Queensland

Regulatory Impact Statement for SL 2003 No. 235

Workplace Health and Safety Act 1995

WORKPLACE HEALTH AND SAFETY AMENDMENT REGULATION (No. 4) 2003

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*Under the Statutory Instruments Act 1992 a regulatory impact statement (RIS) need not be prepared for proposed subordinate legislation if—

(a) it only provides for, or to the extent it only provides for, a matter arising under legislation that is substantially uniform or complementary with legislation of the Commonwealth or another State (section 41(1)(g)); or

(b) it concerns a matter involving an intergovernmental agreement where an assessment of the benefits and costs has already been made and the assessment was made for, or is relevant to, Queensland (section 41(1)(h)).

A RIS was not prepared for the above item of subordinate legislation on the basis that it is substantially uniform or complementary to legislation being enacted in every State and the Commonwealth pursuant to an agreement by the Workplace Relations Ministers' Council to prohibit the use of chrysotile asbestos in Australia.

A RIS in relation to the subject-matter prepared for the National Occupational Health and Safety Commission may be viewed at the following site—

http://www.nohsc.gov.au/PDF/Standards/ hazsubsChrysotileAsbestosRIS.pdf

A copy of the RIS provided to the Queensland Government is attached.

REGULATORY IMPACT STATEMENT

OF THE

PROPOSED PHASE OUT

OF

CHRYSOTILE ASBESTOS

November 2001

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EXECUTIVE SUMMARY

1. Background

This document is referred to as the Stage II Regulatory Impact Statement (RIS) on a proposed phase out of the uses of chrysotile asbestos in Australia, including manufacture for the purposes of export.

2. Problem

The following problems have been identified:

1. Chrysotile asbestos has a long history of use in Australia, both in its raw material form and in manufactured products;

2. Chrysotile continues to be used in Australia today and thus many Australians, particularly workers, are exposed to it;

3. Chrysotile is a known carcinogen;

4. Business must adopt a variety of practices to ensure the protection of workers and the environment, including health surveillance, air monitoring and waste disposal;

5. Chrysotile exposure can be linked to specific diseases which cost the community in financial and social terms;

6. Surveys on the use of asbestos alternatives indicate that substitution is occurring in many industries;

7. The substitute materials have not been classified as carcinogenic to humans; and

8. The European Commission, United Kingdom Health and Safety Executive and US Consumer Product Safety Commission have introduced a ban on the importation and use of products containing Chrysotile asbestos, with limited exemptions.

3. Objectives

The Objective of the proposed phase out of Chrysotile is stated to be:

a) To reduce future death and illness from exposure to chrysotile fibres from the current and future importation, manufacture and processing of chrysotile asbestos into products containing chrysotile asbestos.

b) To undertake this reduction in a cost-effective manner within an appropriate time frame.

4. Options

The following alternative approaches to the achievement of the Objective have been considered in this Regulatory Impact Statement so as to comply with the requirements of COAG.

- Maintain the Status Quo (Base Case)
- Legislative Prohibition / Ban Phased In
- Reduction in the National Exposure Standard

Consideration has also been given to a discussion of the following Options:

- Enforcement of the Existing Exposure Standard
- Information and Education Program
- Voluntary Withdrawal by Industry

5. Recommended Option 2

This RIS indicates the recommended option which will best achieve the objectives is a legislative prohibition/phase in (Option 2). This will eliminate future death and illness from exposure to chrysotile in a timely manner. This Option is consistent with Regulatory approaches in a growing number of overseas jurisdictions.

Both the Base Case Option 1 and Option 3 to reduce the National Exposure Standard do not meet the objective as effectively as Option 2. Both alternatives to the recommended Option permit continued exposure to chrysotile, a known carcinogen, and therefore an accompanying level of future death and illness.

In recommending Option 2, the following points should be noted:

i. There is insufficient information available on the safety of alternative materials, to prepare a complete assessment of the impact of a phased prohibition on chrysotile asbestos.

ii. While the risks associated with chrysotile exposure and control procedures are well known, the risks and therefore appropriate controls and associated costs for the alternative materials, are not as well understood.

iii. Therefore there is a significant need for ongoing study and monitoring of the safety of the alternative materials This should include ongoing research into the adverse health effects associated with exposure to alternative materials, and the development of appropriate risk control procedures.

iv. Compliance costs are a critical factor in the overall calculations of net benefits. While compliance costs under various exposure standards levels may be similar, there is little information on current compliance with existing standards. If a prohibition involves similar compliance costs, the savings from a prohibition may be substantially reduced.

v. In the event of a prohibition on the uses of chrysotile, it is anticipated exemptions will be required in areas where no suitable substitute material exists or in areas of the national interests, for example, in defence. In the example of the Dept. of Defence [Potential Exemptions 2.3.9(b)], while costs cannot be estimated, the procurement of lifetime supplies of stock would translate into a significant cost should an exemption not be granted. However, this would be considered against the costs associated with continued exposure to chrysotile

In summary:

?? The Base Case results in a range of costs to the community from continuing health costs to affected workers and costs to business to mitigate where possible these health impacts.

?? The Base Case fails to achieve the outcomes required in the Objective, namely to reduce death and illness associated with current and future exposure to chrysotile asbestos.

?? Option 3 achieves the outcomes required in the Objective, namely to reduce death and illness associated with current and future exposure to chrysotile asbestos however not to the same extent as that of Option 2.

?? There will still be deaths from exposure at 0.1 f/ml.

?? In addition, Option 3 may impose additional costs on business to comply with the lower exposure standard.

6. Impact Analysis of Option 2

The following impacts, both financial and qualitative, are expected to occur from the introduction of a legislative prohibition on the use of chrysotile phased-in over a period of three years:

?? Employees

The number of employees exposed to chrysotile in the workplace ranges from estimates of 10,300 to 22,300.

The impact on employees of the proposed phase out primarily relates to improved health outcomes. These health outcomes have been quantified and expressed as savings in the potential costs of death and illness. Over 40 years at a discount rate of 8% this results in total savings of $24,187,896.

These savings are represented by savings in treatment costs, statutory compensation costs and the value attributable to the productive potential of a human life.

In addition, qualitative benefits include a reduction in stress and discomfort of other family members, improvements to the environment particularly around busy road intersections and freeway exits.

?? Large Business

A phase out of chrysotile in production will require two major manufacturers to invest capital in processing plant enhancements to better utilise substitute materials. This cost to large business has been estimated at $8,300,000 in the first year of the phase out to ensure all processing plants are upgraded in time.

In addition, manufacturers will be required to purchase raw material substitutes which are expected to cost more than the asbestos raw material used presently. As an input to production of friction materials, asbestos (and its substitutes), account for only a minor proportion of the total raw materials used in manufacture. The major manufacturers believe that an increased purchase volume of substitute raw materials for this industry sector will have no downward impact on the cost of these substitute raw materials over time. Thus recurrent cost increases of some $1,098,900 have been forecast following the phase out of chrysotile.

Furthermore it has been assumed that there may be some savings to business from relaxation of the current OH&S requirements regarding Waste Disposal and Health Surveillance of workers.

These savings to all businesses was estimated to be $1,179,000 per annum in reduced Waste Disposal costs, $640,000 per annum in reduced new and departing employee medical examinations together with $2,560,000 every three years for the remaining employees medical examinations.

?? Small Business

The major cost impact on small businesses in the processing and end use sectors is expected to be higher priced substitute end use products. It is envisaged that asbestos substitutes are some 15 to 20% higher than asbestos based products.

It is assumed that once asbestos is banned, market forces will drive the cost of non-asbestos products down to converge with the asbestos products filling various market price points. With increased volumes and availability of non-asbestos alternatives, it is envisaged that the cost differential will eventually be reduced.

?? Government

There is expected to be initial one-off costs for relevant State and Territory or Commonwealth government authorities associated with the adoption of the national requirements into their legislative frameworks. These costs would typically come out of the existing jurisdiction budgets and simply represent a shift in focus from their administration and enforcement role to that of communication, education and increasing public awareness. This change in focus is not expected to be sustained for any great period.

?? Comparison of Cost Impact for Proposed Phase Out

The comparison of those impacts able to be quantified are provided in the Table below. This Table uses the National exposure standard of 1.0 fibre/ml, the maximum number of exposed

employees, the lower figure used for the value of human life, and a 5% annual cost for mesothelioma.

Item	**Phase Out Option Assumptions**	**Present Value $ Over 40 yrs @ 8%**
Savings in Death & Illness:		
Exposure standard	1.0 f/ml	
Number of Persons Exposed	22,300	
Value of Human Life Cost of Lung Cancer + Mesothelioma	$1.5 million $667,000*1.05	$24,187,596
Savings in Business Compliance Costs:		
Savings In OHS Controls	Waste Disposal & Medical Exams only	$29,511,511
	Present Value Benefits:	**$53,699,107**
Increase in Costs to Business:		
Incr. Cost of Substitutes Small Business	20% brakes 17% gaskets	($6,014,403)
Capital & Recurrent Costs to Large Business	$ 8.3 million Yr 1 $1,098,900 p.a.	($20,789,143)
	Present Value Costs:	**($26,803,546)**
	Net Result:	**$26,895,561**

?? Sensitivity

Analysis of the impacts showed that there were key areas to which the costs and benefits were particularly sensitive.

1. Phase Out Period adopted;
2. Number of workers exposed in end use.
3. Compliance Costs Savings; and
4. Cost convergence of Asbestos substitutes.

A Summary of the resultant scenarios is provided in the Table below. Detailed explanation of each of the nine scenarios is provided in Attachment 4.

Key Assumptions	**Net Present Value over 40 years at 8%**			**Discussion**
	Scenario 1	**Scenario 2**	**Scenario 3**	
Timeframe for Phase out	$26,895,561 3 Years	$17,486,930 5 Years	-$2,327,666 10 Years	Highly sensitive to changes in the phase out period. The shorter the period the higher the NPV. A longer phase out means a continuation of costs associated with illness, and other business costs, which will lower the overall NPV (see NOTE 2 below).
	Scenario 4	**Scenario 5**		
Workers Exposed	$26,895,561 22,300 workers	$13,880,157 10,300 workers		Highly sensitive to the number of workers exposed. However, halving the estimated number of workers exposed still results in a positive NPV.
	Scenario 6	**Scenario 7**		
Compliance Cost Savings	$26,895,561 Selected cost savings	-$2,615,951 No cost savings		If business were to experience no savings in the costs of complying with OH&S controls then the NPV becomes slightly negative.
	Scenario 8	**Scenario 9**		
Substitutes & Cost Convergence	$26,895,561 Costs converge	-$46,507,961 Cost do not converge		The proposal is highly sensitive to the cost of substitute brakes and gaskets remaining some 17 to 20% higher than the asbestos products over the next 40 years.

NOTE 1: Despite the above findings, which show the proposal to be highly sensitive to changes in the underlying assumptions, it is also important to note that it has not been possible to fully quantify the current cost to the community of illnesses such as asbestosis and other malignancies arising from chrysotile exposure. Hence the "Net Present Value" is not a complete quantification of all quantitative impacts and thus should be used as a guide to decision making only.

NOTE 2: The NPV reflects the net benefits derived from the following annual (unless otherwise stated) cash flows:

- Benefits each year from savings in health and illness ($2.194m)
- Benefits each year from reduction in business costs of waste disposal ($1.179m);
- Benefits each year from reduction in business costs of medical exam ($0.64m)
- Benefits every 3 years from reduction in business costs of medical exam ($2.56m)
- Less costs imposed on small business each year during the phase out period only ($6.66m)
- Less costs imposed on large business each year ($1.098m).
- Less costs imposed on large business in Year one only from investment in new production equipment ($8.3m)

Based on the assumptions underlying Option 2, the Benefits exceed the Costs over 40 years resulting in a positive net present value. Furthermore, based on the assumptions underlying Option 2, the impact on the timing and quantum of these cash flows over

various phase out periods, sees the net present value of this Option diminish as the phase out period extends.

It is evident that under Option 2, the Year 1 Costs exceed the Year 1 benefits and by the end of the phase out period (Year 3), the Benefits then begin to outweigh the costs, resulting in a positive net present value over the 40-year period of the analysis. Thus, as the phase out period extends it takes longer for the Benefits to commence outweighing the costs on an annual basis resulting in a lower positive net present value. Based on the above Scenario analysis it would appear that were the phase out period adopted to approach ten years, the costs to business would have outweighed the offsetting benefits to business and workers.

7. Consultation

The Government has consulted widely during the development of the policy on the proposed phase out of Chrysotile asbestos and listened to the concerns of industry. The policy has been developed in consultation with peak industry bodies and a wide range of interested consumer and employee representatives.

All major manufacturers indicated that they had been working towards the development of and use of asbestos substitutes in their manufacturing processes for many years and were aware of the impending prohibition. Most industry members believed they would be able to implement fully a ban on the use of chrysotile within three years.

As part of the consultation on the principles, industry raised the following issues which will be incorporated into the implementation plan:

- Ban on imports of asbestos products to be enforced to ensure no unfair competition;
- Some current users may require an exemption to be granted from the proposed prohibition.

8. Implementation and Review

NOHSC proposed that Chrysotile Asbestos be included in Schedule 2 of the National Model Regulations for the Control of Workplace Hazardous Substances and that it will then be the responsibility of each jurisdiction to give effect to the proposed Chrysotile Phase-Out by way of their own legislation.

In addition, in response to the great uncertainty surrounding actual exposure noted in this RIS and the NICNAS report, it is recommended that further research be undertaken to determine actual exposure to Chrysotile and its substitutes in the Community and the impact of that exposure on health.

NOHSC will continue to conduct a periodic review of the reform process to ensure the objectives are being achieved.

1. INTRODUCTION

1.1 The Regulatory Impact Statement Reported Herein

This document is referred to as the Stage II Regulatory Impact Statement (RIS) on a proposed phase out of the uses of chrysotile asbestos in Australia, including manufacture for the purposes of export.

The objective of the Stage II RIS is to address comment received on the Stage I EIA and provide the necessary enhancement, detailed below, to ensure the regulatory impact requirements of the Commonwealth Government and the Council of Australian Governments (COAG) are met.

In particular, the Stage II RIS:

1. Provides the necessary enhancements and modifications arising from the comment and submission on Stage I of the EIA, and which:
    a) Provides a cost-effectiveness comparison of asbestos products and their non-asbestos alternatives (specifically in the road vehicle – friction products market), estimating market costs of alternatives prior to and following the imposition of a prohibition of chrysotile products.
    b) Assesses the costs and benefits over a range of time periods assuming that a prohibition could be implemented by the end of 2003.
    c) Investigates the effect of proposed exemptions to the ban.
    d) Provides an assessment in qualitative terms of the relative costs and benefits of reducing the national exposure standard as a second alternative option to a prohibition [Note: Stage I EIA discussed the status quo as an alternative option].
    e) Documents any surveys and or consultation with relevant parties.
2. Allows an objective assessment of the data with sensitivity analysis allowing for different options and areas of uncertainty to be compared by altering the major parameters outlined in (a) above.

1.2 Contents and Report Structure

The RIS comprises the following Sections:

1. Problem Identification.
2. Specification of the Desired Objectives.
3. Identification of Options.
4. Assessment of Impacts of each Option.
5. Risk and Uncertainty Analysis.
6. Conclusion and Recommended Option.
7. Further Reading and Methodology.

The RIS also comprises attachments and appendices which provide the impact analysis/ discounted cash flow spreadsheets, a list of persons consulted and their views, a summary of the Sensitivity Analysis conducted and an Extract from the National Competition Policy.

1.3 Acknowledgments

The authors acknowledge the input to the development of this Impact Statement that was provided by a number of people and businesses with whom consultation was undertaken during its preparation. Those consulted are listed in Appendix 1 together with a summary of their views.

In particular, we acknowledge the contribution made by NICNAS in their Report which contains an extensive summary of the issues surrounding exposure to chrysotile asbestos and of the academic and other papers written that demonstrate the health impacts of exposure. This Report has been extensively drawn on in the preparation of this Impact Statement.

2. PROBLEM IDENTIFICATION

2.1 Overview

In this Section of the RIS we outline the nature of the problem which the proposed Regulatory Options are attempting to overcome.

In summary, the following matters are discussed:

1. Chrysotile asbestos has a long history of use in Australia, both in its raw material form and in manufactured products;

2. Chrysotile continues to be used in Australia today and thus many Australians, particularly workers, are exposed to it;

3. Chrysotile is a known carcinogen;

4. Business must adopt a variety of practices to ensure the protection of workers and the environment, including health surveillance, air monitoring and waste disposal;

5. Chrysotile exposure can be linked to specific diseases which cost the community in financial and social terms;

6. Surveys on the use of asbestos alternatives indicate that substitution is occurring in many industries;

7. The substitute materials have not been classified as carcinogenic to humans; and

8. The European Commission, United Kingdom Health and Safety Executive and US Consumer Product Safety Commission have introduced a ban on the importation and use of products containing Chrysotile asbestos, with limited exemptions.

2.2 History of Chrysotile Use in Australia

2.2.1 Past Use

In the past, Australia has mined and imported asbestos.

Chrysotile was mined in Australia for over 100 years with production ceasing in 1983. The mining of chrysotile peaked during the 1970's in which period a total of 400,000 tonnes was produced. When production ceased in 1983, production volumes had fallen to 55,000 tonnes. An additional 20,000 tonnes was imported in that year.

2.2.2 Current Use

Raw chrysotile continues to be imported into Australia. However, volumes have fallen significantly to between 1,000 and 2,000 tonnes per annum over the past 10 years and are now relatively static.

Raw chrysotile is used in Australia to manufacture friction materials such as brake pads, brake linings and brake blocks and in the manufacture of gaskets. These manufactured

products are sold to both local and overseas markets. While many of the overseas markets for these products are also considering a phase-out of chrysotile asbestos, some Asian countries are not and to that extent any proposal to phase-out chrysotile will impact on Australian exports.

Similar chrysotile products are also imported.

Raw chrysotile is also used in the manufacture of non-sag adhesive putties for the building industry.

Base data profiling Australian business uses of chrysotile are provided below:

1. **Employers total 7860 comprising:**

   3 Manufacturers in total comprising:

   - 2 manufacturers that are **Large** (employ > 100)
   - 1 manufacturer that is **Small** (employ < 100)

   7857 Processing & End Use comprising [1] :

   - 1 processing & end use that is Large (employ > 100)
   - 7,856 processing & end use that are Small (employ < 100)

     The 7,856 small processing and end use employers cover some 33,000 separate work sites (repair shops) [2].

2. **Employees Exposed to Chrysotile:**

   It is estimated that some 300 persons employed in Manufacturing are exposed to Chrysotile in the workplace.

   It is estimated that some 10,000 to 22,000 persons employed in Processing and End Use [3] are exposed to Chrysotile in the workplace.

3. **Chrysotile:**

   Volume Raw Imported (1,500 Tonnes)

   Volume End Use Imported for Small Business Use:

   - Brake Linings (860,000 Kits for 4 Wheels)
   - Clutch Linings (6,000 Units)

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1 From NICNAS Report page 39. This assumes that the majority of exposure is in the 'automotive repair and services' industry. ABS statistics state that there are 55,000 persons employed in that industry. ABS data also indicates that the average number of employees per business is 7. Thus it is deduced that there are 7,857 businesses involved.

2 Australian Automotive Aftermarket Association Ltd estimates 33,000 repair shops nationally, 2,500 retailers and in excess of 100 companies involved in the manufacture, importation and distribution of automotive friction and gasket materials.

