryulgil, NSW



There appears to be an association between pulmonary fibrosis and lung cancer in that both diseases: show similar dose-response relationship with respect to asbestos exposure, show a similar latent periods for development, show a similar dependence on fibre type and size, and both diseases emanate from the same underlying chronic inflammatory condition. This suggests that asbestos-induced lung cancer, like fibrosis, is a threshold phenomenon and exposures which are insufficient to cause chronic inflammation/cell proliferation (manifest for example, as alveolar Type II cell hyperplasia or fibrosis) will not incur any increased risk of lung cancer.

Very few cases of mesothelioma can be reliably attributed to chrysotile despite the many thousands of workers who have had massive and prolonged exposures to this type of asbestos. In contrast, mesothelioma has been observed among some people who experienced only brief exposures to amphiboles. These differences are most likely explained by the limited durability of chrysotile in the lungs, in contrast to the amphibole fibres that are more persistent. It would appear that for a fixed level of exposure, the risk of developing mesothelioma is much greater for amphiboles than for chrysotile.

Evidence from human studies suggests that amphibole asbestos may lead to the development of mesothelioma at lower levels of cumulative exposure than would be required to cause lung cancer. However, no reliable exposure-response curve can be constructed for asbestos-induced mesothelioma either in animals or in humans, and although a threshold could be postulated on theoretical grounds, the available data do not allow the identification of a threshold level of exposure below which there would be no risk<sup>51</sup>.

## 2.4 RATES OF ASBESTOS-RELATED DISEASE

### MESOTHELIOMA

Australia has one of the highest incident rates of mesothelioma in the world with 7,027 new cases reported from 1945 to 2001 and a further 488 new cases reported between January 2002 and June 2003<sup>52</sup> although it only represented 0.6% of all cancers diagnosed in Australia in 2006. The most common form is pleural mesothelioma accounting for 94% of cases since 1982, followed by peritoneal and pericardial mesothelioma. Development of mesothelioma in other parts of the body, though uncommon, has also been reported. The International Agency for Research on Cancer (IARC) recently determined that exposure to asbestos is causally associated with an increased risk of ovarian cancer<sup>53</sup>. However a recent literature review and meta analysis has questioned this statement, finding that disease misclassification of the original studies prior to meta analysis may have affected the final analysis<sup>54</sup>.

Latency of mesothelioma means older people are more commonly affected, however 25 cases of mesothelioma have also been diagnosed in people aged under 30 years from 1982 to 2006.

Projections of future new mesothelioma cases have been estimated from disease found among former miners and mill workers at Wittenoom<sup>55, 57</sup> and extrapolated to Australia as a whole to reach approximately 18,000 cases in the period 1945 to 2020, with peak diagnosis estimated to occur around 2020<sup>58</sup>. Populations affected by malignant mesothelioma have changed since the

1960's with the first wave occurring in workers employed in mining and milling raw asbestos and manufacturing asbestos products, while the second wave affected workers who used these asbestos products within industry. More recently a third wave has been identified with the incidence of malignant mesothelioma from exposure during home renovations increasing significantly over the last ten years and this trend is continuing to increase. Predicting the how long this trend will continue and the number of people it will ultimately affect is difficult as asbestos materials remain in many Australian homes and the long latency of the disease.<sup>59</sup>

### LUNG CANCER

After prostate, bowel and melanoma of the skin, lung cancer is the fourth most common cancer in both men and women in Australia and the leading cause of death due to cancer. In 2007 5,948 males and 3,755 females were diagnosed with lung cancer and 4,715 males and 2,911 females died from lung cancer. Between 1982 and 2007 lung cancer mortality rate in men decreased by 41% (from 79 to 46 per 100,000), but increased in women by 56% (from 15 to 24 per 100,000). Tobacco smoking is the largest single cause of lung cancer and is responsible for 90% of lung cancers in males and 65% in females. Compared to non-smokers, smokers have more than a ten-fold increased risk of developing lung cancer. In smokers, risk is strongly related to duration of smoking and the number of cigarettes a person smokes. Giving up smoking reduces the risk of developing lung cancer and as the period of abstinence from cigarette smoking increases, the risk of lung cancer decreases and eventually approaches the risk as for non-smokers<sup>60</sup>.