3 NICNAS estimated up to 10,000 workers are intermittently exposed to chrysotile during end use. The Victorian Asbestos Diseases Society are of the opinion that this figure is likely to be a significant underestimate given the total number of workers in the "automotive repair sector" as provided by the ABS above. Victoria WorkCover, in their submission to the Stage I EIA, state that advice they have received from the VWA Inspectorate suggest an estimate of 2 in 5 employees in the automotive repair industry would be exposed (55,000/5 x 2 = 22,000) given the "hands-on" nature of the work.

?? Gaskets (200,000 Units – Industrial and Automotive Combined)

Dollar Value End Use for Small Business Use:

?? Brake Linings range from $15-$40

?? Clutch Facings range from $180-$240

?? Gaskets (Automotive) range from $100-$120

?? Gaskets (Industrial) N \ A

The discount rate Per Annum used in this RIS is 8%.

2.3 Chrysotile Link to Death and Disease

2.3.1 Overview

The information in this Section is summarised from the NICNAS Report (*op cit*). All forms of asbestos, including chrysotile, are classified by regulatory authorities as carcinogenic to humans.

Workers continue to be exposed to chrysotile during warehousing and distribution, manufacture, processing and end-use of products containing chrysotile. The major route of worker exposure is inhalation.

Additionally, asbestos is still present in the Australian community as a result of past uses, when it was commonly used over substantial periods of time. These past uses include importation and mining of raw asbestos, together with products such as seals, compressed asbestos fibre sheeting, which currently still exist *in situ*. However, assessment of exposure from past uses was considered outside the scope of the NICNAS Report as such exposure was believed to be adequately dealt with by local government authorities and under existing regulation and controls.

In Australia, imports of raw chrysotile are used mainly in the manufacture of friction materials and sheeting for gasket production with a small quantity being used in the manufacture of a 'non-sag' additive in an epoxy resin adhesive. All these uses, according to manufacturers, are being phased out, although it is noted that such claims have been made for a number of years.

2.3.2 Brake Linings and Gaskets

Brake linings and gaskets were found to be the main asbestos products imported for use in Australia. Most clutch facings (approximately 99% in number) for both automotive and industrial applications are now asbestos free. Chrysotile brake linings are imported for industrial applications and use in passenger motor vehicles, although most linings imported for these applications are also non-asbestos products.

According to the NICNAS Report, the use of brake blocks in Australia is declining; the predominant use of which was found to be for industrial applications (such as railway industry and mining equipment). A significant percentage of these brake blocks are non-asbestos.

Investigations indicated that a significant number of non-asbestos gaskets are being used for industrial applications, however there continues to be large numbers of asbestos gaskets still used.

Exemptions may be necessary surrounding older vehicles originally manufactured for the installation of asbestos based braking equipment. It has been suggested to NOHSC that vehicles older than 1973 be exempted from the prohibition on chrysotile importation. It is unclear however, what proportion of the Australian vehicle market this exemption would represent. Refer to Section 2.3.9(b) below for further assessment of the impact of proposed exemptions.

2.3.3 Vehicle Original Equipment Manufacturers

In the new vehicle importing and manufacturing industries, only one company reported the use of asbestos 'original' equipment (in two of their current models). The remaining companies surveyed, used non-asbestos original equipment.

The majority of these companies reported that they have policies in place regarding not using asbestos products.

2.3.4 Industrial Equipment

The majority of industrial equipment and machinery, such as agricultural machinery, have non-asbestos original equipment. A significant number of these companies that make this equipment and machinery use non-asbestos parts in both superseded and new equipment and machinery. Most of these companies stopped using asbestos parts in the late 1980s.

2.3.5 Aircraft Industry

In the aircraft industry, asbestos parts are still being used in new and older aircraft (such as gaskets and seals). However, in this industry there is a continued effort towards the identification of possible substitutes.

Exemptions may be necessary surrounding asbestos parts used by the Australian Defence Forces for some equipment (helicopters and aircraft). NOHSC has advised that, following recent discussions with the Defence Force, whole of life spares are purchased and while a non-asbestos procurement policy can be introduced for the future, past stocks will last some 20 to 30 years and be at significant economic cost to the community if all were to be replaced. Refer to Section 2.3.9(b) below for further assessment of the impact of proposed exemptions.

2.3.6 'One-off' Uses

A small number of 'one-off' uses for asbestos products were also identified. These products include blades in high vacuum pumps, asbestos yarn in packing, asbestos gloves and asbestos washers for oil flame safety lamps (used by miners). Investigations indicate that importation of asbestos fibre cement products is very unlikely.

2.3.7 Areas of Concern

Chrysotile is a known human carcinogen and has been classified as such by NOHSC. As with other forms of asbestos, chrysotile can cause asbestosis, lung cancer and mesothelioma in humans and animals in a dose related manner. The Australia Mesothelioma Program reports that Australia has the highest incidence of mesothelioma in the world [4].

Controversy exists over the potency of chrysotile in relation to other forms of asbestos (crocidolite, amosite and tremolite) and whether asbestosis is a prerequisite for cancer and hence, whether a level of exposure for chrysotile exists, below which there would be no risk to human health (i.e., an exposure threshold for carcinogenic effects).

As such, linear extrapolation methodology was used by NICNAS to provide a conservative estimate of risk.

2.3.8 Risk to Workers

Risk estimates for lung cancer in workers appear to be dependent on both cumulative exposure and the type of industry where exposure has occurred. NOHSC [5] has estimated the lifetime risk of lung cancer, based on the best available epidemiological data (from friction products industries overseas) as up to 173 additional cancers per 100,000 workers exposed to a daily average of 1 chrysotile fibre per millilitre of air inhaled.

Extrapolation for lower exposures provides lifetime risk estimates (per 100,000 population) of 86, 43 and 17 for exposure to 0.5, 0.25 and 0.1 f/ml, respectively. Refer to the summary provided in the Table below.

Table 1: Risk of Lung Cancer at Various Levels of Exposure to Chrysotile

Exposure In Fibres/ml	Risk [6] (per 100,000 Persons Exposed)
1	173
0.5	86
0.25	43
0.1	17

The relationship between risk and exposure levels is provided in the diagram below [7].

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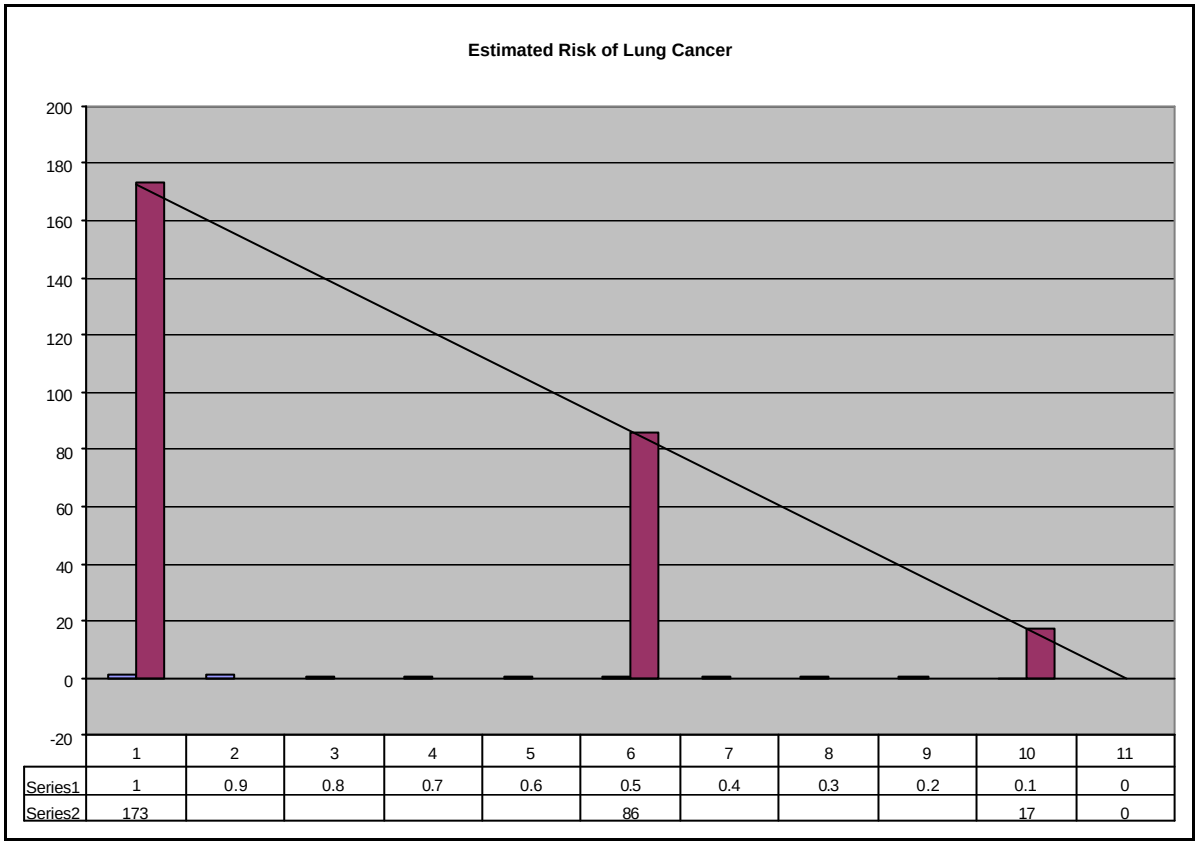
4 Leigh J, Hull B and Davidson P (1997) Malignant Mesothelioma in Australia (1945 – 1995), Annals of Occupational Hygiene, 41 (Supplement 1).

5 NOHSC: (Chrysotile White Asbestos) Proposed National Exposure Standard for the Occupational Environment: Preliminary Impact Analysis of the Proposed National Exposure Standard (Draft) Australian Government Publishing Service, Canberra, 1995.

6 Cumulative risk for lung cancer in Australian male population has been used in this calculation (that is, 7,200 / 100,000 assuming mixed smoking habits)

7 NICNAS PEC Report No. 9. Chrysotile Asbestos, February 1999, page 70.

Figure 1: Estimated Risk of Lung Cancer



	1	2	3	4	5	6	7	8	9	10	11
Series1	1	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0
Series2	173					86				17	0

There are many factors surrounding risk estimates for chrysotile exposure, the most important of which are:

- the possibility of a 'threshold' effect;
- possible co-exposure to other fibre types; and
- inaccurate estimates of historical exposures and the influence of tobacco smoking.

Conclusions by scientific experts in a recent consensus report [8] identified by NICNAS were:

- that all asbestos fibres can cause mesothelioma, but amphiboles are more potent carcinogens for the mesothelium;
- that low level exposure to asbestos is sufficient to cause mesothelioma;
- that cumulative exposure to 25 fibre-years (fibre.year/ml) is sufficient to cause lung cancer; and

[8] Meeting held in Helsinki in January 1997 of international experts (reported in NICNAS page 101)

?? that asbestosis is not a necessary prerequisite for lung cancer.

2.3.9 Exposures Arising from Current Use

2.3.9(a) Occupational Exposure

Exposures of most concern are those where friable chrysotile may be generated. Occupational exposure may arise from the manufacture of compressed asbestos fibre (CAF) sheeting and other products (mainly friction products) and during processing and end-use (replacement) of these products, where public exposure may also occur. The major route of exposure is inhalation.

The actual level of chrysotile asbestos to which workers are exposed to across Australia is very uncertain. Whilst the national Exposure Standard is 1 fibre per ml (and this is why this Standard has been adopted as the Base Case exposure) there is some evidence that actual occupational exposure, in some cases, is below this.

This evidence is based primarily, however, only in the "friction product" manufacturing industry which has regularly and scientifically measured workers exposure. While these measurements have revealed a high proportion of exposures under 1 fibre/ml this represents a very small proportion of workers (300) potentially exposed Australia-wide.

Air monitoring data were provided by two manufacturers of chrysotile products, namely Bendix Mintex and Richard Klinger.

Data for the period 1992 to 1997 (for Bendix Mintex), indicated that more than 80% of personal samples were less than 0.1 f/ml. Only two samples during this period exceeded 0.5 f/ml.

Monitoring data (1991-96) at Richard Klinger (Perth site, where raw chrysotile is handled), indicated that approximately 60% of the personal air samples were less than 0.1 f/ml, with only one sample exceeding 0.5 f/ml. Personal and static samples for the years 1989, 1991, 1993 and 1995 at Richard Klinger (Melbourne site, where production of gaskets takes place) were all less than 0.05 f/ml (static exposures below 0.01 f/ml). Air monitoring data from other sources were also assessed, which included an automotive aftermarket survey of service garages in Western Australia where exposure levels were found to be less than 0.1 f/ml.

Vivacity Engineering, who manufacture an epoxy resin adhesive containing chrysotile, has not conducted air monitoring during manufacturing processes. However, once in place, the hardened adhesive is not considered to be of concern.

The remaining number of workers exposed Australia-wide, some 10,000 to 20,000, remain at risk and are subject to the vigour with which their employers comply with relevant State and Territory legislation. A recent survey conducted by NSW WorkCover (see Table 2) suggest that employers in the small business sector typically have low compliance rates. It is noted however, that this survey was conducted shortly after the introduction of new Hazardous Substances Legislation and may account for the poor awareness of its requirements.

As with exposure, the actual level of compliance with OH&S requirements across the Australian workforce, particularly small business is not known. The government does not

routinely or systematically collect data on compliance or exposures. Only "snapshots" are taken from time to time. For details on the role government plays in enforcement refer to Section 3.5.1 below.

Whether low compliance rates translate into high exposure is not known. However, following release of the Stage I EIA, comment was received from NSW WorkCover, Victorian Work Cover and the ACTU which suggested that employees in the Automotive Repair industry could have poor protection and be exposed to higher levels of asbestos.

The NICNAS Automotive Aftermarket Survey showed that exposure to friable asbestos is highest in the brake bonding industry during grinding of brake shoes and cutting of brake linings. The highest personal monitoring result obtained was 0.16 f/ml, during machining of brake shoes. Work in the brake bonding industry is declining due to the availability of brake pad and clutch kits (preformed to standard sizes) which do not require modification before installation. However, it was reported that 90% of current activities in this industry sector involve asbestos-containing material.

International monitoring results in service garages indicated exposure levels were generally below 0.2 f/ml. Data for personal and static short-term sampling in workshops involved in the removal (wet) and replacement of asbestos gaskets were < 0.05 and < 0.03 f/ml respectively. However, higher exposure levels were noted during the 'dry' removal of gaskets (up to 1.4 f/ml).

Both national and international data indicate that present exposure levels are lower than in the past. Reduced exposure levels could be due to increased awareness of the hazardous effects of chrysotile among workers and/or due to implementation of regulatory controls and better work practices (e.g. prohibition of use of compressed air to blow asbestos dust and diminished use of grinders) during brake and clutch servicing.

Monitoring results also indicate that over the past decade, the majority of exposures were below the current NOHSC national exposure standard (1 f/ml) for chrysotile (although this standard is under review). However, it should be noted that this standard relates to exposures where chrysotile is the *only* asbestos fibre present. Where other forms of asbestos (such as amosite or crocidolite) are present, or where the composition is unknown, the NOHSC TWA exposure standard is 0.1 f/ml [9].

Following the introduction of the NSW Occupational Health and Safety (Hazardous Substances) Regulation in 1996, during 1997 and 1998 NSW Workcover surveyed several brake and clutch specialist vehicle workshops in the Newcastle region of NSW and the percentage of workshops in each of the following categories were found to be:

Table 2: NSW WorkCover Survey of Vehicle Repair Workshops

Category	Percentage
Aware of the use of asbestos products in the Workshop	75
Used mostly asbestos linings	50

[9] NOHSC: Exposure standards for atmospheric contaminants in the Occupational Environment and National Exposure Standards (NOHSC: 1003) 1995.

Using asbestos linings sometimes	50
Have a grinder on the premises	25
Have local exhaust ventilation fitted to grinders and linishers	25
Have a linisher on the premises	17
Provide Personal Protective Equipment (PPE)	17
Have records of testing of local exhaust ventilation	8
Have completed a risk assessment	8
Have carried out air monitoring	8
Have carried out health surveillance	8

The results of the survey, although small in number, indicate the level of awareness and compliance with the NSW Occupational Health and Safety (Hazardous Substances) Regulation 1996 soon after its introduction was poor.

NSW Workcover go on to conclude that this is consistent with what is found generally with small business.

2.3.9(b) Potential Exemptions

It is noted that in the aviation sector, new planes all use non-asbestos friction materials. There are a number of light aircraft in service which use asbestos-based friction materials in the brake system. In the tightly regulated aviation sector, however, the brake friction materials can only be replaced by an 'approved' component and the supply and installation processes for replacement of components is tightly controlled.

There are a number of other components using asbestos in aircraft, such as high temperature clamps and spacers in jet engines. In the UK, regulations permit a range of components in aircraft which contain asbestos-based products and which are considered essential to safe operation [10].

In the petrochemical industries, non-asbestos seals can be used in most applications and asbestos products are being phased out as old plants are de-commissioned. In the UK, the only application where asbestos may continue to be used is in a diaphragm for chlorine pumps [11]. With that exception, worker exposure to asbestos in these industries will disappear as old plants are phased out.

As a result of public comment received on the Stage I EIA, the following additional exemptions have been proposed.

Table 3: Proposed Exemptions

Exemption Proposed	Impact

[10] *Technical Assessment of the Impact of a Phase Out of Use of Chrysotile Asbestos in Australia*, Alross Pty Ltd, July 2000.

[11] Alross Report, *op cit.*

Motor vehicles brake linings and pads for light vehicles manufactured prior to 1973.	An ABS survey in 1995 found that 4% of Australian vehicles were in excess of 25 years old. While still under review, the AAAA has suggested that the industry does not want a large and potentially confusing list of exemptions. They proposed that an Implementation Monitoring Committee be formed to draft the list of exemptions containing representatives from the repair industry, the Aftermarket Association and vintage and veteran car club representatives. If these cars were to be allowed to continue to use asbestos brakes then to assess the impact it will be necessary to assess the number of such cars and the related impact on persons who are called upon to repair and service these vehicles.
CSIRO testing laboratories	The CSIRO in its role in scientific research has a need to perform tests on asbestos materials and substitutes from time to time.
Defence Force Helicopters and Aircraft	Asbestos spare parts. The Defence Safety Management Agency has a *no asbestos* procurement policy but may need to use current stock for older equipment that was designed for the use of asbestos. By letter dated 20 June 2001 from the Minister for Defence to the Minister for Employment, Workplace Relations and Small Business, it is stated that "a prohibition and three year phase out of chrysotile asbestos could have a significant impact on the operational capability of the Australian Defence Force. Defence believes that the phase out may take five or more years to achieve because asbestos products are found in operationally critical equipment including aircraft, helicopters, ships, vehicles and artillery carriers. Equipment modification will require highly specialised technical changes that may not be achievable. Defence maintains large stocks of spare parts for its operational capacity. For example, in the Navy alone over 130,000 combinations of asbestos related equipment have been identified. In this regards, the Defence organisation may need to apply for some exemptions." By letter dated June 2001 from the Regulatory Services Division of Comcare Australia, it is stated that "it is anticipated that Defence will request exemptions in relation to particular applications that utilise spare parts containing chrysotile. An alternative option is provided for in Section 7 of the Occupational Health and Safety (Commonwealth Employment) Act. This Section provides for the Chief of the Defence Force, after consulting the Minister for Employment, Workplace Relations and Small Business, to declare that specified provision of the Act which would be prejudicial to Australia's Defence either do not apply to the Defence Force or are subject to specific modifications and adaptations." The letter from Comcare Australia goes on the state that

	the following Agencies also use asbestos and exemptions may be sought by them. These Agencies include: ?? Australian War Memorial; ?? National Museum of Australia; ?? Commonwealth Scientific and Industrial Research Organisation; and ?? Environment Australia (Antarctic Division).

2.3.9(c) Public

The major source of public exposure is from chrysotile dusts generated by vehicle braking, although the level of exposure is very low.

Overseas and Australian studies showed very low air levels of chrysotile fibres at busy intersections (less than 0.01 f/ml) or freeway exits (0.5 fibres/ml), generated by braking vehicles [12]. At a location of 30 metres from the nearest traffic, air levels were below the limit of detection.

There are no data on exposure of home mechanics during the changing of brake pads and shoes. However, the time-weighted exposure of home mechanics is unlikely to be higher than that of workers in automotive brake service centres due to the infrequent nature of such activities by home mechanics.

2.3.9(d) Environment

When chrysotile is encapsulated in end use products such as brake linings and epoxy-resin adhesives, it is unlikely that fibres will be in a form where an environmental hazard is posed. Based on available data for Australia, it can be predicted that the manner of use of chrysotile (including release from driving and wastes from manufacturing) as outlined in the NICNAS Report [13], will result in a low exposure and hazard to the environment.

2.3.10 Specific Diseases

The following diseases are causally linked to exposure to chrysotile asbestos.

Any one instance of the disease results in the following cost ranging from treatment costs to court settlements [14].

Table 4: Diseases Linked to Chrysotile and Treatment Costs per Person

Disease	Treatment	Statutory Compensation	Judgements & settlements	TOTAL COSTS
Asbestosis	$2,200 survival 20 years	$30,000	$150,000	$182,200

12 NICNAS PEC Report No. 9 Chrysotile Asbestos (February 1999)

13 NICNAS PEC Report No. 9 Chrysotile Asbestos (February 1999)

14 Personal correspondence from Dr Jim Leigh, NOHSC.

Disease	Treatment	Statutory Compensation	Judgements & settlements	TOTAL COSTS
Lung Cancer	$ 57,000 survival < 1 year	$160,000	$450,000	$667,000
Mesothelioma	$ 57,000 survival < 1 year	$160,000	$450,000	$667,000
Other malignancies such as cancer of larynx, oropharynx and upper and lower digestive tract.	$ 57,000 survival < 1 year	$160,000	$450,000	$667,000

2.4 Costs to Business of Worker Protection

As noted above, chrysotile is a known carcinogen and as such its use is regulated through the implementation of a number of controls currently imposed on businesses.

These control measures include:

- Induction and Training;
- Health surveillance;
- Record Keeping;
- Air monitoring and ventilation equipment;
- Insurance; and
- Waste Disposal.

These risk control and health surveillance measures impose significant costs to business.

In response to the Public Consultation period following release of the Stage I EIA, risk control and health surveillance costs incurred by Victorian business was assessed by Victorian WorkCover. In Victoria, an exposure standard of 0.5 f/ml (50% of the National Standard) is used. The cost to business estimated below are based on the assumption that the Victorian OH&S requirements are the same Australia-wide, and the costs of medical examinations, HEPA filters etc are assumed the same for whatever exposure level is in place.

Victorian WorkCover assumed that Victorian employee and employer numbers equate to 27% of the Australia-wide numbers outlined in Section 2.2.2 above:

- Estimated number of Victorian employers: 2,100 (approx. 27% * 7,860)
- Estimated number of Victorian exposed employees: 2,700 (27% * 10,000 (low est))

For a full analysis of the derivation of these Victorian Business Compliance Cost estimates, refer to Attachment 2.

Table 5: Victorian WorkCover Assessment of Compliance Costs to VIC Business

Regulatory Requirement	Cost Element	Cost Derived	Present Value over 40 yrs @ 8%
Waste Disposal	$150 / employer / year	$150 * 2,100 = $315,000 (pa)	$3,756,253
Medical Exams	$160 / employee Initial, then every 3rd year & upon departure. 10% turnover assumed	$160 * 10% * 2,700= $43,200 New employees $160 * 10% * 2,700= $43,200 Departing employees New + Departing = $86,400(pa) $160 * 2,700 *0.8 = $345,600(3rd yr)	$2,521,166
		Sub Total	**$6,277,420**
HEPA Filter vacuum	$170 / replacement filter @ two p.a.	$170 * 2 * 2,100 = $714,000(pa)	$8,514,174
RPE	$250 / employee	$250 * 2,700 = $675,000(pa)	$8,049,114
Air Monitoring	$375 / employer / 5 years	$375 * 2,100 = $787,500(5 yrs)	$2,177,727
			$25,018,435

If the Number of Employees was 27% of 20,000 (instead of the low estimate of 10,000) then the Present Value of Costs over 40 years at 8% would increase from $25 million to $35.6 million.

Consequently, if the Victorian regulatory requirements were applicable to all Australian employers (7,860), and employees (10,000 to 20,000) and the costs identified by Victorian WorkCover above were extrapolated across the total number of Australian Employers, this would indicate the Present Value of costs between $93.2 million and $132.3 million over 40 years at a discount rate of 8%.

Again, these calculations are provided in Attachment 2: Business Compliance Costs: Present Value.

2.5 Australian Costs of Illness and Death

2.5.1 Number of Persons Currently Exposed

The number of persons potentially exposed to chrysotile asbestos during manufacture, processing and end use was estimated in Section 2.2.2 above to be:

Table 6: Persons Currently Exposed to Chrysotile in Australia

Industrial Group	Total Employees	Max Exposed	Min Exposed
Manufacture	1,000	300	300
Processing and End Use	55,000	22,000	10,000
	TOTAL:	**22,300**	**10,300**

2.5.2 Lung Cancer Risks

Using the lung cancer exposures provided in 2.3.8 above, (Table 1), the Table below outlines the lung cancer risks to Australian persons exposed at various exposure levels [15].

Refer to Attachment 3 for full derivation of these figures.

Table 7: Risk of Lung Cancer at Various Levels of Exposure to Chrysotile

Exposure In Fibres/ml	Risk [16] (Per 100,000 Persons Exposed)	No of Lung Cancer Cases in 22,300 persons) (Over 40 years)	No of Lung Cancer Cases in 10,300 persons (Over 40 years)
1	173	38.58	17.82
0.5	86	19.18	8.86
0.25	43	9.59	4.43
0.1	17	3.79	1.75

This assumes a lifetime exposure of 40 years, that is, no staff turnover.

2.5.3 Primary Source of Current Exposure

The profile of the segments of the industry to which exposure to chrysotile is prevalent is provided in Section 2.5.1 above.

While there is estimated to be from 10,300 to 22,300 exposed persons in Australia, the primary source of exposure to chrysotile today is in the replacement of industrial and automotive gaskets and in the replacement of automotive brake linings.

Exposure in manufacturing of products is believed by NICNAS to be low because of protective measures installed through OHS measures over the years. Employees in the manufacturing sector, being Bendix Mintex, Richard Klinger and Vivacity Engineering, though only account for 300 out of the 10,300 to 22,300 referred to above.

2.5.4 Estimated Cost of Exposure

2.5.4(a) Lung Cancer Costs to the Community

Using the disease treatment and settlement costs noted in Section 2.3.10 above (Table 4), the estimated cost of illness per person who develops lung cancer is $667,000. It is understood that average survival is within one year of diagnosis.

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15 As given in the NICNAS PEC Report No. 9 Chrysotile Asbestos (February 1999), page 70, based upon linear extrapolation methodology assuming a linear non-threshold model. It is noted that the NICNAS Report (page 71) states that at present there is no consensus with respect to a threshold level of exposure for Chrysotile below which there is no risk of disease.

16 Cumulative risk for lung cancer in Australian male population has been used in this calculation (that is, 7,200 / 100,000 assuming mixed smoking habits)

The costs of death have been estimated by various academic studies which place a value on a human life of between a minimum of $1.5 million [17] and a maximum of $6.1 million [18].

The following Tables show the calculation of the costs of illness and death created by exposure to chrysotile with the human life values ranging between the two extremes of $1.5 million and $6.1 million given above for an estimated 22,300 persons currently exposed.

Refer to Attachment 3 for full calculations of how the figures provided in Tables 8 – 11 are derived.

Table 8: Estimated Cost of Lung Cancer for 22,300 Persons (Minimum Death Costs)

No of Lung Cancer Cases (Over 40 years)	Cost of Illness	Cost of Death	TOTAL COSTS	TOTAL COSTS PER ANNUM
1 f/ml = 38.58 cases	$25,732,860	$57,870,000	$83,602,843	$2,090,072
0.5f/ml =19.18 cases	$12,793,060	$28,770,000	$41,563,051	$1,039,077
0.25 f/ml=9.59 cases	$6,396,530	$14,385,000	$20,781,521	$519,538
0.1f/ml =3.79 cases	$2,527,930	$5,685,000	$8,212,928	$205,323

Table 9: Estimated Cost of Lung Cancer for 22,300 Persons (Maximum Death Costs)

No of Lung Cancer Cases (Over 40 years)	Cost of Illness	Cost of Death	TOTAL COSTS	TOTAL COSTS PER ANNUM
1 f/ml = 38.58 cases	$25,732,860	$235,338,000	$261,070,843	$6,526,772
0.5f/ml =19.18 cases	$12,793,060	$116,998,000	$129,791,051	$3,244,777
0.25 f/ml=9.59 cases	$6,396,530	$58,499,000	$64,895,521	$1,622,388
0.1f/ml =3.79 cases	$2,527,930	$23,119,000	$25,646,928	$641,173

The following Tables show the calculation of the costs of illness and death created by exposure to chrysotile with the human life values ranging between the two extremes of $1.5 million and $6.1 million given above for an estimated 10,300 persons currently exposed.

Table 10: Estimated Cost of Lung Cancer for 10,300 Persons (Minimum Death Costs)

No of Lung Cancer Cases (Over 40 years)	Cost of Illness	Cost of Death	TOTAL COSTS	TOTAL COSTS PER ANNUM

[17] Miller collection of fifty studies (1990) in Miller and Guria (1991)

[18] Viscusi, W.K. (1993) "The Value of Risks to Life and Health", Journal of Economic Literature, XXXI, pp 1912 – 1946.

1 f/ml = 17.82 cases	$11,885,940	$26,730,000	$38,615,923	$965,399
0.5f/ml =8.86 cases	$5,909,620	$13,290,000	$19,199,611	$479,991
0.25 f/ml=4.43 cases	$2,954,810	$6,645,000	$9,599,801	$239,995
0.1f/ml =1.75 cases	$1,167,250	$2,625,000	$3,792,248	$94,806

Table 11: Estimated Cost of Lung Cancer for 10,300 Persons (Maximum Death Costs)

No of Lung Cancer Cases (Over 40 years)	Cost of Illness	Cost of Death	TOTAL COSTS	TOTAL COSTS PER ANNUM
1 f/ml = 17.82 cases	$11,885,940	$108,702,000	$120,587,923	$3,014,699
0.5f/ml =8.86 cases	$5,909,620	$54,046,000	$59,955,611	$1,498,891
0.25 f/ml=4.43 cases	$2,954,810	$27,023,000	$29,977,801	$749,445
0.1f/ml =1.75 cases	$1,167,250	$10,675,000	$11,842,248	$296,056

In summary, the lung cancer cost to the community from persons currently exposed to asbestos during manufacturing, processing and end-use ranges from $94,806 per annum ($1.5 m cost of death across 10,300 exposed persons) to $6,526,772 per annum ($6.1m cost of death across 22,300 exposed persons).

Hence, the present value of these lung cancer costs, over 40 years at a discount rate of 8% ranges from $ 1,130,525 to $ 77,829,232. It is this range of costs together with related negative social consequences that the proposed Regulatory Phase-Out is attempting to address.

2.5.4(b) Other Health Costs to the Community

As noted in Section 2.3.10 above, there are a range of illnesses presenting in persons exposed to Chrysotile asbestos.

There is no data available to indicate the number of cases of asbestosis likely to develop at current exposure levels. Also, at current exposure levels the risk of developing asbestosis is considered by NOHSC to be low. Nevertheless, asbestosis is a chronic illness resulting in some 20 years of treatment at an estimated cost per case of $2,200 per annum, together with statutory compensation of $30,000 and judgements/settlements of $150,000. Nor is there data available to indicate the number of cases of other malignancies.

According to Victorian WorkCover, while dose response data in respect of mesothelioma is limited, studies are emerging, some of which have suggested that there may be as many as two lung cancer cases for every case of malignant mesothelioma (Omen *et al* 1986 [19]).

[19] Omenn, G.S., Merchant, J., Boatman, E., Derment, J., Kusehner, M., Nicholson, W.J., Peto, J. & Rosenstock, L. (1986) Contribution of environmental fibres to respiratory cancer. *Environmental Health Perspectives* 70: 51-56.

In their Regulatory Impact Statement on a proposal for a domestic ban on asbestos, the United Kingdom Health and Safety Executive, using risk factors from the textile industry, determined the total number of deaths from lung cancer over the next forty years would be 350, of which 18 would be mesothelioma. If one can conclude that mesothelioma accounts for approximately 5% of all likely lung cancers then one could conclude that for Australia exposed workers, the number of new mesothelioma cases arising from current and future exposure is 5% of that of lung cancer reported above.

Hence, mesothelioma may impose an additional 5% to 50% (if one takes the Omen study results) on top of the cost estimated for chrysotile related lung cancers above, as outlined in Attachment 3.

Table 12: Mesothelioma Health Costs Per Annum (using figures from Table 9 & 10)

Scenario	Mesothelioma Annual Cost @ 5% of Lung Cancer	Mesothelioma Annual Cost @ 50% of Lung Cancer
Minimum Death Cost and Persons Exposed	$4,740	$47,403
Maximum Death Cost and Persons Exposed	$326,339	$3,263,386

2.5.4(c) Summary of Health Costs

A summary of the potential range of heath costs to the community is provided in the Table below. For full details on how these costs were derived refer to Attachment 3.

Table 13: Total Health Costs Per Annum

Scenario	Mesothelioma + Lung Cancer Cost Per Annum
Minimum Death Cost and Persons Exposed	$99,546 [20]
Maximum Death Cost and Persons Exposed	$9,790,158 [21]

Hence, the present value of these costs, over 40 years at a discount rate of 8% ranges from $1,187,059 to $116,743,837. It is this range of costs together with related negative social consequences that the proposed Regulatory Phase-Out is attempting to address.

2.6 Alternatives to Chrysotile

2.6.1 NICNAS Surveys

NICNAS surveys on the use of asbestos alternatives indicated that substitution is occurring in many industries and at a quickening pace. In Australia, chrysotile has been

[20] Calculated at 0.1f/ml, 10,300 persons exposed, value of human life is $1.5 million, mesothelioma is an additional 5% of lung cancer costs.

[21] Calculated at 1.0 f/ml, 22,300 persons exposed, value of human life is $6.1 million, mesothelioma is an additional 50% of lung cancer costs.

replaced for many uses, which include railway blocks, cement sheeting, tubes and piping, roofing tiles, and fibre insulation/packing.

The NICNAS Aftermarket Survey found that the automotive industry is moving rapidly towards using non-asbestos products (friction products and gaskets) with almost all new vehicles now asbestos free. Replacement non-asbestos parts are reported to perform as efficiently or better than asbestos parts [22]. Thus earlier concerns about the risk of increased road accidents due to increased stopping distances when using non-asbestos brake linings appear not to be generally a concern.

However, it is noted that Bendix Mintex has advised that their testing results indicate that a number of sub-standard alternative products are being introduced to the Australian market, mainly from non-Japanese Asian sources. Non-asbestos parts are also available for some superseded models and clutches.

With respect to older vehicles fitted with 'asbestos original' equipment, the suitability and efficacy of using non-asbestos replacement parts was difficult to ascertain, due mainly to the fact that the testing of non-asbestos parts in most old vehicles is reportedly costly and hence limited in scope. However, other countries would also have faced this issue during phase-out of chrysotile friction products, which should expedite the development of suitable alternatives.

2.6.2 Range of Substitutes

Bendix Mintex indicate that they have a product range of non-asbestos brake linings which covers around 90 per cent of vehicle models in Australia, however the extent of coverage for the remaining market by other suppliers of alternative friction products was not able to be ascertained.

In order to evaluate current and future use of asbestos products in the Aftermarket, an assessment of the age of vehicles in use in Australia compared to other countries was carried out by NICNAS.

2.6.3 Reasons for the Continued Use of Asbestos Products

?? Vehicle Age

In a recently available survey reported by NICNAS, it was found that Australia has the highest percentage of cars older than 10 years in OECD countries, which may account for the sustained importation and use of chrysotile products in the automotive industry.

?? Cost

Other explanations for continued use of asbestos products are the cost differential between asbestos and non-asbestos products and the fact that there are no regulations aimed at preventing replacement of non-asbestos with asbestos parts in the aftermarket.

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[22] *Changes Caused by Legislation Against Asbestos,* Powder. Baker R: Metallurgy, 35 (4): 255 – 257.

Certain Defence Force Equipment (Helicopter and Aircraft) are purchased with accompanying whole of life spare parts. To scrap such spares and replace with non-asbestos substitutes would be at significant economic cost. Defence has indicated to NOHSC that this cost cannot be quantified and such spares are not recorded in their asset system.

?? Driver Perception of Performance

Bendix Mintex also reports that preferences exist for asbestos products based on 'driver perception' of performance.

2.6.4 Cost Effectiveness Analysis – Road Vehicle Friction Products

2.6.4(a) Market Cost Comparison

As noted in Section 2.2.2 above, one of the largest markets for asbestos products in Australia is in road vehicle friction products. Thus, the proposal to phase out uses of chrysotile asbestos including manufacture for the purposes of export will be felt primarily within this friction products market.

It was noted by Alross [23] that non-asbestos products in the road vehicle sector are now provided for all types of road vehicles – cars, buses, trucks, trailers, 4WD and light commercial. Alross further identifies that the brake service sector is characterised by contradictory views. Some parties feel that there is still a problem with replacement non-asbestos friction products. These issues are often related to "consumer" issues such as noise and "black dust on the wheels". For more details on the Alross Report findings refer to Section 2.6.4(b) below.

The Australian market is dominated by Bendix Mintex. Bendix Mintex offers a range of four varieties of non-asbestos disc pads, asbestos replacement linings and bulk roll for drum brakes and asbestos and non-asbestos product for heavy vehicles. The remainder of the after-market is served by a number of smaller manufacturers of replacement disc pads for light vehicles and by importers of asbestos and non-asbestos products. The vehicle manufacturers offer original equipment (OE) replacement friction parts, generally at a price premium.

According to the Australian Automotive Aftermarket Association Ltd (AAAA), the current market share of asbestos pads is around 60%. Currently, some 860,000 brakes pads are imported each year containing asbestos and some are also manufactured locally.

Advice received from the AAAA suggest most asbestos brake pads would be coming into the country at the bottom end of the market although there is also an increasing amount of non-asbestos brake pads imported.

At this bottom end of the friction product range the expected price differential between an asbestos vs non-asbestos brake pad is 15 to 20% or $2 to $3 for trade sales. This generally reflects the current price differential.

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[23] *Technical Assessment of the Impact of a Phase-Out of Uses of Chrysotile Asbestos in Australia*. Draft Report July 2000. ALROSS Pty Ltd

In the "do it for me" repair sector, non-asbestos pads are believed to be around $25 to $30 a set and at the retail store for "do it yourself" about $30 depending on the brand. The repair sector pays around $20 and the retail sector about $25 to $30 on average for asbestos pads.

Most car company replacement pads for newer vehicles are non-asbestos and higher performance or higher specification pads are also non-asbestos. The top of the range Kevlar aluminium pads produced by Bendix Mintex are about 80% more expensive and are usually purchased for specialist applications. The actual price of non-asbestos pads varies widely depending on composition and performance.