Passive smoking also causes lung cancer and people living with a smoker are 20-30% more likely to develop lung cancer, than those living with a non-smoker. Inhalation of industrial and chemical carcinogens like asbestos also increases the risk of developing lung cancer, especially in people who also smoke cigarettes. People exposed to asbestos can significantly reduce their risk of developing lung cancer if they stop smoking<sup>61</sup>.

Recent research has found annual screening with the use of low-dose CT reduces mortality from lung cancer and though more studies are required before public policy recommendations can be made<sup>62</sup>, there may be some benefit for patients at increased risk.

### ASBESTOSIS

Although caused exclusively from asbestos exposure, asbestosis is not a notifiable disease, so the number of new cases diagnosed each year in Australia is unknown. The number of asbestosis-related hospitalisations, compensation claims made, and claims accepted (by the NSW Dust Diseases Board) provide some insight, though some hospitalisations would be repeat admissions. Dust Disease Board and state and territory data have been combined and show that approximately 1860 claims have been compensated between 2002-2008. Deaths from serious conditions triggered by asbestosis have steadily increased from 1998-2008, aside from a slight dip in 2005, with approximately 734 deaths in this date range recorded as due to asbestosis. However, the number of deaths attributed to asbestosis represents only around one third of the deaths where the condition is mentioned on the death certificate, indicating that real mortality is higher than this<sup>63</sup>.



### 3. WHEN IS ASBESTOS SAFE?

It is important that everyone understands that asbestos still exists in many buildings within our environment – including potentially where we live, work or other structures we visit. It is especially important for people who are renovating or performing simple repairs or home improvements (or getting a trades-person to do the work) to understand this risk and ensure that work is carried out safely.

Current advice is that as long as the asbestos product is in good condition and is left undisturbed, there is no risk of asbestos exposure. But once the product deteriorates or is disturbed causing fibres to be released (eg by activities such as drilling, sawing, high pressure cleaning etc), then there is a real risk of asbestos exposure to not only the person performing the work, but also to other people living or visiting the area<sup>10</sup>.

**Homes or structures built between 1921 and 1990 should be expected to contain asbestos until proven otherwise<sup>10</sup>.** Products previously used in the Australian building industry that contained asbestos include:

- Roofing, shingles and siding
- Exterior wall cladding
- Fencing
- Thermal boards around fireplaces
- Backing material on floor tiles and vinyl flooring
- Gaskets in wood stoves
- Textured paints
- Water or flue pipes
- Roofing insulation (not used in Western Australian homes)
- Insulation used on hot water pipes, domestic heaters and stoves

Removing asbestos from buildings is heavily regulated. People can remove up to 10 sq metres of non-friable asbestos – in line with these regulations without a license<sup>10,11</sup>. If larger amounts of non-friable asbestos are to be removed or the asbestos for removal is friable, then it must be removed by a licensed asbestos removal contractor. The Australian Asbestos Network website <http://www.australianasbestosnetwork.org.au/Asbestos+Today/Asbestos+Resources/default.aspx> provides information on how asbestos may be safely removed from your home, the precautions that should be taken, as well as links to state and national legislation and regulatory bodies.

DIY renovators removing asbestos themselves must take several precautions for their own safety and for others in the vicinity. The principal aim is to prevent the release of any dust particles into the atmosphere. The main advice is:

1. Have the material tested to confirm the presence of asbestos.
2. Isolate the area where asbestos removal will be taking place.
3. Wear protective clothing.
4. Wear breathing apparatus.
5. Avoid using power tools unless fitted with dust suppression or dust extraction attachments.
6. Minimise dust by watering surface areas.
7. Securely wrap and seal asbestos in plastic.
8. Clearly label all packages with asbestos warnings.
9. Do not use ordinary domestic vacuum cleaners to clean the site afterwards. You will need to use specialist cleaners fitted with a HEPA filter or else a wet mop.
10. Dispose of asbestos in an approved landfill site.<sup>10,12</sup>