According to Bendix Mintex it is not possible to directly compare the cost of asbestos to the cost of its "substitute". There are no direct substitutes for asbestos. Where other fibres are used, it is necessary to include additional materials to obtain the required performance. Asbestos based products generally contain up to 8 ingredients, whilst non-asbestos products contain in excess of 15 ingredients. In general the raw materials for non-asbestos products are 69% more expensive than for asbestos products. These higher priced raw materials however only make up a small proportion of the total product cost. The resultant impact further up the supply chain to the retail end of the market is reflected in the AAAA's analysis as a 15% to 20% price differential noted above.

Recent discussions were held with the following parties to gather cost and effectiveness data for road vehicle – frictions products. It will be noted from the Table below that the OE prices are usually at a premium.

- Toyota - Ryde
- Holden - Ryde
- Brookers Brakes – West Ryde
- Repco – West Ryde

The results of these discussions are outlined in the following Table. It will be seen that the large differential in prices in the Table relates to original equipment manufacturers market, generally regarded as more expensive.

Table 14: Cost and Estimated Life Friction Products Comparison

Make	**Model**	**Recommended Retail Price**			**Estimated Life**	
		Asbestos	*Non-Asbestos*	*% Difference*	*Asbestos*	*Non-Asbestos*
Toyota	Camry	$50 approx	$83.40	66.8%	30,000-40,000 km	30,000-40,000 km
Toyota	Prado	$50 approx	$83.40	66.8%	15,000-20,000 km	15,000-20,000 km
Toyota	Land Cruiser	$50 approx	$83.40	66.8%	15,000-20,000 km	15,000-20,000 km
Holden	Commodore	$77.00	$91.40	18.20%	30,000 km	30,000 km

Make	Model	Recommended Retail Price			Estimated Life	
		Asbestos	*Non-Asbestos*	*% Difference*	*Asbestos*	*Non-Asbestos*
Holden	Rodeo	$140.00	$240.00	71.40%	15,000-20,000 km	15,000-20,000 km
Ford	Falcon		$88.00	66.80%		
Brake Retailer 1	General	$77.00	Similar	0.0%		
Brake Retailer 2	Commodore	$57.00	None supplied	No comparison	30,000 km	
Brake Retailer 2	Camry	$74.95	None supplied	No comparison	30,000-40,000 km	
Brake Retailer 2	Falcon	$57.00	None supplied	No comparison	30,000-40000 km	

2.6.4(b) Non-Asbestos & Asbestos Product Effectiveness Comparison

The following advice is provided by the Department of Transport and Regional Services.

Product effectiveness is assessed on the basis of product compliance with Australian Design Rules. While the ADRs apply to new vehicles, which must comply before they can be supplied to the market, once put into use, vehicles must comply with the in-service regulations administered by the States and Territories. The general principle applied by the States and Territories is that vehicles produced in compliance with ADRs applicable at the time of manufacture must continue to comply with those ADRs. In 1999 the National Road Transport Commission (NRTC) published the Australian Vehicle Standards Rules (AVSRs), with the aim of providing a set of national uniform in-service rules and all the jurisdictions agreed to progressively implement the AVSRs.

The AVSRs have preserved the general principle of requiring continuing compliance with the ADRs and in the case of passenger vehicle braking, the AVSRs effectively demand continued compliance with ADR 31. This means that replacement brake system parts are required to deliver braking performance in compliance with ADR 31. This applies equally to so called "genuine spares" as it does to "non-genuine spares".

In respect of new cars, vehicle manufacturers are required to conduct tests to confirm compliance with the performance requirements of the braking ADRs and retain evidence of compliance. They are also required to provide the Federal Department of Transport and Regional Services with sufficient information to confirm compliance before they can obtain an approval to supply their vehicles to the market. The evidence supplied is used by the Department to audit the manufacturer at a later date to confirm the evidence upon which the approval was granted and that production vehicles comply with the same specification as the vehicle type that was granted the approval.

The requirements for replacement parts are the AVSRs, as adopted in jurisdictional legislation, which constitute mandatory requirements in that they require continuing

compliance with ADR 31. However, government supervision and enforcement are different from the system administered by the Federal Government in respect of new vehicle compliance. In the case of replacement parts there does not appear to be an established system of supervision by the States and Territories, however, this does not rule out investigations where particular problems come to light.

While there is an international standard for replacement brake parts, there is no guarantee that replacement parts suppliers are complying with it. The standard requires the brake linings to be fitted to a test vehicle of the type for which the parts are intended and to be tested to and meet the performance requirements of the braking standard as well as confirming compliance with certain mechanical characteristics like shear strength and compressibility. Having established that a lining of a particular specification complies, the standard further provides for an abbreviated test program (using a bench test approach)to confirm on-going compliance of production runs.

To conclude, it is correct to say that any braking system - asbestos or non asbestos - new part or replacement part - MUST comply with the relevant ADRs.

The use of replacement products in the friction product market is discussed in the Alross Report (extract as follows):

“A key issue in the Australian market is the wide range of replacement product available. The problem is not one related to the phase out of asbestos product, but rather one of consumer education and product standards. There is no effective requirement that replacement friction product meet the performance standards of the ADRS. Manufacturers do in-house testing, but do not warrant that the product meets the performance standards. Some local manufacturers express strong confidence that their product will meet the performance standards. Some imported product is certified to the ECE/EU standards.

Bendix Mintex, for example offer five different non-asbestos pad formulations, each with specific characteristics. They also offer a comprehensive range of asbestos based replacement pads.

The most comprehensive range of Bendix Mintex replacement non asbestos brake pads --- the Metal King Plus - is a semi-metallic compound that is well suited to heavy duty cycles such as city driving (couriers and taxi) and larger cars and light commercial vehicles. It performs well and gives a long life. However, it would generally give a higher pedal pressure in family cars and could lead to customer reaction in normal suburban use. For many models, where other materials are available, the Metal King is not the recommended replacement pad. For some vehicles, where the vehicle was designed with semi-metallic pads, the Metal King is the recommended pad.

Bendix Mintex has now introduced a new line - the Premium - specifically targeted at normal family vehicles and competitively priced with asbestos based pads. The new line is currently focussed on popular models and does not cover the range of the Metal King line. Bendix also offers a 4" product line, a Euro-pack line and a high performance line - Ultimate. These lines are offered for a more restricted range of vehicles.

In the current Australian market, the issue is that an owner may choose from a range of replacement pads, but often does so solely on price, thus choosing asbestos based product. There is limited information available to the customer, although the companies do attempt to provide some guidance.

It is interesting to note that in spite of these issues, there does not seem to be a consumer or a safety concern arising from the use of replacement disc pads which may not be best matched to the vehicle and/or its use.

The design of materials to replace asbestos in brake friction materials is complex compared to asbestos. The basic elements of design for friction materials for vehicle braking systems are complex in themselves, and there are added complications for the non asbestos sector.

Asbestos is well understood and offers quite satisfactory performance in most areas - a broad performance band. The physical characteristics are well suited to the environment in vehicle brake systems. There are factors such as high temperature performance (fade) but these are relatively well understood. A limited number of compounds are able to cover market needs. For instance in the light vehicle sector, one friction grade meets most normal needs.

The non asbestos sector on the other hand is more complex. In the first instance, the technology is at a much earlier stage of development than asbestos based technology, which is relatively mature. The friction materials themselves are more complex - some claim 30 or more ingredients compared to around 10 for an asbestos based component. The performance band is not as broad as asbestos materials, so a wider range of compounds is used to cover the market demands. There have been problems with noise, wear, cold performance, quality and cost. New ingredients are tried to meet particular needs and controlling finished product cost is a continual issue for manufacturers.

One problem is that many of the components used in non asbestos friction product are expensive compared to asbestos. This is claimed to makes it difficult for manufacturers to keep costs down for non asbestos product. Some local manufacturers dispute this and point to their pricing policy, which is competitive with Australian asbestos disc pads. They claim that, in Australia, it should be possible produce non asbestos disc pads at competitive prices with asbestos product, and suggest that the market prices for some non asbestos product lines are inflated.

There is some limited test evidence to confirm that non asbestos friction product can be developed to meet the performance requirements of the ADRS. There is also the simple fact that new vehicle manufacturers offer non asbestos friction product in new vehicles. There have been issues in the past, but the European moves to ban chrysotile asbestos show that suitable product can be developed to replace asbestos product in older vehicles.

While this design complexity is a problem for friction material manufacturers, there are consequences in production, storage, distribution and retail flowing from the wider range

of different compounds used in non asbestos components. These factors alone introduce cost penalties.

Impacts on Industry

For the road vehicle friction products sector, it is possible to set out some broad impacts of a phase out of chrysotile asbestos. These are:

- There would need to be a significant increase in the supply of replacement non-asbestos product to fill the demand currently met by asbestos based product.

- This may lead to investment and production problems for Australian manufacturers, but also increases the market opportunities for producers of non asbestos product.

- There would also be a need to develop and market non-asbestos replacement brake linings in quantity. This would require development and investment, and could take some time. Developments in UK and the fact that new vehicle manufacturers market asbestos free replacement linings confirms that the technology is available to produce non asbestos replacement linings for light vehicles.

- There could be an issue of product rationalisation for Australian manufacturers currently offering asbestos based product. The problem would be in the "specialist" vehicles where numbers are small. The demand would need to be met through imports.

- There could be an industry issue if the technology for producing bulk replacement lining material is not available. This would lead to issues of product range and processing, given that currently there is a significant supply of bulk material to brake bonders. The outcome could be further shrinkage in the brake bonding sector.

- There would be a need for a consumer education program to support the change to non asbestos product, and to help customers identify the appropriate product for their operations. This is generally an issue for the light vehicle sector, as the heavy vehicle operators tend to be better informed.

- There would be a need to consider the issues posed by older vehicles, where the volume may not justify the development of non asbestos product lines. As in the current situation, imports could help fill the gap, with specialist businesses sourcing replacement parts for rare vehicles (as is the case for other components). The European approach offers a potential solution.

This group of implications supports the view that there would need to be a reasonable transition period if a decision was taken to phase out chrysotile asbestos."

2.6.4(c) Summary of Cost Effectiveness

In summary, it noted that non-asbestos market prices in the road vehicle friction product industry are 15 to 20% higher than an asbestos equivalent. At the top end of the market the price is some 80% more expensive.

It is also noted that non-asbestos friction products are not as effective as asbestos products from a consumer perspective due to additional noise, dust and feel. However, for critical performance attributes, i.e. braking effectiveness and useful life these products are the same.

Non-asbestos products are therefore, not presently, as cost effective as asbestos products. It is anticipated however, given the rate of penetration of non-asbestos products into the Australian market, that the cost differential will disappear over the next three years as manufactures and importers look to fill various market price points as a mechanism to capture market share vacated by the asbestos products.

2.6.5 Health Impacts of Substitutes

A considerable amount of information on alternatives was reviewed in the NICNAS assessment. The International Program on Chemical Safety (IPCS) and the European Union have also conducted reviews of alternative fibres. The reports of these bodies provide significant data on the safety of alternatives. There are alternatives that are considered to be safer than chrysotile. However, there is a potential that alternative fibres which have similar physical properties (particularly fibre dimension) to chrysotile may exhibit similar toxicological profiles. Therefore, further work is required to generate health effects data for proposed alternative materials.

Replacement of chrysotile with other substitute materials must take into consideration all available toxicological, physicochemical and performance data to ensure that the selected substitutes are likely to present lower health risks than chrysotile for each particular use, without compromising road safety.

It is noted that NOHSC has commissioned a study by Dr David Douglas on the health assessment of substitutes. A preliminary report from Dr Douglas is available and a summary of the findings of that report is given in Section 7.3.1 below.

2.6.6 Public Safety and Environmental Protection

NICNAS concluded that the major source of public exposure is from chrysotile dusts generated by vehicle braking, although the level of exposure is low as stated above. Overseas and Australian studies reported by NICNAS showed air levels of chrysotile fibres varying from 0.01 f/ml to 0.5 f/ml at busy intersections and freeway exists.

In addition, it was concluded by NICNAS that the manner in which chrysotile is used in Australia will result in a low exposure hazard to the environment.

2.7 Overseas Experience

2.7.1 European Commission

The NICNAS Report recommendations are consistent with international activity regarding the use of chrysotile asbestos. On 27 July 1999, the European Commission agreed to expand an existing ban as this was seen to be an effective way of protecting human health from the use of chrysotile asbestos fibres and products containing them. The ban was extended to asbestos cement products, friction products (brake and clutch linings),

seals and gaskets, by 1 January 2005. The only exception to this is the continued use of chrysotile in diaphragms for electrolysis in certain chlorine plants.

It is also noted that since January 1, 1997, France has prohibited the manufacture, import and sale of asbestos and products containing asbestos, with rare exceptions.

It is also noted that a Canadian appeal to World Trade Organisation was rejected and so the European Union ban remains.

2.7.2 United Kingdom

The United Kingdom's Health and Safety Executive followed the European Commission's move on 24 August 1999, announcing a ban within 3 months of nearly all uses of chrysotile. Continued use for a limited time for some applications is allowed, such as gaskets used with particularly hazardous substances, and use of chrysotile in the manufacture of high temperature clothing. All exceptions will be reviewed before the 2005 deadline set by the European Commission.

2.7.3 US Consumer Product Safety Commission

In the late 1970s, the U.S. Consumer Product Safety Commission banned the use of asbestos in wallboard patching compounds and gas fireplaces because these products released excessive amounts of asbestos fibres into the environment. In addition, asbestos was voluntarily withdrawn by manufacturers of electric hair dryers.

These and other regulatory actions, coupled with widespread public concern about the hazards of asbestos, have resulted in a significant annual decline in U.S. use of asbestos. Domestic use of asbestos amounted to about 560,000 metric tons in 1979, but it had dropped to about 55,000 metric tons by 1989.

2.8 Consistency with Other Legislation and Regulations in the Australian Jurisdictions

Chrysotile is regulated in Australia through various State and Territory legislation relating to occupational health and safety, dangerous goods and to a limited extent through environmental protection.

The National Occupational Health and Safety Commission has declared several standards under s.38 (1) of the National Occupational Health and Safety Commission Act 1985 (Commonwealth) which address asbestos exposure risks.

The following documents are called up under the NOHSC Hazardous Substances Standard and Code:

- List of Designated Hazardous Substances;
- National Code of Practice for the Labelling Of Workplace Substances;
- National Code of Practice for the Preparation of Material Safety Data Sheets;
- Guidelines for Health Surveillance (Asbestos);
- Guide to the Control of Asbestos Hazards in Buildings and Structures;
- Australian Code for the Transport of Dangerous Goods by Road and Rail.

As noted in Appendix 2: Background to NOHSC Policy Development, in 1996, the National Occupational Health and Safety Commission (NOHSC) released a Preliminary Impact Analysis of a Proposed National Exposure Standard for the Occupational Environment for Chrysotile (White Asbestos). The Impact Analysis assessed the impact of the National Standard at three chrysotile concentrations in the air of 1.0 fibre/millilitre (f/ml), 0.5 f/ml and 0.1 f/ml.

As a result of this assessment the National Exposure standard was set at 1 f/ml.

It is noted, however, that this proposed standard did not achieve national consistency with some States and Territories setting lower thresholds (0.5f/ml and 0.1f/ml).

3. THE OBJECTIVES OF THE PROPOSED PHASE OUT

3.1 Purpose of this Section of the Impact Statement

This Section of the RIS specifies the **outcomes** sought in relation to the identified problem. The term 'outcome' is used here to describe the future state of the world that is expected to exist after the legislative proposal is put into effect.

It is important not to confuse 'ends' with 'means': thus the Objective is not to ban or control chrysotile *per se* but to achieve measurable improvements in health outcomes as a result of taking some one or more optional actions to ameliorate the public health impacts of exposure to chrysotile asbestos.

The Objective has also been drafted to accord with the "Guide to Regulation" [24] which states:

> "The objective should not pre-justify a preferred solution, but rather, should allow for an examination of alternative solutions to the underlying problem.
>
> "The objective should be clear, concise and as specific as possible. It should be specified broadly enough to allow consideration of all relevant alternative solutions but should not be so broad or general that the range of alternatives is too large to assess, or the extent to which the objective has been met becomes too hard to establish".

3.2 The Desired Objective

Based on the preceding analysis of the problem and the regulatory régime existing in Australia, the Objective of the proposed phase out of Chrysotile is stated to be:

a) *To reduce future death and illness from exposure to chrysotile fibres from the current and future importation, manufacture and processing of chrysotile asbestos into products containing chrysotile asbestos.*

b) *To undertake this reduction in a cost-effective manner within an appropriate time frame.*

3.3 The Challenge

In light of this Objective, the challenge now is to be able to show not just that the controls envisaged in the proposed phase out will reduce the incidence of death and illness but that the costs imposed by those controls are less than the benefits.

It is the purpose of the remaining Sections of this RIS to now determine if the proposed legislative controls on exposure to chrysotile will meet those objectives.

This is done by first identifying feasible optional ways of meeting the Objective (including the 'do nothing' or Base Case Option) and then examining each Option in detail to

[24] "*Guide to Regulation*", ORR, December, 1998, page D3.

estimate the costs and benefits of each so as to identify the Option that yields the greatest cost-benefit.

The net cost-benefit of each Option (other than the Base Case) is expressed as **incremental** to the Base Case.

If one of the other Options reveals a positive net-benefit incremental to the Base Case then that Option may be considered for implementation. If more than one of the other Options reveal a positive net-benefit incremental to the Base Case then the Option with the highest cost-benefit is selected.

If none of the other Options reveals a positive cost-benefit incremental to the Base Case, then the Base Case (the 'Do Nothing' Option) must be selected.

3.4 Comparison of Alternative Approaches

The following alternative approaches to the achievement of the Objective have been considered in this Regulatory Impact Statement so as to comply with the requirements of COAG.

3.4.1 Maintain the Status Quo (Base Case)

The Base Case is the maintenance of existing legislative requirements in the States and Territories.

3.4.2 Legislative Ban Phased In

This Alternative calls for government involvement through the development of an advisory National Regulation recommending banning the use of chrysotile in Australia.

The recommendation would form the basis of a consistent prohibition in Commonwealth, State and Territory OH&S legislation.

This ban may be implemented over a number of years to ease the burden on business. In this RIS consideration has been given to a three year, five year and ten year Phase-Out.

3.4.3 Reduction in National Exposure Standard

This Alternative calls for amendment to the National Exposure Standard from the current acceptable level of 1 fibre/ml to 0.1 fibre/ml.

3.5 Other Options

Three other Options were considered but rejected from full analysis for the reasons given below.

3.5.1 Option: Enforcement of Existing Exposure Standard

3.5.1(a) Description

This Option relates to the role of government in ensuring compliance by industry with the current exposure standard and related OH&S controls.

It was noted earlier in section 2.3.9(a) that the current level of compliance and exposure to chrysotile across Australia was unknown. While some localised surveys conducted have revealed poor levels of compliance with OH&S legislation and there is some evidence that exposures below the current national exposure standard occur, particularly in the higher profile manufacturing industries, this cannot be extrapolated across the entire working population with confidence.

3.5.1(b) Costs of Illness and Death at Existing Exposure Standard

It was also noted above, that at the current exposure standard of 1 fibre/ml, workers still have the risk of developing lung cancer, mesothelioma, asbestosis and other cancers. For those illnesses where quantification was possible (lung cancer and mesothelioma) the annual cost to the community from exposure at the national standard ranged from $1,013,668 per annum to $9,790,157 per annum.

Increased enforcement to ensure compliance with the current exposure standard will not assist in reducing this level of exposure but would, depending on its effectiveness, assist in ensuring that exposure did not increase beyond the current level.