Roebourne, WA

### 4. SUGGESTED READINGS:

- Blue Asbestos: Is this killer in your house? 1974, Hall T.
- Malignant Mesothelioma in Pilbara Aborigines. 1995, Musk AW, et al.
- Malignant Mesothelioma in Australia, 1945-2000. 2002, Leigh J, et al.
- Increasing incidence of malignant mesothelioma after exposure to asbestos during home maintenance and renovation. 2011, Olsen NJ et al.
- Does Exposure to Asbestos Cause Ovarian Cancer? A Systematic Literature Review and Meta-analysis. 2011, Reid A et al.
- The Case for a Global Ban on Asbestos. 2010, LaDou J et al.
- Cancer incidence among women and girls environmentally and occupationally exposed to blue asbestos at Wittenoom, Western Australia. 2007 Reid, A et al.
- Smoking, exposure to crocidolite, and the incidence of lung cancer and asbestosis. 1991 de Klerk et al.
- Reduce Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening. 2011, National Lung Screening Trial Research Team – New England Journal of Medicine.
- The natural history of chronic airflow obstruction. 1977, Fletcher C, Peto R.
- The effect of smoking on the risk of lung cancer mortality for asbestos workers in Great Britain (1971-2005). 2011, Frost G, et al.
- Smoking Intervention in Subjects at Risk of Asbestos-Related Lung Cancer. 1997, Waage HP, et al.
- The Mine at Baryulgil: Work, Knowledge, and Asbestos Disease. 2007, McCulloch J.

## 5. USEFUL ONLINE INFORMATION AND WEBSITES

- Australian Asbestos Network

<http://www.australianasbestosnetwork.org.au/>

A great website which includes information on many aspects of asbestos as well as oral accounts from historians, patients and respiratory physicians and up to date information.

- Asbestos Diseases Research Institute (ADRI)

<http://www.adri.org.au/index.html>

Located in the Bernie Banton Centre, ADRI was established to improve the prevention, diagnosis and treatment of asbestos-related disease. Useful information & current research is included. Evidence based guidelines for the diagnosis & treatment of Malignant Mesothelioma inline with NHMRC - currently in development and due to be published in 2012.

- Asbestos Diseases Society of Australia (ADSA)

[http://www.asbestosdiseases.org.au/asbestosinfo/wittenoom\\_tragedies.htm](http://www.asbestosdiseases.org.au/asbestosinfo/wittenoom_tragedies.htm)

A charitable organisation initially set up to help Wittenoom workers and their families, provides counselling and assistance to people affected by asbestos, advocates and lobbies on behalf of those affected, fundraises for asbestos research and provides community awareness.

- WA Public Health - Asbestos Issues in the home

<http://www.public.health.wa.gov.au/3/1143/2/asbestos.pm>

This WA government website provides a number of links to useful asbestos information including: current asbestos regulations, phone numbers to call if you have asbestos issues such as damaged or dumped in your community; soil contamination; information relating to how to remove asbestos from your home.

- NSW Government Health - Asbestos and Health Risks

[http://www.health.nsw.gov.au/factsheets/environmental/asbestos\\_fs.html](http://www.health.nsw.gov.au/factsheets/environmental/asbestos_fs.html)

Provides some information and contact numbers for more asbestos information throughout NSW.

- Kimberley Smoking cessation protocol for primary health care workers

[http://resources.kamsc.org.au/downloads/cd\\_sces.pdf](http://resources.kamsc.org.au/downloads/cd_sces.pdf)

This resource is freely available for anyone involved in helping people quit smoking. The information is concise, evidence based and regularly reviewed by the Kimberley protocol-writing group.

- Centre for Excellence in Indigenous Tobacco Control

<http://www.ceitc.org.au/welcome-ceitc>

This website includes a wide range of information about smoking cessation relevant for Aboriginal and Torres Strait Islander populations



Baryulg Mine NSW



## REFERENCES:

- <sup>1</sup> Asbestos Diseases Society of Australia Inc 2004, Asbestos Products, Asbestos Diseases Society, viewed 18 August 2011, <http://www.asbestosdiseases.org.au/asbestosinfo/asbestos\_products.htm>.
- <sup>2</sup> National Health and Medical Research Council 2011, Asbestos related diseases, National Health and Medical Research Council, viewed 18 August 2011, <http://www.nhmrc.gov.au/your-health/asbestos-related-diseases#9>.
- <sup>3</sup> Asbestos.com 2001, Friable vs Non-Friable asbestos, Asbestos.com, viewed 18 August 2011, <http://www.asbestos.com/abatement/friable.php>.
- <sup>4</sup> Asbestos Diseases Society of Australia Ltd 2004, History of Asbestos, Asbestos Diseases Society, viewed 18 August 2011, <http://www.asbestosdiseases.org.au/asbestosinfo/historyasbestos.htm>.
- <sup>5</sup> Asbestos Diseases Society of Australia Ltd 2004, History of Asbestos, Asbestos Diseases Society, viewed 18 August 2011, <http://www.asbestosdiseases.org.au/asbestosinfo/historyasbestos.htm>.
- <sup>6</sup> Hills, B 1989, Blue Murder: Two thousand doomed to die - the shocking truth about Wittenoom's deadly dust, South Melbourne, Sun Books, Victoria, Australia.
- <sup>7</sup> Lavelle P 2004, Asbestos, ABC Fact File, viewed 27 August 2011, <http://www.abc.net.au/health/library/stories/2004/04/29/1828906.htm>.
- <sup>8</sup> OCTIEF 2011, Asbestos in Australia, OCTIEF viewed 27 August 2011, <http://www.asbestosaustralia.com.au/>
- <sup>9</sup> The Australian Asbestos Network 2008, Asbestos Inside, The Australian Asbestos Network, viewed 18 August 2011, <http://www.australianasbestosnetwork.org.au/Asbestos+History/Asbestos+at+Home/Asbestos+Inside/default.aspx>.
- <sup>10</sup> Cancer Council of Western Australia 2008, Cancer Myth: Talcum Powder and Cancer, Cancer Council of Western Australia, 18 October 2011, <http://www.cancerwa.asn.au/resources/cancermyths/talcum-powder-myth>.
- <sup>11</sup> Longo WE, Rigler MW, Slade J, et al 1995, Crocidolite Asbestos fibers in smoke from original Kent cigarettes, Cancer Research vol. 55, pp 2232-2235, viewed 10 Jan 2012, <http://cancerres.aacrjournals.org/content/55/11/2232.full.pdf+html>.
- <sup>12</sup> Burton B, 2004, Fund for patients with asbestos induced diseases may run out, British Medical Journal, no. 328, p. 728, viewed online 3 April 2012, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC381352/pdf/bmj3280728c.pdf>.
- <sup>13</sup> McCulloch J, 2007, The Mine at Baryulgil: Work, Knowledge, and Asbestos Disease, Labour History May 2007, viewed 3 April 2012, <http://www.historycooperative.org/journals/lab/92/mcculloch.html#REF20>.
- <sup>14</sup> LaDou J, Castleman B, Frank A, et al. 2010, The Case for a Global Ban on Asbestos, Environmental Health Perspectives vol.118, pp. 897-901, viewed 17 August 2011, <http://cancerres.aacrjournals.org/content/55/11/2232.full.pdf+html>.