3.5.1(c) Costs to Business

Under an environment where businesses have a high expectation that a government official will attend to inspect compliance it could be assumed that businesses would incur additional costs in engineering controls to ensure fibres are kept down to 1 f/ml at all times. It is not possible to quantify the impact of any additional compliance costs incurred.

However it is not known to what degree businesses already comply with current OH&S requirements. Assuming full compliance, the costs to business have been determined in Section 2.4 above.

3.5.1(d) Costs to Government

Enforcement costs are derived from the salaries and on-costs for Inspectors across the various State and Territory Governments. Enforcement costs in relation to asbestos would be based on a proportion of time spent by Inspectors on those OH&S requirements devoted purely to the existence of asbestos at a workplace. The ability to quantify the proportion of inspectorate costs currently devoted to chrysotile OH&S requirements is not possible. Most inspections currently undertaken cover a broad range of issues from noise hazards to exposure to other hazardous substances.

The role of an Inspector is quite broad having responsibility for the following:

1. Administration of the OH&S Act;

2. Handling enquiries;

3. Design and communication of workplace public awareness materials;

4. Education of Employers and Employees;

5. Administration and Processing;

6. Discrete Enforcement Role – inspection, identification of breaches and issuance of notices.

There has been an ongoing shift in the responsibilities and expectations of Inspectors with specialist inspectors with specific skills in asbestos being replaced by more generalists. The numbers of Inspectors have also been declining as there has been a move towards performance based rather than prescriptive legislative requirements. The responsibility has been largely directed towards employers taking responsibility for the duty of care to provide a safe and healthy workplace, a philosophy consistent with the performance based style of modern OHS legislation The role for programmed inspectors checking compliance with rigorous prescriptive requirements has fallen.

Additional, there has also been no broad test undertaken to assess the link between government enforcement and compliance by industry.

While the government may choose to direct more resources to the Inspection role in an effort to ensure a safe and healthy workplace exists there would be barriers to overcome, particularly;

?? Remove the responsibility from businesses to innovate, plan and develop risk mitigation strategies suitable to their own workplaces;

?? No ability to measure the effectiveness of increased enforcement as the link to increased health and wellbeing; and

?? The limitation on government resources and hence the difficulty to inspect all premises (7,860 business and the 33,000 underlying repair shops) on a regular basis to ensure continued compliance.

3.5.1(e) Conclusion

It is concluded that enforcement of the existing exposure standard will not ensure a reduction in the costs of death and illness likely to present from current exposure compared to the Base Case environment. In terms of cost to Government, this Option would be managed by a reprioritisation of existing resources. The benefits of enforcement are not measurable.

It should be clearly noted, however, that there is no information on current levels of exposure in the workplace.

3.5.2 Option: Information and Education Program

3.5.2(a) Program Target

It is possible to implement an information and education program into the hazards associated with exposure to chrysotile. However, manufacturers of chrysotile products

are well aware of the hazards and actions to protect workers are in place. Thus an education program aimed at manufacturers would have no effect.

This Option assumes that an information and education program would be aimed at those who use products containing chrysotile such as motor mechanics to inform consumers on the dangers of chrysotile products and encourage them to select products that do not contain chrysotile

3.5.2(b) Inadequacy of Public Education Programs

No data is available as to the effectiveness of such programs in the field of chrysotile product use. One must draw conclusions, therefore, from other markets where a potential hazard to consumers exists. For example, in the field of food safety, the US Department of Agriculture (USDA) has, since 1993, required that all packaged meat and poultry products include a label providing information on safe handling and preparation. In addition, the USDA tries to educate the public on the importance of safe food handling and how consumers can protect themselves from the risks of foodborne illness.

While some evidence exists that recent efforts in this area have had some effect [25], new data from the US Food Marketing Institute (FMI) present a mixed picture. In its most recent survey of consumer attitudes in the supermarket, FMI asked shoppers about the impact of safe-handling labels on safety awareness.

Among those who were aware of safe-handling labels, 65 per cent said the labels made them more aware of food safety issues, while 34 per cent said their awareness of food safety had not changed. Forty-three per cent of shoppers reported changing their behaviour in response to the labels, while 57 per cent did not.

To be effective, the labelling and education must change consumer behaviour, and this change must be permanent if the health benefits are to persist. Given exposure to risk information, the consumer must then pay attention to the information, understand its meaning and personal relevance, remember and retrieve it when needed, and act in accordance with the recommendation. If any one of these steps is not successfully completed, the information provided is not sufficient to change behaviour.

Several factors reduce consumer adoption of recommended safety practices. Again in the food industry it was found that:

?? Consumers often do not view themselves as being at risk (the attitude of 'it can't happen to me'). Research by the Economic Research Service of the USDA shows that when respondents are asked "compared to other men / women who eat as many hamburgers as you do, what would be YOUR chances of getting sick, sometime in the next 12 months, from a hamburger patty because of the way it is cooked," 52 percent of respondents chose "my chances are smaller than average," while 8 per cent chose "larger than average". This perception may be reinforced for consumers who have been consuming undercooked food or using unsafe preparation practices for years and have not become ill (or not realised that the food had made them ill). The parallel here,

[25] Reported in "*An Economic Assessment of Food Safety Regulations: The New Approach to Meat and Poultry Inspection*." Crutchfield, et al, USDA Agricultural Economic Report No 75, July, 1997. Page 16.

of course, with exposure to chrysotile, is the long latency time and thus there is no immediate impact on consumers that would produce feedback to them in time for them to cease permitting themselves to be exposed.

?? Consumers may view the probability of harm as being small. If consumers do not believe they have ever become ill from food or feel they are not at risk, then they may be prone to believe that the risks are small.

?? Consumer habits are ingrained. Behavioural choices are strongly influenced by past behaviour and experience. For example, if consumers have eaten undercooked foods for years and have not become ill, they could be reluctant to make long-term changes in food preparation and consumption practices.

3.5.2(c) Conclusion

All of these factors suggest that consumer education on safe handling of chrysotile products could face a difficult challenge in changing behaviour to reduce risk. Although necessary and useful, education and labelling alone will not prove an acceptable substitute for other efforts to reduce chrysotile-related disease.

3.5.3 Option: Voluntary Withdrawal by Industry

As mentioned in Section 2.2.2 above, raw chrysotile continues to be imported into Australia in volumes of between 1,000 and 2,000 tonnes per annum and over the past 10 years these volumes have been relatively static.

In addition, withdrawal will involve industry in additional costs. These costs for both large and small business are quantified in Sections 5.2.1(e) and 5.2.1(f) below.

Under the circumstances, no evidence exists that Industry will voluntarily withdraw the use of chrysotile while a demand for products containing the material exists and while costs would be incurred in introducing substitute materials.

3.6 Summary of Other Options

In summary, the Other Options assessed above fail to achieve the following objectives:

?? fewer deaths and illnesses arising out of prolonged exposure of persons to chrysotile;

?? improved protection of the environment;

?? elimination of unnecessary costs of complying with differing State and Territory standards;

?? enhancement of innovation of further control measures.

4. OPTION 1: THE BASE CASE

4.1 Description

This Option assumes that no action is taken by government to prevent exposure to new uses of chrysotile beyond the continuance of the current availability of Occupational Health and Safety Legislation in the Commonwealth, States and Territories together with National Codes and Standards for Hazardous Substances control.

In particular, the Base Case allows the continued exposure of workers to a range of fibres per millilitre, despite the existence of a minimum level as expressed in the Chrysotile Exposure Standard. Exposure standards represent airborne concentrations of individual chemical substances which, according to current knowledge, should neither impair the health of nor cause undue discomfort to nearly all workers. Exposure standards do not represent 'no effect' levels that guarantee protection to every worker.

There is a range of exposure standards across the country including:

- Nationally 1.0 f/ml;
- VIC 0.5 f/ml;
- NSW 0.5 f/ml;
- ACT 0.1 f/ml.

The Base Case also imposes on business the continuation of costs associated with mitigating the harm of such exposed workers including periodic health checks and dust extraction equipment.

4.2 Costs of the Base Case

4.2.1 Quantitative Costs

4.2.1(a) Costs of Illness and Death

The quantitative costs of the Base Case are the treatment and compensation costs of person's exposure together with the value of human life.

A summary of the potential range of heath costs imposed on the community each year is provided in the Table below.

Refer to Attachment 3 for full derivation of these costs.

Table 15: Total Health Costs Per Annum

Scenario	Mesothelioma + Lung Cancer Cost Per Annum
Minimum Death Cost and Persons Exposed	$99,547 [26]
Maximum Death Cost and Persons Exposed	$9,790,157 [27]

The present value of these costs, over 40 years at a discount rate of 8% ranges from $1,187,059 to $116,743,837.

4.2.1(b) Costs to Business

In Section 2.4 above it was outlined that if the Victorian regulatory requirements were applicable to Australian employers, potential costs between $93.2 million (based on 10,300 persons exposed) and $132.3 million (based on 22,300 persons exposed) over 40 years at a discount rate of 8% would continue to be incurred.

4.2.2 Qualitative Costs

There is no likelihood that simply waiting for substitute materials to take over all traditional chrysotile uses will enable the Objective to be met.

While there has been a significant reduction in the amount of chrysotile used over the last 20 years, evidence exists that this fall has now ceased with imports stabilising over the last 10 years and no downward trend in the importation of asbestos brake linings, clutch facings and gaskets.

Contamination of the environment will continue from asbestos dust from brake linings and other chrysotile applications.

In addition, due to the image and history of asbestos use in Australia, fear and concern still exists in the community about persons becoming contaminated when in contact with asbestos products. The family and friends of asbestos exposed workers incur social costs associated with this fear and concern about potential danger to loved ones.

4.3 Benefits of the Base Case

4.3.1 Quantitative Benefits

The Base Case has no quantitative benefits.

4.3.2 Qualitative Benefits

The Base Case has the following qualitative benefits:

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[26] Calculated at 0.1f/ml, 10,300 persons exposed, value of human life is $1.5 million, mesothelioma is an additional 5% of lung cancer costs.

[27] Calculated at 1.0 f/ml, 22,300 persons exposed, value of human life is $6.1 million, mesothelioma is an additional 50% of lung cancer costs.

- The continued availability of chrysotile brake linings for older motor vehicles;
- The continued availability of high performance chrysotile gaskets for certain specialised applications, e.g. petrochemical industry applications;
- The continued availability of chrysotile for certain specialist applications such a adhesives and putties used in the building industry in Australia and overseas;
- High level of knowledge of the health risks of chrysotile and thus an ability to manage that risk, based on experience built up over many years in chrysotile handling.

4.4 Summary

The Base Case results in a range of costs to the community from continuing health costs to affected workers and costs to business to mitigate where possible these health impacts.

The Base Case fails to achieve the outcomes required in the Objective, namely to reduce death and illness associated with current and future exposure to chrysotile asbestos.

5. OPTION 2: INTRODUCTION OF A PHASED-IN LEGISLATIVE BAN ON CHRYSOTILE

5.1 Description

Under this Option, a nationally imposed prohibition Regulation to meet the specified Objective will be introduced and phased in over a three-year period. Compliance with this prohibition Regulation is assumed to be 100%.

The primary focus of the Regulation is a prohibition or ban on the introduction of new uses of chrysotile, where 'new uses' also includes replacement of 'past uses'.

It is important to note that the regulation referred to under this Option is the prohibition regulation, and not a workplace exposure standard (the x fibres/ml type of standard/regulation). There is no existing national prohibition regulation/standard. Page36 lists each State's current exposure standard.

Compliance with a prohibition (ban) is more straightforward to enforce than the ongoing compliance with an operation (exposure standard level) standard.

In addition, it is understood that it is impossible to identify WorkCover inspectorate costs specifically devoted to chrysotile exposure standard monitoring. It has been assumed that there will be no change to existing resources devoted to inspecting workplaces as a result of the implementation of Option 2 due to the ongoing need for inspection in response to other legislative requirements. Note a discussion of increased enforcement was provided in Section 3.5.1 above.

5.2 Costs of Option 2

5.2.1 Quantitative Costs

5.2.1(a) Key Assumption to Determine Costs

Before determining the impact of the legislative ban, it is initially necessary to ascertain what would be the level of illness and death in the absence of the ban. It is important not to confuse the impact of the ban on its ability to influence illness currently presenting due to past exposure to chrysotile. The scope of this Option can only address future exposure.

Whilst incidence rates for mesothelioma are increasing significantly, this is due to past exposure to all forms of asbestos, unsafe work practices and industrial activity involving mining of raw asbestos together with manufacture and use in a broader range of products and applications than exists today.

The focus of this RIS is to assess the impact of a proposal to phase out the use of chrysotile asbestos. In accordance with RIS methodology, this impact is expressed as the *incremental* impact between the circumstances that would exist if no action were taken (described as the Base Case alternative) and the situation that would exist if the phase out occurred (described as the Phase Out alternative).

Looking firstly at the Base Case alternative, the current population of persons (22,300 in number) will, as they age, demonstrate a certain incidence of illness and death as a result of past exposure to asbestos. Looking into the future, that incidence may continue to rise

and then later fall due to actions taken in the past to reduce exposure to asbestos. Data is not available to enable an estimation of what that incidence is now or will be in the future (nor is it necessary to make that estimate because of the incremental nature of the measurement as described above). Let us simply assume that over the next 40 year period there will be X_1 cases of illness and death in year 1 (say, in the year 2001) due to past exposure to all forms of asbestos, and current and future exposure to chrysotile, X_2 cases in year 2, and so on.

Note that under the Base Case alternative, we assume that the *current* cohort of 22,300 persons is exposed now and will continue to be exposed in the future, to chrysotile *only* and at an exposure level of 1 f/ml.

We further know from the NICNAS report that, at an exposure level of 1 f/ml, the incidence of illness and death due to lung cancer over a 40 year period is 173 per 100,000 persons. Thus if we assume that the current exposure level remains constant over the next 40 years then in the cohort of 22,300 over that 40 year period, the number of persons expected to become ill and die *from current and future exposure only at that level* is (173/100,000)*22,300 = 38.58. Thus in any one year the incidence of illness and death will be (38.58/40) = 0.96 persons. This incidence forms part of the X_1 cases in year 1, X_2 cases in year 2, etc., projected under the Base Case.

In year 40, all persons currently working and exposed in the past will have left the work force. The persons in the work force in year 40 under the Base Case will be those exposed during the preceding 40 years to the exposure level of 1 f/ml.

We turn now to the Phase Out alternative. Obviously, no action taken now can change the fact that the current cohort of 22,300 persons was exposed to asbestos in the past. Illness and death will continue to occur due to that past exposure. However, by phasing out chrysotile now, this cohort will be less exposed than would be the situation under the Base Case and as the years go on, the incidence of illness and death will diminish until, in year 40, the incidence will reduce to zero.

We determined above that if no action is taken then the incidence would be X_1 cases in year 1, X_2 cases in year 2, etc., projected into the future. We also showed that as part of these cases, 0.96 were created by current exposure. If that current exposure is now phased out, then in year 1 the *incremental* incidence of illness and death will be Base Case exposure – Phase Out exposure, that is $(X_1-(X_1-0.96) = 0.96$ cases per year less. Similarly in year 2 the incremental incidence will be $(X_1-(X_1-0.45) = 0.96$ cases per year less.

We mentioned at the beginning of this section that, in accordance with the RIS methodology, only the incremental impact between the Base Case and the Phase Out alternative was important. Thus in calculating the impact of the proposed phase out, we can say that the phase out will reduce the incidence of illness and death by 0.96 persons per year. This will fall to zero in year 40 and those persons who reach 40 years service then will be the persons who were recruited next year (2001), assumed to be the first year where exposure to asbestos was zero.

The above represents in words the mathematical model used to determine the cost savings due to the proposed phase out of chrysotile.

The sensitivity of the assumptions used above is also determined in the model created.

5.2.1(b) Savings in Cost of Illness and Death from Chrysotile Exposure

A full analysis of the current costs of illness and death resulting from chrysotile exposure is provided in Attachment 3 using a range of scenarios, varying factors including:

- Number of persons exposed;
- Value of human life; and
- Additional incidence of other illnesses.

In addition, a full analysis of the potential cost savings resulting from a phase out of chrysotile over various time frames is provided in Attachment 1.

It can be seen in Attachment 1 that under the following assumptions (referred to in the Attachment as Scenario A):

- Exposure at 1 f/ml
- 22,300 persons exposed
- Cost of Lung cancer at $667,000;
- Cost of mesothelioma at 5% of lung cancer or $33,350;
- Cost of death at $1.5 million

The annual savings in death and illness would be $2,194,573.

It is assumed that these costs will be avoided in a linear fashion throughout the phase-in period. This assumption has been made based on the understanding that the development of these illnesses have a long latency period with no clear data to support when in a persons exposed life the majority of the harm has been caused.

Thus, with a ban brought in over three years, the annual savings would not be the full cost of $2,194,573 but would be 1/3 of $2,194,573, then 2/3 the next year and 100% from year 3 onwards. Over three years the present value of savings at 8% discount rate is $24,187,596, over five years $22,395,465 and over ten years $18,617,053.

Given the uncertainty surrounding the current level of exposure, outlined below are the ranges of likely costs.

It was calculated in Section 2.5.4 above that the costs of lung cancer illness and death from current chrysotile exposure ranges from $965,399 (minimum value of human life and 10,300 persons exposed) to $6,526,772 (maximum value of human life and 22,300 persons exposed) per annum at an exposure of 1 fibre / ml.

If was further calculated that additional costs of mesothelioma could range from 5% to 50% of the lung cancer costs, hence the cost of death and illness from lung cancer and mesothelioma could range between $1,013,668 (i.e. $965,399 x 1.05) and $9,790,157 (i.e. $6,526,772 x 1.5) per annum.

The impact of a phase in of a legislative ban across a range of timeframes is shown in the following Tables.

The source of the impact on cost savings as provided in the Table below is Attachment 1.

Table 16: Phased in Cost Savings under Option 2: Maximum Cost of Exposure

Maximum Cost of Exposure: 1 f/ml, 22,300 persons exposed, value of human life at $6.1 million and mesothelioma costs an additional 50% on top of lung cancer costs.

YEAR	3 Years	5 Years	10 Years
1	$3,263,386	$1,958,031	$979,016
2	$6,526,771	$3,916,063	$1,958,031
3	$9,790,157	$5,874,094	$2,937,047
4	$9,790,157	$7,832,126	$3,916,063
5	$9,790,157	$9,790,157	$4,895,079
6	$9,790,157	$9,790,157	$5,874,094
7	$9,790,157	$9,790,157	$6,853,110
8	$9,790,157	$9,790,157	$7,832,126
9	$9,790,157	$9,790,157	$8,811,141
10 +	$9,790,157	$9,790,157	$9,790,157
Present Value over 40 yrs @ 8%	**$107,902,714**	**$99,907,881**	**$83,052,096**

Table 17: Phased in Cost Savings under Option 2: Minimum Cost of Exposure

Minimum Cost of Exposure: 1 f/ml, 10,300 persons exposed, value of human life at $1.5 million and mesothelioma costs an additional 5% on top of lung cancer costs.

YEAR	3 Years	5 Years	10 Years
1	$337,889	$202,734	$101,367
2	$675,779	$405,467	$202,734
3	$1,013,668	$608,201	$304,100
4	$1,013,668	$810,934	$405,467
5	$1,013,668	$1,013,668	$506,834
6	$1,013,668	$1,013,668	$608,201
7	$1,013,668	$1,013,668	$709,568
8	$1,013,668	$1,013,668	$810,934
9	$1,013,668	$1,013,668	$912,301
10 +	$1,013,668	$1,013,668	$1,013,668
Present Value over 40 yrs @ 8%	**$11,172,214**	**$10,344,432**	**$8,598,117**

5.2.1(c) Cost of Illness and Death from Substitutes Exposure

NOHSC Technical Report in the health effect of Alternatives indicates that none of the alternatives to Chrysotile have been classified as carcinogenic to humans. This was reinforced by comments to the consultants from the ACTU. Under these circumstances

and in the absence of any other data that proves health consequences arise from exposure to substitutes, no other assumption is possible.