- <sup>15</sup> National Health and Medical Research Council 2011, Asbestos related diseases, National Health and Medical Research Council, viewed 18 August 2011, <http://www.nhmrc.gov.au/your-health/asbestos-related-diseases#9>.
- <sup>16</sup> Asbestos Diseases Society of Australia Ltd 2004, The Wittenoom Tragedy, Asbestos Diseases Society, viewed 18 August 2011, <http://www.asbestosdiseases.org.au/asbestosinfo/wittenoom\_tragedies.htm>.
- <sup>17</sup> Asbestos Diseases Foundation of Australia 2011, Asbestos History, Asbestos Diseases Foundation of Australia, viewed on 26 October 2011, <http://www.adfa.org.au/asbestoshistory.html>.
- <sup>18</sup> McCulloch J, 2007, The Mine at Baryulgil: Work, Knowledge, and Asbestos Disease, Labour History May 2007, viewed 3 April 2012, <http://www.historycooperative.org/journals/lab/92/mcculloch.html#REF20>.
- <sup>19</sup> Graham L 1994, Report of the select committee appointed to inquire into Wittenoom, Perth: Legislative Assembly of the Parliament of Western Australia.
- <sup>20</sup> McLeod DW 1984, How the West was Lost: The Native Question in the Development of Western Australia, DW McLeod, Port Hedland Western Australia.
- <sup>21</sup> The Australian Asbestos Network 2008, Lung Cancer, The Australian Asbestos Network, viewed 16 November 2011, <http://www.australianasbestosnetwork.org.au/Asbestos+History/Asbestos+at+Wittenoom/Closure+at+Wittenoom/default.aspx>.
- <sup>22</sup> McCulloch J, 2007, The Mine at Baryulgil: Work, Knowledge, and Asbestos Disease, Labour History May 2007, viewed 3 April 2012, <http://www.historycooperative.org/journals/lab/92/mcculloch.html#REF20>.
- <sup>23</sup> Report of the House of Representatives Standing Committee on Aboriginal Affairs 1984, The Effects of Asbestos Mining on the Baryulgil Community, Viewed on line 10 March 2012, <http://www.aph.gov.au/Parliamentary\_Business/Committees/House\_of\_Representatives\_Committees?url=reports/1984/1984\_pp232report.htm>.
- <sup>24</sup> Report of the House of Representatives Standing Committee on Aboriginal Affairs 1984, The Effects of Asbestos Mining on the Baryulgil Community, Viewed on line 10 March 2012, <http://www.aph.gov.au/Parliamentary\_Business/Committees/House\_of\_Representatives\_Committees?url=reports/1984/1984\_pp232report.htm>.
- <sup>25</sup> The Australian Asbestos Network 2008, Asbestos at Wittenoom, The Australian Asbestos Network, viewed 18 August 2011, <http://www.australianasbestosnetwork.org.au/Asbestos+History/Asbestos+at+Wittenoom/default.aspx>.
- <sup>26</sup> McLeod DW 1984, How the West was Lost: The Native Question in the Development of Western Australia, DW McLeod, Port Hedland Western Australia.
- <sup>27</sup> The Australian Asbestos Network 2008, Asbestos at Wittenoom, the Australian Asbestos Network, viewed 18 August 2011, <http://www.australianasbestosnetwork.org.au/Asbestos+History/Asbestos+at+Wittenoom/default.aspx>.
- <sup>28</sup> Day, WB, 2010, Aboriginal People and Wittenoom, Dr Bill Day, viewed 27 August 2011, <http://www.drilldayanthropologist.com/aborigines-and-wittenoom.php>.