It is thus assumed here that the costs of illness and death from exposure to chrysotile substitutes is zero.

The impact of this assumption on the results is tested by an analysis of risk and uncertainty in Section 7.3.1 below.

5.2.1(d) Cost to Business of Adhering to Current OHS Requirements

Large manufacturing businesses contacted during the preparation of this RIS expressed the need to continue with current risk mitigation measures due to the uncertainty surrounding the safety of substances contained in asbestos-free products.

However, the Victorian WorkCover Authority suggests that the absence of regulatory requirements to do so and the absence of a declaration of carcinogenic properties for substitutes, the risk control and health surveillance activities of commercial businesses would be reduced.

The cost to Australian business of this regime was earlier estimated to lie between $93.2 million and $ 132.3 million.

At a minimum the VWA suggests the controls surrounding waste disposal and health surveillance would be eliminated.

The costs of waste disposal and health surveillance are provided in Attachment 2 and range from $6.2 million to $8.8 million, over 40 years at a discount rate of 8% for Victorian businesses. Extrapolated Australia wide could see savings to businesses of between $23.4 million to $32.7 million over 40 years at a discount rate of 8%.

5.2.1(e) Costs to Large Business

The following incremental costs have been identified by large businesses resulting from a future ban on chrysotile in production and operating equipment. It is assumed that the incremental recurrent costs will continue over the 40 year period assessed in this RIS.

Refer Attachment 1 page 1 for full detail of these costs.

Table 18: Incremental Costs to Large Business Option 2

Cost Item	**Amount**
Capital Costs – Year 1	
New manufacturing equipment and processes	$8,300,000 [28]
Recurrent Costs – Year 1 - 40	
Recurrent Cost increase for raw material substitutes	$1,220,000 [29]

[28] Industry estimate provided by 2 of the 3 manufacturers.

[29] Industry estimate provided by 2 of the 3 manufacturers.

Operating cost savings	($121,100) [30]
Net Recurrent Costs	**$1,098,900**

The Present Value of Costs for large business is $20,789,143 at a discount rate of 8% over 40 years.

5.2.1(f) Cost to Small Business

A number of incremental costs to Small Business have been identified. These are outlined in the Table below and reflect the analysis provided in Section 2.6.4 above. It is assumed that the incremental costs identified in the Table will be diminish over the period in which Chrysotile has been phased out, that is 3, 5 and 10 years. Refer to Attachment 1, page 1 for full detail of these costs.

Table 19: Incremental Costs to Small Business: Option 2

Cost Element	Unit Cost	Non-Asbestos Cost Impact	No of Units	Incremental Cost
Brake Pads	$15	$18 (20% higher for trade)	860,000 [31]	$2,580,000
Gasket Replacement	$120 [32]	50% cost increase in sheeting which accounts for 30% of total gasket value = 17% increase [33]	200,000 [34]	$4,080,000
			TOTAL:	**$6,660,000**

It is envisaged by a number of studies that the current differential in costs between asbestos and non-asbestos products will diminish over time. For example, the NICNAS report on page 112 states "with the increased volume and availability of non-asbestos alternatives, it is envisaged that cost differentials will eventually be reduced". Furthermore, a Report by ALROSS commissioned by NOHSC on a technical assessment of the impact of a phase-out of chrysotile, states on page 13 that "some (local disc pad manufacturers) dispute that non-asbestos product costs will be higher and that their pricing policy is to remain competitive. Manufacturers claim that, in Australia, it should be possible to produce non-asbestos disc pads at competitive prices with asbestos product." The Report goes on to say that, in the context of industrial uses of asbestos, "as technology improves and production builds up, costs should fall".

It is important to note here that a distinction needs to be drawn between the cost of non-asbestos raw materials and the market prices of non-asbestos products. For example, one manufacturer of adhesive material which uses chrysotile as a non-sag additive

30 Industry estimate provided by 1 of the 3 manufacturers.

31 NICNAS Report.

32 Estimate by auto-repairer who has experience of this acquisition.

33 Estimate by Richard Klinger.

34 NICNAS Report.

reported that asbestos substitutes cost more than chrysotile but less of the material is required to give the product its required characteristics. Thus the production cost of the product is identical despite the higher cost of the non-asbestos additive.

Thus from these reports and from discussions with industry it can be assumed that after a government-mandated phase out, technological development of non-asbestos products would be accelerated and any market price differential that exists now between asbestos-containing products and non-asbestos products will eventually disappear.

For the purposes of this RIS it has been assumed that such development will drive incremental cost to zero over the 3-year period of the chrysotile phase out.

Further is it assumed that these cost reductions will occur in a linear fashion over the phase-out period due to:

- Businesses would need to manage stocks over the period of the phase-out to ensure they are not left at the end of the phase-out with large quantities of banned products on hand;

- Commercial imperatives would lead businesses to refrain from incurring the total cost of the phase-out up front.

An analysis of the cost effectiveness of non-asbestos products in the road vehicle – friction products market was undertaken in Section 2.6.4(c) above. This analysis concluded that non-asbestos market prices in the road vehicle friction product industry are 15 to 20% higher than an asbestos equivalent. At the top end of the market, the price is some 80% more expensive.

It is also noted that non-asbestos friction products are not as effective as asbestos products from a consumer perspective due to additional noise, dust and feel. However, for critical performance attributes, i.e. braking effectiveness and useful life these products are the same.

Non-asbestos products are therefore, not presently, as cost effective as asbestos products. It is anticipated however, given the rate of penetration of non-asbestos products into the Australian market, that the cost differential will disappear over the next three years as manufactures and importers look to fill various market price points as a mechanism to capture market share vacated by the asbestos products.

The Table below show the annual phase-out costs to small business over three phase out timeframes. Refer to Attachment 1 for details.

Table 20: Phased Out Small Business Costs under Option 2

YEAR	3 Years	5 Years	10 Years
1	$4,440,000	$5,328,000	$5,994,000
2	$2,220,000	$3,996,000	$5,328,000
3	$ 0	$2,664,000	$4,662,000
4	$ 0	$1,332,000	$3,996,000
5	$ 0	$ 0	$3,330,000

6	$ 0	$ 0	$2,664,000
7	$ 0	$ 0	$1,998,000
8	$ 0	$ 0	$1,332,000
9	$ 0	$ 0	$666,000
10 +	$ 0	$ 0	$ 0
Present Value of Costs over 40 yrs @ 8%	**$6,014,403**	**$11,453,088**	**$22,919,658**

5.2.1(g) Present Value of Costs for Small Business

The present value of costs for small business, if the ban were to take effect from 31 December 2003, is $6,014,403 at a discount rate of 8% over 40 years. These costs represent the cost differential imposed on small business for the acquisition of higher priced non-asbestos substitutes for the 3 year period until the non-asbestos product prices converge with the chrysotile product. If a ten year timeframe was allowed, the present value of costs would increase to $22,919,658 as the cost differential imposed on small business would take longer to diminish.

The impact on the present value of costs if business were to incur the phase-out costs in a front or rear end loaded fashion over the three year Phase-Out is not material over the 40 year analysis as provided below:

- Front loaded (i.e. all costs incurred in Year 1 of the phase-out) present value would be $6,166,667; and

- Rear loaded (i.e. all costs incurred in Year 3 of the phase-out) present value would be $5,286,923.

5.2.1(h) Number of Small Businesses

It was determined above that there are 7,856 small businesses involved in the use of asbestos products.

The costs to small business were determined above as $4,440,000 in year 1 reducing to $0 over 3 years.

The cost per small business will thus be $ 565 per annum, again reducing to $0 over 3 years.

5.2.1(i) Small Business Costs on a State and Territory Basis

The Year 1 and subsequent years' costs are divided among the States and Territories as follows.

Table 1 in Mayhew [35] gives the percentage of small businesses in each State and Territory used in the Table below:

[35] "*Barriers to Implementation of OH&S in Small Business*", Claire Mayhew, May 1997, Table I page 33.

Table 21: Costs to Small Businesses by State/Territory

	Small Bus	Year 1	Year 2	Year 3
New South Wales	34%	$1,509,600	$754,800	$0
Victoria	27%	$1,198,800	$599,400	$0
Queensland	18%	$799,200	$399,600	$0
South Australia	7%	$310,800	$155,400	$0
Western Australia	9%	$399,600	$199,800	$0
Tasmania	3%	$133,200	$66,600	$0
Northern Territory	1%	$44,400	$22,200	$0
Australian Capital Territory	1%	$44,400	$22,200	$0
TOTAL:	100%	$4,440,000	$2,220,000	$0
Cost per Business in Year		$ 565.17	$ 282.59	$0

5.2.1(j) Cost Implications for Government

There will be initial one-off costs for relevant State, Territory or Commonwealth government authorities associated with the adoption of the national requirements into their legislative frameworks. The costs include:

- costs associated with repealing existing legislation where required and introducing the legislative ban, such as instructions for Parliamentary Counsel, preparation of legislation by Parliamentary Counsel and printing. Similar to the process required under the NRTC's draft RIS on the transport of dangerous goods regulations, an estimated national cost for this of $290,000 [36] is assumed.

These costs, which will typically come out of jurisdictions' existing budgets, will be off-set by a reduction in the costs of the administration and enforcement of adherence to the Chrysotile exposure standard. The costs to Government are, therefore, assumed to be zero **incremental** to the Base Case.

5.2.2 Qualitative Costs

Option 2 has the following qualitative costs:

- Chrysotile brake linings for older motor vehicles may not be available after 3 years;
- High performance chrysotile gaskets for certain petrochemical industry applications may not be available after 3 years (depending on the scope of exemptions granted);
- Chrysotile for certain specialist applications such as adhesives and putties used in the building industry in Australia and overseas will not be available after 3 years;

[36] National Road Transport Commission, *Draft Regulatory Impact Statement: Dangerous Goods Regulations*, March 1997, Appendix D, p. D7.

?? Low level of knowledge of the health risks of chrysotile substitutes and thus an uncertain ability to manage that risk, based on experience built up over many years in substitute handling.

These qualitative costs are assessed in greater detail in the Risk and Uncertainty Section, Section 6 below.

5.3 Benefits of Option 2

5.3.1 Quantitative Benefits

The quantitative benefits of Option 2 have been expressed in Section 5.2.1(b) above, as cost savings due to a reduction in illness.

No additional quantifiable benefits exist.

5.3.2 Qualitative Benefits

5.3.2(a) Broader Community Benefits

There will be reduced damage to the environment by progressive elimination in the number of vehicles with asbestos brakes and clutch linings.

5.3.2(b) Impact on Competition and Market Outcomes

The barrier to change imposed by the potential loss associated with being the first operator to introduce chrysotile bans is an argument in favour of a national ban phased in.

It is understood that the use of chrysotile in local manufacture is maintained to protect the domestic market from imported products containing asbestos. It is further understood that were a ban to be placed on imported products containing asbestos then local manufacture of asbestos products would hasten in its cessation.

The consistency of regulations between States and Territories means that firms operating in some jurisdictions will not be disadvantaged against competitors operating in other jurisdictions, to the extent that there are any differences in regulatory régimes.

Much of our locally produced asbestos products are exported to countries who do not currently have bans or restrictions on the importation of asbestos. It is noted, however, that due to increasing world-wide concern regarding the health impacts of asbestos, countries to which Australian manufacturers of asbestos products are exporting are increasingly accepting chrysotile substitution.

A ban is expected by industry to have an impact on Australian export earnings initially [37], but this impact may progressively occur anyway as world-wide bans on the use of chrysotile products are imposed in overseas markets.

[37] Information on export earnings was provided by industry, but on a commercial-in-confidence basis.

Industry [38] has stated, however, that a significant proportion of our export market is in Asian countries where chrysotile asbestos is used in a broad range of applications and where bans on the use of chrysotile are not even being considered.

5.3.3 Benefits Applying to Small Business

5.3.3(a) Workers Compensation Insurance

Elimination of exposure to chrysotile may result in less illness and death and thus translate in time into lower workers compensation insurance premiums. However, in practice, it has been the view of employers consulted that such costs will not reduce to any significant degree due to exposure to other hazardous and dangerous goods and other workplace hazards.

5.3.3(b) Worker Protection Costs

Similarly, it has been the view of employers consulted that costs of worker protection such as goggles, overalls, etc., will not reduce to any significant degree due to exposure to hazardous and dangerous goods and other workplace hazards.

5.3.3(c) Distributional Effect

Not all of the benefits that flow from the costs of implementing Option 2 by small business will flow back to the small business segment. Some of these benefits are enjoyed by the community through less impact on the environment from reduced incidents and through reduced social costs from fewer illnesses and deaths.

5.4 Market Failure

Option 2 will address the problems associated with market failure. The extent to which the market fails in the provision of safety associated with exposure to chrysotile asbestos is discussed in Appendix 3.

This included:

- Lack of Information.
- The existence of ‘externalities’.
- The high transaction costs associated with negotiating a price, and
- Time lag between exposure and onset of illness.

5.5 Summary of Costs and Benefits

A summary of the present value of costs and benefits from the implementation of a ban on the uses of chrysotile in Australia, including the manufacture for export, over a three year period is provided in the Table below. These figures are detailed in Attachment 1 together with an assessment of different timeframes (three, five and ten years) for the phase out.

[38] Bendix Mintex, 21 August 2000.

Table 22: Comparison of Present Value of Quantifiable Costs and Benefits: Option 2 (Three Year Phase Out)

Item	Scenario A Assumptions	Present Value $ Over 40 yrs @ 8%
Savings in Death & Illness:		
Exposure standard	1.0 f/ml	
Number of Persons Exposed	22,300	
Value of Human Life Cost of Lung Cancer + Mesothelioma	$1.5 million $667,000*1.05	 $24,187,596
Savings in Business Compliance Costs:		
Savings In OHS Controls	Waste Disposal & Medical Exams only	$29,511,511
	Present Value Benefits:	$53,699,107
Increase in Costs to Business:		
Incr. Cost of Substitutes Small Business	20% brakes 17% gaskets	 ($6,014,403)
Capital & Recurrent Costs to Large Business	$ 8.3 million Yr 1 $1,098,900 p.a.	 ($20,789,143)
	Present Value Costs:	($26,803,546)
	Net Result:	$26,895,561

If there were no savings, then the impact of the net result is as follows:

?? reduction in Waste Disposal and Health Surveillance

?? reduction in cost of death and illness

Sensitivity;	Net Result
If Nil Savings in Death and Illness	$2,707,965
If Nil Savings to Business	-$2,615,951

It is also important to note that it has not been possible to quantify the potential savings in costs of death and illness from asbestosis or other cancers caused by exposure to chrysotile.

For further analysis of the proposals sensitivity to variations in Assumptions refer to Section 7.4.2 below (Table 25)

5.6 Conclusion

Option 2 meets the Regulatory Objectives.

Based on the assumptions provided in Table 22 above, the net present value (NPV) of Option 2 is $26,895,561. However this NPV could range from negative $2,615,951 where there is no assumed savings to business.

It is also important to note that it has not been possible to fully quantify the current cost to the community of illnesses such as asbestosis and other malignancies arising from chrysotile exposure. Hence the "Net Present Value" is not a complete quantification of all quantitative impacts and thus should be used as a guide to decision making only.

The additional costs imposed on the business community from higher product prices would appear to be outweighed by the savings to other industry participants from the relaxation of the risk control and health surveillance regulatory requirements. In addition Option 2 sees additional benefits accruing from the savings in the anticipated cost of illness and death.

A prohibition will result in no exposure to chrysotile, a known carcinogen, and therefore is the most effective means of achieving the policy outcomes.

6. OPTION 3: REDUCTION IN NATIONAL EXPOSURE STANDARD

6.1 Description

This Option assumes that action is taken by government to reduce the National Exposure Standard from 1 fibre/ml to a lower level of between 0.5 f/ml and 0.1 fibre/ml.

This will bring the national exposure standard in line with several other States and Territories.

6.2 Background

As noted in Appendix 2 the National Occupational Health and Safety Commission (NOHSC) in 1996, released a Preliminary Impact Analysis of a Proposed National Exposure Standard for the Occupational Environment for Chrysotile (White Asbestos). The Impact Analysis assessed the impact of the National Standard at three chrysotile concentrations in the air of 1.0 fibre/millilitre (f/ml), 0.5 f/ml and 0.1 f/ml.

Incremental costs were identified at an exposure level of 0.1 f/ml and were related to the incorporation of engineering controls, changes to work practices and possible difficulties in measurement of air level concentrations.

The benefits of adopting a lower exposure level were seen to be minimising the risks of adverse health affects from occupational exposure to chrysotile. There were other related benefits seen including improved quality of life and avoidance of psychological costs of illness and death.

There was seen to be further unquantifiable benefits from uniformity in a national exposure standard replacing a multiplicity of State and Territory legislation.

6.3 Impacts of Option 3

6.3.1 Exposed Workers

In Section 2.5.4 above the estimated cost to the community of exposure to chrysotile asbestos at a variety of exposure levels was analysed.

The cost was also analysed across a range of values including:

- Number of employees exposed in Australia (10,300 to 22,300);
- Value of a human life ($1.5 million to $6.1 million); and
- Lung Cancer and Mesothelioma.

It will be seen from that analysis that a reduction in the exposure standard from 1 f/ml to 0.5 f/ml and 0.1 f/ml see a dramatic reduction in the costs of persons exposed as provided in Attachment 1 and summarised as follows:

Table 23: Annual Reduction in Health Costs from Reduction in Exposure Standard

Lung Cancer	1 f/ml to 0.5 f/ml	1 f/ml – 0.1 f/ml
Minimum Cost [39]	$485,408	$870,593
Maximum Cost [40]	$3,281,995	$5,885,599

Assuming (as per the Base Case) that workers are currently exposed to 1 f/ml, a reduction to 0.1 f/ml would lead to annual lung cancer cost savings of $870,593 to $5,885,599 per annum. The present value of this saving over 40 years at a discount rate of 8% ranges from $10,381,485 to $70,183,492.

By including the costs of mesothelioma at a minimum of 5% of lung cancer costs up to 50% the range in annual savings could be $914,122 to $8,828,398. The present value of this saving over 40 years at a discount rate of 8% ranges from $10,900,551 to $105,275,233.

6.3.2 Large Business

In the large business sector it is not envisaged that a reduction to a lower exposure level would impose significant additional burdens. Nevertheless, large business may be required to enhance their risk control and health surveillance to ensure the lower exposures are not exceeded.

Despite a higher exposure standard of 1 fibre/ml [41] currently in existence nationally, the NICNAS report provided a summary of occupational exposures taken from a small number of samples from atmospheric monitoring, together with exposure trends.

Table 24 below shows that the exposure standard of 1 fibre/ml is rarely reached or exceeded for the major manufacturer, Bendix Mintex whilst a lower exposure of 0.1 f/ml is exceeded in the brake bonding and manufacturing.

Table 24: Industry Exposure Measurements Using Air Monitoring

Industry	No of Samples	< 0.1 fibre / ml	> 0.1 fibre / ml	Highest Recording
Bendix Mintex	461 personal	84%	16%	1.02 fibre/ ml
Richard Klinger	232 personal	58%	42%	0.8 fibre / ml
Vivacity	Nil	-	-	-
Brake Bonding	6 personal	80%	20%	0.2 fibre / ml
Gasket Manufacturing	3 personal	100%	-	-
Service Garages	5 personal	100%	-	-

[39] Minimum: 10,300 persons exposed, value of human life at $1.5 million.