- <sup>29</sup> Asbestos Diseases Society of Australia Ltd 2004, The Wittenoom Tragedy, Asbestos Diseases Society, viewed 18 August 2011, <http://www.asbestosdiseases.org.au/asbestosinfo/wittenoom\_tragedies.htm>.
- <sup>30</sup> The Australian Asbestos Network 2008, Arrival of CSR, The Australian Asbestos Network, viewed 18 August 2011, <http://www.australianasbestosnetwork.org.au/Asbestos+History/Asbestos+at+Wittenoom/Arrival+of+CSR/default.aspx>.
- <sup>31</sup> Layman L, 2008, Who went there, The Australian Asbestos Network, viewed 19 August 2011, <http://www.australianasbestosnetwork.org.au/Asbestos+History/Asbestos+at+Wittenoom/Who+went+there/default.aspx>.
- <sup>32</sup> Day WB, 2010, Aboriginal People and Wittenoom, Dr Bill Day, viewed 27 August 2011, <http://www.drilldayanthropologist.com/aborigines-and-wittenoom.php>.
- <sup>33</sup> Seymour, J 1994, 'Aborigines rue asbestos work', West Australian, 18 November, p.3
- <sup>34</sup> Brown, K 1994, 'Asbestos work a deadly legacy', West Australian, 22 June, p.13.
- <sup>35</sup> Day WB, 2010, Aboriginal People and Wittenoom, Dr Bill Day, viewed 27 August 2011, <http://www.drilldayanthropologist.com/aborigines-and-wittenoom.php>.
- <sup>36</sup> Day WB, 2010, Aboriginal People and Wittenoom, Dr Bill Day, viewed 27 August 2011, <http://www.drilldayanthropologist.com/aborigines-and-wittenoom.php>.
- <sup>37</sup> Day WB, 2010, Aboriginal People and Wittenoom, Dr Bill Day, viewed 27 August 2011, <http://www.drilldayanthropologist.com/aborigines-and-wittenoom.php>.
- <sup>38</sup> Roebourne Asbestos Oral History Project, ongoing work.
- <sup>39</sup> The Australian Asbestos Network 2008, The Beginning, The Australian Asbestos Network, viewed 3 May 2011, <http://www.australianasbestosnetwork.org.au/Asbestos+History/Asbestos+at+Wittenoom/default.aspx>.
- <sup>40</sup> Asbestos Diseases Society of Australia Ltd 2004, The Wittenoom Tragedy, Asbestos Diseases Society, viewed 3 May 2012, <http://www.asbestosdiseases.org.au/asbestosinfo/wittenoom\_tragedies.htm>.
- <sup>41</sup> Musk, AW, de Klerk NH, Eccles JL, et al 1995, Malignant mesothelioma in Pilbara Aborigines, Australian Journal of Public Health, vol. 19, no. 5, pp 520-522.
- <sup>42</sup> ABC Four Corners: Blue Death, 1988, television program, ABC 1, Sydney Four Corners, 23 May.
- <sup>43</sup> Lavelle P 2004, Asbestos, ABC Fact File, viewed 27 August 2011, <http://www.abc.net.au/health/library/stories/2004/04/29/1828906.htm>.
- <sup>44</sup> Workers Health Centre 2004, Asbestos - A major Health Hazard for Workers, Workers Health Centre, viewed 25 October 2011, <http://www.workershealth.com.au/facts031.html>.
- <sup>45</sup> Musk AW, de Klerk NH, Eccles JL, et al 1995, Malignant mesothelioma in Pilbara Aborigines, Australian Journal of Public Health, vol. 19, no. 5, pp 520-522.
- <sup>46</sup> World Health Organization 2011, Asbestos-related diseases, World Health Organization, viewed on 19 August 2011, <http://www.who.int/occupational\_health/topics/asbestos\_documents/en/>.

- <sup>14</sup>Musk AW. 2008. A Dictionary of Diseases. The Australian Asbestos Network, viewed 17 November 2011, <<http://www.australianasbestosnetwork.org.au/Medical+Information/Asbestos+Diseases/A+Dictionary+of+Diseases/default.aspx>>.
- <sup>15</sup>Lee PN. Relation between exposure to asbestos and smoking jointly and the risk of lung cancer. *Occ Environ Med* 2001; 58:145-153.
- <sup>16</sup>Hammond EC, Selikoff IJ, Seidman H. Asbestos exposure, cigarette smoking and death rates. *Ann NY Acad Sci* 1979; 330:473-90.
- <sup>17</sup>Report on the Health Effects of the Asbestos Mines on the Population of the Neighbouring Communities. Prepared for the Ministry of Health in Cyprus by Leonidou Associates in cooperation with the Institute of Cancer Research, UK, April 2005, pp. 13-29.
- <sup>18</sup>Leigh J, Driscoll T. 2003. Malignant mesothelioma in Australia 1945-2002. *Int J Occup Environ Health*, Jul-Sep;9(3):206-17.
- <sup>19</sup>IARC Monographs 2008/2009. Updating the assessments of human carcinogens. International Agency for Research on Cancer. Viewed on 14 November 2011, <[http://www.iarc.fr/en/publications/pdfs-online/breport/breport0809/breport0809\\_IMO.pdf](http://www.iarc.fr/en/publications/pdfs-online/breport/breport0809/breport0809_IMO.pdf)>.
- <sup>20</sup>Reid A, De Klerk N, Musk AW 2011. Does Exposure to Asbestos Cause Ovarian Cancer? A Systematic Literature Review and Meta-analysis. *Cancer Epidemiol Biomarkers Prev*. Jul;20(7):1287-95.
- <sup>21</sup>Safe Work Australia 2010. Asbestos-related Disease Indicators. Safe Work Australia, viewed 14 November 2011, <[http://safeworkaustralia.gov.au/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/538/Asbestos-related\\_Disease\\_Indicators.pdf](http://safeworkaustralia.gov.au/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/538/Asbestos-related_Disease_Indicators.pdf)>.
- <sup>22</sup>de Klerk NH, Armstrong BK, Musk AW, Hobbs MS 1989. Predictions of asbestos-related disease among former miners and millers of crocidolite in Western Australia. *Med J Aust*, Dec 4-18; 151(11-12):616-20. Viewed 14 November 2011, <<http://www.ncbi.nlm.nih.gov/pubmed/2593905>>.
- <sup>23</sup>Berry G 1991. Prediction of mesothelioma, lung cancer and asbestosis in former Wittenoom asbestos workers. *Br J Ind Med*;48: 793-802 Viewed 15 November 2011, <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1035458/?page=1>>.
- <sup>24</sup>Leigh J, Davidson P, Hendrie L. 2002. Malignant Mesothelioma in Australia, 1945-2000. *Ann occup Hyg*, vol. 46, Supplement 1, pp.160-165, viewed 13 November 2011, <[http://annhyg.oxfordjournals.org/content/46/suppl\\_1/160.full.pdf+html?sid=b2b166bd-073a-4889-99d7-31509f4dea38](http://annhyg.oxfordjournals.org/content/46/suppl_1/160.full.pdf+html?sid=b2b166bd-073a-4889-99d7-31509f4dea38)>.
- <sup>25</sup>Olsen NJ, Franklin RJ, Reid A 2011. Increasing incidence of malignant mesothelioma after exposure to asbestos during home maintenance and renovation. *Med J Aust*, Sept 5;195(5):271-274.
- <sup>26</sup>Australian Institute of Health and Welfare 2011. Lung cancer in Australia: an overview. Australian Institute of Health and Welfare. Viewed 17 November 2011, <<http://www.aihw.gov.au/publication-detail/?id=10737420419>>.
- <sup>27</sup>The Australian Asbestos Network 2008. Lung Cancer. The Australian Asbestos Network, viewed 16 November 2011, <<http://www.australianasbestosnetwork.org.au/Medical+Information/Asbestos+Diseases/Lung+Cancer/default.aspx>>.
- <sup>28</sup>The National Lung Screening Trial Research Team 2011. Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening. *The New England Journal of Medicine*, vol.365, no. 5, pp. 395-409.
- <sup>29</sup>Safe Work Australia 2010. Asbestos-related Disease Indicators. Safe Work Australia, viewed 14 November 2011, <[http://safeworkaustralia.gov.au/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/538/Asbestos-related\\_Disease\\_Indicators.pdf](http://safeworkaustralia.gov.au/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/538/Asbestos-related_Disease_Indicators.pdf)>.
- <sup>30</sup>The Australian Asbestos Network 2008. Asbestos Today. The Australian Asbestos Network, viewed 16 January 2012, <<http://www.australianasbestosnetwork.org.au/Asbestos+Today/default.aspx>>.
- <sup>31</sup>The Australian Asbestos Network 2008. Asbestos in your house. The Australian Asbestos Network, viewed 16 January 2012, <<http://www.australianasbestosnetwork.org.au/Asbestos+Today/Asbestos+at+Home/Asbestos+in+your+house/default.aspx>>.
- <sup>32</sup>WorkCover Authority of New South Wales 2011. How to safely remove asbestos: code of practice, WorkCover Authority of New South Wales, 6 July 2012, pp 8, <<http://www.workcover.nsw.gov.au/formspublications/publications/Documents/how-to-safely-remove-asbestos-code-of-practice-3561.pdf>>.
- <sup>33</sup>The Australian Asbestos Network 2008. Removing Asbestos. The Australian Asbestos Network, viewed 16 January 2012, <<http://www.australianasbestosnetwork.org.au/Asbestos+Today/DIY+Renovators+Guide/Removing+Asbestos/default.aspx>>.
- <sup>34</sup>The Australian Asbestos Network 2008. Removing Asbestos. The Australian Asbestos Network, viewed 16 January 2012, <<http://www.australianasbestosnetwork.org.au/Asbestos+Today/DIY+Renovators+Guide/Removing+Asbestos/default.aspx>>.



Near Wittenoom, WA