[40] Maximum: 22,300 persons exposed, value of human life at $6.1 million.

[41] NOHSC, 1988 currently under review.

Industry	No of Samples	< 0.1 fibre / ml	> 0.1 fibre / ml	Highest Recording
Brake Bonding	20 static	85%	15%	0.2 fibre / ml
Gasket Manufacturing	6 static	100 %	-	-
Service Garages	31 static	100%	-	-

6.3.3 Small Business

The impact on small business will rely on their ability to implement and enforce risk control procedures to ensure that their current levels of 1 f/ml are brought down to a lower, and harder to detect, level.

NSW WorkCover, in their Newcastle region sample discussed in Section 2.3.9(a) above, noted that in the Small Business sector, adoption of additional risk control and air monitoring procedures to ensure compliance with a more stringent regulatory standard would be difficult to achieve.

6.3.4 Government

It is anticipated that the impact on Government of a reduction in the National exposure standard would be a short term refocus of priorities of the Inspectorate to an educational role and public awareness role. Once the change was communicated to the workplace, this activity would not be sustained and other Inspectorate priorities would be implemented. It is not envisaged that there would be a sustained increase in government resources required, more a redeployment away from, for example, noise control or manual handling, to focus on the National Standard. Asbestos is already heavily regulated and therefore widely known by the broader community as a harmful substance and, unlike the “regulation” of a brand new hazardous chemical, communicating issues surrounding its use are generally easier to promulgate.

The same could also be said were an immediate ban on chrysotile to take effect. There would be an initial focus of effort on communicating this change to the community. This would be absorbed by the existing inspectorate resources.

6.4 Summary

Option 3 achieves the outcomes required in the Objective, namely to reduce death and illness associated with current and future exposure to chrysotile asbestos however not to the same extent as that of Option 2.

There will still be deaths from exposure at 0.1 f/ml.

In addition, Option 3 may impose additional costs on business to comply with the lower exposure standard.

7. RISK AND UNCERTAINTY ANALYSIS

7.1 Purpose of this Section of the RIS

The purpose of this Section of the RIS is to identify the impact of any risks or uncertainties that exist is relation to the preferred Option.

7.2 Assumptions Made

To assist the reader, a comparison of the assumptions made during the preparation of the Stage I EIA are provided together with an outline of how these assumptions have changed and been incorporated into this RIS as a result of the feedback from the public consultation period.

Assumption Made in Stage I EIA	**Proposed Changes to Stage II RIS**
1. Actions to ban future exposure to chrysotile cannot influence future illness occurring from past exposure, or from future exposure to past uses;	No Change
2. Average worker exposure is 40 years;	No Change
3. Number of persons currently exposed to chrysotile is 10,300;	Disclosed present value across a range of exposed workers from 10,300 to 22,300.
4. The predicted number of persons who will develop lung cancer out of those persons currently exposed ranges from 1.75 to 17.82 over 40 years.	Shown NPV across a range of exposures. Option 3 introduced to show the impact of a reduction in the exposure standard.
5. Cannot quantify those persons falling victim to asbestosis, mesothelioma, cancer of larynx etc.	Mesothelioma incidence 5% to 50% that of lung cancers. Cost to treat and compensate is the same as lung cancer.
6. Lung cancer & mesothelioma & other malignancies treatment costs $57,000; Asbestosis is $2,200.	No Change
7. Statutory compensation for lung cancer & mesothelioma other malignancies is $160,000; Asbestosis is $30,000.	No Change
8. Judgments and settlements for lung cancer & mesothelioma other malignancies is $450,000;	No Change

Assumption Made in Stage I EIA	**Proposed Changes to Stage II RIS**
Asbestosis is $150,000.	
9. The value of a human life lies between $1.5 million to $6.1 million;	Disclose cost impact at both ends of the range. No judgement made as to which value is more appropriate.
10. Cost to business through adherence to current State, Territory and National legislation will not change following a ban on chrysotile;	Will discuss VIC Work Cover's and disclose the range of likely savings.
11. There are 7,586 small businesses involved in the use of chrysotile;	No Change
12. Within 5 years, costs of chrysotile substitutes will fall to equal current chrysotile costs.	Within 3 years of phase out no predicted reduction in cost of raw material substitutes to mirror that of chrysotile. However the market price of brake products and gaskets is assumed to fluctuate after the ban is fully implemented as producers compete at various market price points.
13. The impacts will be linear, ie. Equal each year of the phase out rather than reducing or increasing as the phase out progresses.	Make the argument for linearity clearer: Business would not risk waiting till the last minute but would manage stocks over the period to avoid incurring costs all in the first year if possible. Do a sensitivity on front or rear loaded impacts.
14. The export market for products currently containing chrysotile may be adversely affected by a change to substitute materials.	No Change
15. The processes of government that prevent the importation of asbestos-products after the ban is imposed will be effective.	No Change
16. Friction product cost difference between asbestos and non-asbestos:	Assess / discuss market costs of alternative friction products pre and post the ban. Explain that the cost of raw materials will

Assumption Made in Stage I EIA	Proposed Changes to Stage II RIS
?? Brakes 5% increase for non-asbestos ?? Gaskets 17% increase for non-asbestos	remain higher for non-asbestos but that at the retail end of the market, given the small amount of raw material used that comprises the friction product, the cost should even up over the ban. AAAA data to be included.
17. Friction product longevity is equivalent	No Change
18. There will be no exemptions to the ban	Discuss qualitative cost and benefits to groups from proposed exemptions. ?? Department of Transport and Department of Defence, COMCARE, CSIRO. ?? Vehicles older than 1973; ?? 20 to 30 year whole of life spares for Defence equipment (aircraft).
19. Status Quo or the Proposed Phase Out assessed only	Introduce a qualitative assessment of a Reduction in the National Exposure standard as another Option to assess.

7.3 Risk : Uncertainty Analysis

7.3.1 Uncertainty as to Safety of Chrysotile Substitutes

Alternative materials are used in products in place of chrysotile. Chrysotile has been completely replaced in the following products:

?? Cement sheeting, tubes and piping;
?? Roofing tiles;
?? Textiles;
?? Fibre insulation;
?? Railway brake blocks;
?? Brake disc pads in new automobiles.

In addition, the following products too are moving towards non-chrysotile substitutes:

?? Clutch facings;
?? Brake disc pads;
?? Gaskets such as spiral wound and head gaskets;
?? Washers;
?? Packing material; and
?? Rotor blades.

The materials in place of chrysotile can be categorised according to their properties as follows:

1. Synthetic vitreous (mineral) fibres;

2. Natural mineral fibres;

3. Synthetic organic fibres; and

4. Natural organic fibres.

There are a number of uncertainties surrounding the use of alternative materials which include, safety, performance and cost.

It is the safety aspect of substitutes which is of particular concern to the proposal to phase out chrysotile. In order to achieve the stated objective of a reduction in future illness and death, the safety of substitute materials must be assured.

A recent review by Dr David Douglas has been undertaken to perform a health assessment of alternative materials to chrysotile asbestos.

In conclusion, there is still a lack of data on the likely human health consequences and safety surrounding the use of the alternative materials listed above. Out of the eighteen (18) alternative materials assessed by Dr Douglas, only the following four have been assessed as safe in human studies:

?? Fibre glass;

?? Rock wool;

?? Slag wool;

?? SP Glass.

This lack of certainty as to the safety of alternative materials casts some doubt on the ability for Option 2 to fully eliminate the level of future illness and death which currently exists in the Base Case.

In a worst case scenario, if it were found in the future that substitutes were as harmful as chrysotile and the benefits assumed herein of a phase-out were not realised, then the net result of the phase out proposal over 40 years becomes $2,707,965 as noted in Section 5.5 above. Refer to Attachment 1 for sensitivity analysis surrounding Option 2 variables.

7.3.2 Uncertainty as to the Health Costs of Other Asbestos Related Diseases

The figures on the costs of illness and death due to exposure to chrysotile are based on lung cancer and mesothelioma. They do not include costs of illness due to other asbestos related malignancies or asbestosis.

There is no data available to indicate the number of cases of asbestosis likely to development at current exposure levels. Also, at current exposure levels the risk of developing asbestosis is considered by NOHSC to be low. Nevertheless, asbestosis is a

chronic illness resulting in some 20 years of treatment as an estimated cost per case of $2,200 per annum, together with a statutory compensation of $30,000 and judgements/settlements of $150,000.

Therefore, the costs of illness quantified and quoted in this RIS are likely to be conservative – the costs may be higher but to a degree that cannot be quantified.

7.3.3 Uncertainty as to the Need for Asbestos in Industrial Gaskets

During our consultation, it was noted that some industrial applications of gaskets in, for example, large Oil Refinery Plants, require critical high performance materials to ensure the levels of performance required.

Chrysotile is one such material which ensures the high levels of performance necessary. The oil industry has expressed uncertainty as to the availability of a viable substitute material for industrial gaskets which would meet their quality control requirements and engineering standards.

Richard Klinger has advised that substitutes are available and undergoing evaluation trials. AA Gaskets have also been developing asbestos free substitutes for the petrochemical industry.

Within the three years phase-out it has been assumed that such substitutes are effective in performing the specialised function for which they have been designed.

7.3.4 Uncertainty as to Effectiveness of Importation Bans

Industry have expressed some concerns in relation to the economic impact of a phase out of asbestos in friction materials, as outlined below:

?? Importation

A prohibition on the importation of raw chrysotile, and subsequent restriction of manufacturing appears to industry to be relatively simple.

However, their concern relates to the ability of the relevant regulatory and enforcement bodies to provide impenetrable importation controls that ensure asbestos based friction material products are not imported into the country. They state that the untrained eye would be unable to differentiate asbestos product from non-asbestos product; hence, import controls will be reliant on importers providing accurate information as to the constituents of the product.

?? Supply/Possession

The Technical Assessment of the phase out of chrysotile puts forward a potential model of banning the supply and possession of products containing asbestos within each relevant jurisdiction. This strategy, combined with importation restrictions seems to industry to provide the greatest chance of ensuring control within Australia.

?? Summary

In the absence of these controls, industry states that Australian industry will be disadvantaged. In this context costs may include:

- The cost of establishing and maintaining relevant importation controls;
- The cost to industry if these controls are not impenetrable; and
- The cost to regulatory authorities of providing remedies to Australian industry if the importation rules are breached.

?? Costs

No information is available to enable these costs to be quantified.

7.4 Risk: Sensitivity Analysis

7.4.1 Overview

Sensitivity Analysis is used to assess the possible impact of uncertainty. It illustrates what would happen if the assumptions made about some or all of the key variables proved to be wrong and shows how changes in the values of various factors affect the overall cost or benefit of a given legislative proposal.

A key practical role of sensitivity analysis is to incorporate different views about one or more key assumptions which can reasonably be held by the different people involved in the assessment process.

It is a useful means of indicating the *critical elements* on which the outcome of the legislative proposal depends. This allows government and stakeholders to focus on these areas during legislative implementation or to divert further resources to the improvement of cost and benefit estimates and the reduction of uncertainty.

7.4.2 Critical Sensitivity Elements

Analysis of the impacts showed that there were key areas to which the costs and benefits were particularly sensitive.

1. Phase Out Period adopted;
2. Number of workers exposed in end use.
3. Compliance Costs Savings; and
4. Cost convergence of Asbestos substitutes.

An assessment of the sensitivity of the net present value to changes in these variables is provided in Attachment 4.

A Summary of the results is provided in the Table below.

Table 25: Scenario Analysis

Key Assumptions	Net Present Value over 40 years at 8%			Discussion
	Scenario 1	Scenario 2	Scenario 3	
Timeframe	$26,895,561	$17,486,930	-$2,327,666	Highly sensitive to changes in the phase out period. The shorter the period the higher the NPV.
	Scenario 4	Scenario 5		
Workers Exposed	$26,895,561	$13,880,157		Highly sensitive to the number of workers exposed. However, halving the estimated number of workers exposed still results in a positive NPV.
	Scenario 6	Scenario 7		
Compliance Cost Savings	$26,895,561	-$2,615,951		If business were to experience no change in the costs of complying with OH&S controls then the NPV becomes slightly negative.
	Scenario 8	Scenario 9		
Substitutes Cost Never Converge	$26,895,561	-$46,507,961		The proposal is highly sensitive to the cost of substitute brakes and gaskets remaining some 17 to 20% higher than the asbestos products over the next 40 years.

Despite the above findings which show the proposal to be highly sensitive to changes in the underlying assumptions it is also important to note that it has not been possible to fully quantify the current cost to the community of illnesses such as asbestosis and other malignancies arising from chrysotile exposure. Hence the “Net Present Value” is not a complete quantification of all quantitative impacts and thus should be used as a guide to decision making only.

8. CONCLUSION

8.1 Summary of Findings

8.1.1 Discussion Option 2

A ban on the use of chrysotile will have a benefit through a reduction in illness and death to those persons exposed. There is a high degree of uncertainty as to the quantum of this reduction.

If we assume that:

- the current exposure of workers is 1 f/ml;
- the number of workers exposed is 22,300;
- the value of a human life is $1.5 million; and
- mesothelioma imposes an additional 5% cost on top of lung cancer;

then the phase-out of the use of chrysotile over three years will have a significant benefit and this benefit will take the form of a reduction in costs to the community from death and illness of $24,187,596 in present value terms over 40 years.

This represents some 18 persons whose lives will be saved over a 40-year period together with the suffering of their friends and relatives.

It is noted that the number of persons affected may in fact be higher than this because data on the incidence of other diseases caused by exposure to chrysotile such as asbestosis and other malignancies, is not available. In addition, the number of workers exposed could be twice that assumed for this conclusion.

It is recognised, however, that the degree of current exposure to chrysotile is uncertain and may be significantly less than 1 f/ml. The NICNAS Report revealed that generally the exposure is less than 0.1 f/ml. As mentioned earlier, however, the sample size used was small and a high degree of uncertainty exists as to the true current exposure across the some 7,860 businesses where exposure to chrysotile occurs.

The costs incurred to phase out the use of chrysotile over a 3 year period will be $20,789,143 for large business and $6,014,403 for small business. These costs are in present value terms discounted over 40 years. The costs to small business are assumed to last for only 3 years during the proposed phase in, and assumes that the market costs of asbestos-substitutes fall to asbestos levels in the same period.

8.1.1(a) Comparison to Options 1 and 3

The Base Case results in a range of costs to the community from continuing health costs to affected workers and costs to business to mitigate where possible these health impacts.

The Base Case fails to achieve the outcomes required in the Objective, namely to reduce death and illness associated with current and future exposure to chrysotile asbestos.

Option 3 achieves the outcomes required in the Objective, namely to reduce death and illness associated with current and future exposure to chrysotile asbestos however not to the same extent as that of Option 2.

There will still be deaths from exposure at 0.1 f/ml.

In addition, Option 3 may impose additional costs on business to comply with the lower exposure standard.

8.2 Conclusion

On balance and having regard for the risks and uncertainties associated with the proposal to phase out chrysotile discussed in Section 6, savings in illness and death are expected to occur from future exposure to the material.

The quantum of this future exposure is uncertain but is believed to lie in concentrations between 1 f/ml and 0.1 f/ml. These savings will result from reduced illness and death affecting between 2 and 17 persons over a 40 year period, with the variation in the number of persons affected depending on the exposure level.

These savings will occur at an annual cost to small business for a 3-year period as shown in 5.3.3 above.

The analysis supports the recommendation in the NICNAS Report that the use of chrysotile should be phased out over the shortest possible period of time. Over this period, while exemptions may be initially granted for specialist applications, alternatives are expected to have been developed, tested and available to the market.

The proposal to phase out the use of chrysotile is also consistent with actions being taken in the UK, Europe and elsewhere.

8.3 Implementation Issues

8.3.1 Legislative Implementation

NOHSC proposed that Chrysotile Asbestos be included in Schedule 2 of the National Model Regulations for the Control of Workplace Hazardous Substances and that it will then be the responsibility of each jurisdiction to give effect to the proposed Chrysotile Phase-Out by way of their own legislation.

Comcare has suggest that the Commonwealth may use Schedule 1A (Scheduled Carcinogenic Substances) and Schedule 1, Part 2 (Permitted Circumstance for Handling Certain Hazardous Substances with Carcinogenic Properties) of the Occupational Health and Safety (Commonwealth Employment) (National Standards) Regulations together with changes to relevant approved Codes of Practice.

8.3.2 Implementation of Exemptions

NOHSC should carefully consider how exemptions, if any, are implemented to ensure a consistent approach nationally.

8.3.3 Future Research

In response to the great uncertainty surrounding actual exposure noted in this RIS and the NICNAS report, it is recommended that further research be undertaken to determine actual exposure to Chrysotile and its substitutes in the Community and the impact of that exposure on health.

9. FURTHER READING AND METHODOLOGY

9.1 Further Reading

1. National Occupational Health and Safety Commission, *Chrysotile Asbestos Priority Existing Chemical No. 9: Full Public Report,* February 1999.

2. NOHSC Report: Dr David Douglas, *Health assessment of alternative materials in the event of a phase-out of uses of chrysotile asbestos in Australia*, June 2000.

3. NOHSC Report: ALROSS Pty Ltd, *Technical Assessment of the Impact of a Phase-Out of Uses of Chrysotile Asbestos in Australia*, June 2000.

9.2 Methodology: Discounted Cash Flow Analysis

9.2.1 The Concept Of Discounting

The costs and benefits flowing from a legislative action are spread over time. Initial costs are borne up front while benefits may extend far into the future. Even in the absence of inflation, a dollar received now is worth more than a dollar received at some time in the future. Conversely, a dollar's cost incurred now is more onerous than a dollar's cost accruing at some future time. This reflects the concept of time preference which can be seen in the fact that people normally prefer to receive cash sooner rather than later and pay bills later rather than sooner. The existence of real interest rates reflects this time preference.

In order to compare the costs and benefits flowing from a Code it is necessary to bring them back to a common time dimension. This is done by discounting the value of future costs and benefits in order to determine their present value. The process of discounting is simply compound interest worked backwards.

9.2.2 Treatment of Inflation

Due to inflation, costs and benefits which occur later will be higher in cash terms than similar costs or benefits which occur earlier.

There are two different ways to tackle this issue. Either nominal values can be used for each time period and then discounted with a nominal discount rate, or real cash flows can be used discounted by a real discount rate. There is no inherent reason to choose one rather than the other as both will provide the same answer, but the important factor is that real and nominal cash flows and discount rates must never be mixed in the one evaluation. Where cash flows are in real or un-escalated terms, only the real discount rate should be used and where nominal or escalated cash flows are used, the nominal discount rate must be used.

In practice, however, there are strong merits in adopting a uniform basis of analysis and it is considered that the use of real cash flows and discount rates simplifies the forecasting and calculation processes. Hence, the analysis used in this RIS has used costs and benefits valued in real terms and discounted by a real discount rate.

9.2.3 Discount Rate

The discount rate nominated by the Commonwealth Treasury is 8% per annum.

This is a 'real' discount rate and contains no allowance for inflation. Thus cash flows discounted using the discount rate should be not have allowances made for any future inflation projections.

9.3 The Decision Rule: Net Present Value

Net Present Value is the sum of the discounted legislation benefits less discounted costs. Formally, it can be expressed as follows:

$$NPV = \sum_{n=0}^{n} \frac{B_n - C_n}{(1 + r)^n}$$

where B_n = project benefits in year n expressed in constant dollars

C_n = project costs in year n expressed in constant dollars

r = real discount rate

n = number of years that costs and/or benefits are produced

Under this decision rule, a Code is potentially worthwhile (or viable) if the NPV is greater than zero, that is, the total discounted value of benefits is greater than the total discounted costs.

ATTACHMENTS

ATTACHMENT 1

DISCOUNTED CASH FLOW ANALYSIS SPREADSHEET

OPTION 2 IMPACT ANALYSIS WITH A 3 YEAR PHASE OUT (TABLE 22)

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$731,524	$1,463,049	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
	one third	two thirds								
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$393,000	$786,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$853,333	$0	$0	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Small Business 3 year	$4,440,000	$2,220,000	$0	$0	$0	$0	$0	$0	$0	$0
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
NET RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	$2,707,965
If Nil Savings to Business	-$2,615,951

OPTION 2 IMPACT ANALYSIS WITH A 5 YEAR PHASE OUT

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$438,915	$877,829	$1,316,744	$1,755,658	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$235,800	$471,600	$707,400	$943,200	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$64,000	$128,000	$192,000	$256,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$64,000	$128,000	$192,000	$256,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$512,000	$0	$0	$2,048,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
Small Business 5 year	$5,328,000	$3,996,000	$2,664,000	$1,332,000	$0	$0	$0	$0	$0	$0
NETT RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	-$4,908,535
If Nil Savings to Business	-$9,846,766

OPTION 2 IMPACT ANALYSIS WITH 10 YEAR PHASE OUT

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$219,457	$438,915	$658,372	$877,829	$1,097,287	$1,316,744	$1,536,201	$1,755,658	$1,975,116	$2,194,573
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$117,900	$235,800	$353,700	$471,600	$589,500	$707,400	$825,300	$943,200	$1,061,100	$1,179,000
Elimination of Medical Examinations										
Initial	$32,000	$64,000	$96,000	$128,000	$160,000	$192,000	$224,000	$256,000	$288,000	$320,000
Departure	$32,000	$64,000	$96,000	$128,000	$160,000	$192,000	$224,000	$256,000	$288,000	$320,000
3 Yearly	$256,000	$0	$0	$1,024,000	$0	$0	$1,792,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
Small Business10 year	$5,994,000	$5,328,000	$4,662,000	$3,996,000	$3,330,000	$2,664,000	$1,998,000	$1,332,000	$666,000	$0
NETT RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	-$20,944,719
If Nil Savings to Business	-$25,091,748

OPTION 3 IMPACT ANALYSIS

Table 23 of RIS Year	1	2	3	4	5	6	7	8	9	10	**PV**
SAVINGS MAX											**@ 8%**
Lung Cancer only 3 year	$5,885,599	$5,885,599	$5,885,599	$5,885,599	$5,885,599	$5,885,599	$5,885,599	$5,885,599	$5,885,599	$5,885,599	**$70,183,492**
+ mesothelioma3 Year	$8,828,398	$8,828,398	$8,828,398	$8,828,398	$8,828,398	$8,828,398	$8,828,398	$8,828,398	$8,828,398	$8,828,398	**$105,275,233**
SAVINGS MIN											**@ 8%**
Lung Cancer only 3 year	$870,593	$870,593	$870,593	$870,593	$870,593	$870,593	$870,593	$870,593	$870,593	$870,593	**$10,381,485**
+ mesothelioma 3 Year	$914,122	$914,122	$914,122	$914,122	$914,122	$914,122	$914,122	$914,122	$914,122	$914,122	**$10,900,551**
COSTS											
Small Business 3 year	$4,440,000	$2,220,000	$0	$0	$0	$0	$0	$0	$0	$0	$6,014,403
Small Business 5 year	$5,328,000	$3,996,000	$2,664,000	$1,332,000	$0	$0	$0	$0	$0	$0	$11,453,088
Small Business10 year	$5,994,000	$5,328,000	$4,662,000	$3,996,000	$3,330,000	$2,664,000	$1,998,000	$1,332,000	$666,000	$0	$22,919,658
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$20,789,143
											$61,176,292

ATTACHMENT 2

BUSINESS COMPLIANCE COSTS: PRESENT VALUE

Victorian WorkCover Data Provided: **@ 8%**

1. Victoria Low refer Table 5 of RIS

Year	1	2	3	4	5	6	7	8	9	10	NPV	Sub Total
Waste Disposal	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	**$3,756,253**	
Medical Examinations												
Initial	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	**$515,143**	
Departure	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	$43,200	**$515,143**	
Three Yearly	$345,600	$0	$0	$345,600	$0	$0	$345,600	$0	$0	$345,600	**$1,490,880**	**$6,277,420**
HEPA Filters	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	**$8,514,174**	
RPE	$675,000	$675,000	$675,000	$675,000	$675,000	$675,000	$675,000	$675,000	$675,000	$675,000	**$8,049,114**	**$16,563,288**
Air Monitoring	$787,500	$0	$0	$0	$0	$787,500	0	$0	$0	$0	**$2,177,727**	**$2,177,727**
											$25,018,435	**$25,018,435**

Victoria High

Year	1	2	3	4	5	6	7	8	9	10	NPV	
Waste Disposal	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000	**$3,756,253**	
Medical Examinations												
Initial	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	**$1,030,287**	
Departure	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	$86,400	**$1,030,287**	
Three Yearly	$691,200	$0	$0	$691,200	$0	$0	$691,200	$0	$0	$691,200	**$2,981,761**	**$8,798,587**
HEPA Filters	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	$714,000	**$8,514,174**	
RPE	$1,350,000	$1,350,000	$1,350,000	$1,350,000	$1,350,000	$1,350,000	$1,350,000	$1,350,000	$1,350,000	$1,350,000	**$16,098,228**	**$24,612,402**
Air Monitoring	$787,500	$0	$0	$0	$0	$787,500	0	$0	$0	$0	**$2,177,727**	**$2,177,727**
											$35,588,716	**$35,588,716**

Australia Low

Year	1	2	3	4	5	6	7	8	9	10	NPV	
Waste Disposal	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	**$14,059,119**	
Medical Examinations												
Initial	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	**$1,907,938**	
Departure	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	**$1,907,938**	
Three Yearly	$1,280,000	$0	$0	$1,280,000	$0	$0	$1,280,000	$0	$0	$1,280,000	**$5,521,780**	**$23,396,775**
HEPA Filters	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	**$31,867,337**	
RPE	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	**$29,811,533**	**$61,678,870**
Air Monitoring	$2,947,500	$0	$0	$0	$0	$2,947,500	$0	$0	$0	$0	**$8,150,919**	**$8,150,919**
											$93,226,564	**$93,226,564**

Australia High

Year	1	2	3	4	5	6	7	8	9	10	NPV	
Waste Disposal	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	**$14,059,119**	
Medical Examinations												
Initial	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	**$3,815,876**	
Departure	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	**$3,815,876**	
Three Yearly	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000	**$11,043,559**	**$32,734,431**
HEPA Filters	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	$2,672,400	**$31,867,337**	
RPE	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	**$59,623,067**	**$91,490,403**
Air Monitoring	$2,947,500	$0	$0	$0	$0	$2,947,500	$0	$0	$0	$0	**$8,150,919**	**$8,150,919**
											$132,375,753	**$132,375,753**

ATTACHMENT 3

CALCULATION OF COSTS OF DEATH AND ILLNESS

	PRESENT VALUE OF COSTS OF DEATH AND ILLNESS											
	Year	1	2	3	4	5	6	7	8	9	10	PV
	Scenario A											@ 8%
	l f/ml lung cancer only	$2,090,072	$2,090,072	$2,090,072	$2,090,072	$2,090,072	$2,090,072	$2,090,072	$2,090,072	$2,090,072	$2,090,072	**$24,923,300**
	1 f/ml 5 % meosthelioma	$2,194,576	$2,194,576	$2,194,576	$2,194,576	$2,194,576	$2,194,576	$2,194,576	$2,194,576	$2,194,576	$2,194,576	**$26,169,470**
	1 f/ml 50% mesothelioma	$3,135,108	$3,135,108	$3,135,108	$3,135,108	$3,135,108	$3,135,108	$3,135,108	$3,135,108	$3,135,108	$3,135,108	**$37,384,951**
	0.1 f/ml lung cancer only	$205,323	$205,323	$205,323	$205,323	$205,323	$205,323	$205,323	$205,323	$205,323	$205,323	**$2,448,397**
	0.1 f/ml 5% mesothelioma	$215,589	$215,589	$215,589	$215,589	$215,589	$215,589	$215,589	$215,589	$215,589	$215,589	**$2,570,815**
	0.1 f/ml 50% mesothelioma	$307,985	$307,985	$307,985	$307,985	$307,985	$307,985	$307,985	$307,985	$307,985	$307,985	**$3,672,602**
	Scenario B											@ 8%
	l f/ml lung cancer only	$6,526,772	$6,526,772	$6,526,772	$6,526,772	$6,526,772	$6,526,772	$6,526,772	$6,526,772	$6,526,772	$6,526,772	**$77,829,232**
	1 f/ml 5 % meosthelioma	$6,853,110	$6,853,110	$6,853,110	$6,853,110	$6,853,110	$6,853,110	$6,853,110	$6,853,110	$6,853,110	$6,853,110	**$81,720,687**
Table 16	1 f/ml 50% mesothelioma	$9,790,157	$9,790,157	$9,790,157	$9,790,157	$9,790,157	$9,790,157	$9,790,157	$9,790,157	$9,790,157	$9,790,157	**$116,743,837**
	0.1 f/ml lung cancer only	$641,173	$641,173	$641,173	$641,173	$641,173	$641,173	$641,173	$641,173	$641,173	$641,173	**$7,645,740**
	0.1 f/ml 5% mesothelioma	$673,232	$673,232	$673,232	$673,232	$673,232	$673,232	$673,232	$673,232	$673,232	$673,232	**$8,028,031**
	0.1 f/ml 50% mesothelioma	$961,760	$961,760	$961,760	$961,760	$961,760	$961,760	$961,760	$961,760	$961,760	$961,760	**$11,468,616**
	Scenario C											@ 8%
	l f/ml lung cancer only	$965,399	$965,399	$965,399	$965,399	$965,399	$965,399	$965,399	$965,399	$965,399	$965,399	**$11,512,010**
Table 17	1 f/ml 5 % meosthelioma	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	**$12,087,599**
	1 f/ml 50% mesothelioma	$1,448,098	$1,448,098	$1,448,098	$1,448,098	$1,448,098	$1,448,098	$1,448,098	$1,448,098	$1,448,098	$1,448,098	**$17,268,009**
	0.1 f/ml lung cancer only	$94,806	$94,806	$94,806	$94,806	$94,806	$94,806	$94,806	$94,806	$94,806	$94,806	**$1,130,525**
	0.1 f/ml 5% mesothelioma	$99,547	$99,547	$99,547	$99,547	$99,547	$99,547	$99,547	$99,547	$99,547	$99,547	**$1,187,059**
	0.1 f/ml 50% mesothelioma	$142,209	$142,209	$142,209	$142,209	$142,209	$142,209	$142,209	$142,209	$142,209	$142,209	**$1,695,787**
	Scenario D											@ 8%
	l f/ml lung cancer only	$3,014,699	$3,014,699	$3,014,699	$3,014,699	$3,014,699	$3,014,699	$3,014,699	$3,014,699	$3,014,699	$3,014,699	**$35,949,120**
	1 f/ml 5 % meosthelioma	$3,165,433	$3,165,433	$3,165,433	$3,165,433	$3,165,433	$3,165,433	$3,165,433	$3,165,433	$3,165,433	$3,165,433	**$37,746,565**
	1 f/ml 50% mesothelioma	$4,522,048	$4,522,048	$4,522,048	$4,522,048	$4,522,048	$4,522,048	$4,522,048	$4,522,048	$4,522,048	$4,522,048	**$53,923,674**
	0.1 f/ml lung cancer only	$296,056	$296,056	$296,056	$296,056	$296,056	$296,056	$296,056	$296,056	$296,056	$296,056	**$3,530,353**
	0.1 f/ml 5% mesothelioma	$310,859	$310,859	$310,859	$310,859	$310,859	$310,859	$310,859	$310,859	$310,859	$310,859	**$3,706,873**
	0.1 f/ml 50% mesothelioma	$444,084	$444,084	$444,084	$444,084	$444,084	$444,084	$444,084	$444,084	$444,084	$444,084	**$5,295,530**

ATTACHMENT 4

SCENARIO ANALYSIS

Scenario Summary

Key Assumptions	Net Present Value over 40 years at 8%			Discussion
Timeframe	**Scenario 1** $26,895,561	**Scenario 2** $17,486,930	**Scenario 3** -$2,327,666	Highly sensitive to changes in the phase out period The shorter the period the higher the NPV.
Workers Exposed	**Scenario 4** $26,895,561	**Scenario 5** $13,880,157		Highly sensitive to the number of workers exposed However halving the estimated number of workers exposed still results in a positive NPV.
Compliance Cost Savings	**Scenario 6** $26,895,561	**Scenario 7** -$2,615,951		If business were to experience no change in the costs of complying with OH&S controls then the NPV becomes negative.
Substitutes Cost Never Converge	**Scenario 8** $26,895,561	**Scenario 9** -$46,507,961		The proposal is highly sensitive to the cost of substitute brakes and gaskets remaining some 17 to 20% higher than the asbestos products.

	PRESENT VALUE OVER 40 YEARS AT 8%		
	Scenario 1	**Scenario 2**	**Scenario 3**
SAVINGS IN DEATH AND ILLNESS COSTS			
Death & Illness Lung Cancer & Mesothelioma	$24,187,596	$22,395,465	$18,617,053
SAVINGS IN BUSINESS COMPLIANCE COSTS			
Elimination of Waste Disposal	$12,994,407	$12,031,613	$10,001,720
Elimination of Medical Examinations			
Initial	$3,526,896	$3,265,578	$2,714,631
Departure	$3,526,896	$3,265,578	$2,714,631
3 Yearly	$9,463,312	$8,770,927	$7,333,099
	$29,511,511	**$27,333,696**	**$22,764,082**
INCREMENTAL COSTS TO BUSINESS			
Small Business	$6,014,403	$11,453,088	$22,919,658
Large Business	$20,789,143	$20,789,143	$20,789,143
	$26,803,546	**$32,242,231**	**$43,708,801**
NET RESULT	**$26,895,561**	**$17,486,930**	**-$2,327,666**
VARIABLES			
Death and Illness savings derived from:			
Fibre exposure	1 f/ml	1 f/ml	1 f/ml
Number of persons exposed	22,300	22,300	22,300
Cost of Lung cancer	$667,000	$667,000	$667,000
Additional Cost of Mesothelioma	5%	5%	5%
Value of a human Life	1.5 million	1.5 million	1.5 million
Business Compliance Cost Savings from:			
Waste	$1,179,000 p.a.	$1,179,000 p.a.	$1,179,000 p.a.
Health Surveillance annual	$320,000 p.a	$320,000 p.a	$320,000 p.a
Health Surveillance 3 yearly	$2,560,000	$2,560,000	$2,560,000
HEPA	Nil	Nil	Nil
RPE	Nil	Nil	Nil
Air Monitoring	Nil	Nil	Nil
Business Increased Material/Proccessing Costs:			
Small Business cost impactc	Converge	Converge	Converge
Large Business capital	$8,300,000	$8,300,000	$8,300,000
Large Business recurrent	$1,098,900	$1,098,900	$1,098,900
Phase Out Timeframe	**3 Years**	**5 Years**	**10 Years**

SCENARIO 1

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$731,524	$1,463,049	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
	one third	two thirds								
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$393,000	$786,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$853,333	$0	$0	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Small Business 3 year	$4,440,000	$2,220,000	$0	$0	$0	$0	$0	$0	$0	$0
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
NET RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	$2,707,965
If Nil Savings to Business	-$2,615,951

SCENARIO 2

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$438,915	$877,829	$1,316,744	$1,755,658	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$235,800	$471,600	$707,400	$943,200	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$64,000	$128,000	$192,000	$256,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$64,000	$128,000	$192,000	$256,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$512,000	$0	$0	$2,048,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
Small Business 5 year	$5,328,000	$3,996,000	$2,664,000	$1,332,000	$0	$0	$0	$0	$0	$0
NETT RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	-$4,908,535
If Nil Savings to Business	-$9,846,766

SCENARIO 3

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$219,457	$438,915	$658,372	$877,829	$1,097,287	$1,316,744	$1,536,201	$1,755,658	$1,975,116	$2,194,573
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$117,900	$235,800	$353,700	$471,600	$589,500	$707,400	$825,300	$943,200	$1,061,100	$1,179,000
Elimination of Medical Examinations										
Initial	$32,000	$64,000	$96,000	$128,000	$160,000	$192,000	$224,000	$256,000	$288,000	$320,000
Departure	$32,000	$64,000	$96,000	$128,000	$160,000	$192,000	$224,000	$256,000	$288,000	$320,000
3 Yearly	$256,000	$0	$0	$1,024,000	$0	$0	$1,792,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
Small Business10 year	$5,994,000	$5,328,000	$4,662,000	$3,996,000	$3,330,000	$2,664,000	$1,998,000	$1,332,000	$666,000	$0
NETT RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	-$20,944,719
If Nil Savings to Business	-$25,091,748

	PRESENT VALUE OVER 40 YEARS AT 8%	
SAVINGS IN DEATH AND ILLNESS COSTS	**Scenario 4**	**Scenario 5**
Death & Illness Lung Cancer & Mesothelioma	$24,187,596	$11,172,192
SAVINGS IN BUSINESS COMPLIANCE COSTS		
Elimination of Waste Disposal	$12,994,407	$12,994,407
Elimination of Medical Examinations		
Initial	$3,526,896	$3,526,896
Departure	$3,526,896	$3,526,896
3 Yearly	$9,463,312	$9,463,312
	$29,511,511	**$29,511,511**
INCREMENTAL COSTS TO BUSINESS		
Small Business	$6,014,403	$6,014,403
Large Business	$20,789,143	$20,789,143
	$26,803,546	**$26,803,546**
NET RESULT	**$26,895,561**	**$13,880,157**
VARIABLES		
Death and Illness savings derived from:		
Fibre exposure	1 f/ml	1 f/ml
Number of persons exposed	**22,300**	**10,300**
Cost of Lung cancer	$667,000	$667,000
Additional Cost of Mesothelioma	5%	5%
Value of a human Life	1.5 million	1.5 million
Business Compliance Cost Savings from:		
Waste	$1,179,000 p.a.	$1,179,000 p.a.
Health Surveillance annual	$320,000 p.a	$320,000 p.a
Health Surveillance 3 yearly	$2,560,000	$2,560,000
HEPA	Nil	Nil
RPE	Nil	Nil
Air Monitoring	Nil	Nil
Business Increased Material/Proccessing Costs:		
Small Business cost impactc	Converge	Converge
Large Business capital	$8,300,000	$8,300,000
Large Business recurrent	$1,098,900	$1,098,900
Phase Out Timeframe	3 Years	3 Years

SCENARIO 4

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$731,524	$1,463,049	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
	one third	two thirds								
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$393,000	$786,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$853,333	$0	$0	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Small Business 3 year	$4,440,000	$2,220,000	$0	$0	$0	$0	$0	$0	$0	$0
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
NET RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	$2,707,965
If Nil Savings to Business	-$2,615,951

SCENARIO 5

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$337,889	$675,779	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668	$1,013,668
	one third	two thirds								
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$393,000	$786,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$853,333	$0	$0	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Small Business 3 year	$4,440,000	$2,220,000	$0	$0	$0	$0	$0	$0	$0	$0
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
NET RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	$2,707,965
If Nil Savings to Business	-$15,631,354

	PRESENT VALUE OVER 40 YEARS AT 8%	
SAVINGS IN DEATH AND ILLNESS COSTS	**Scenario 6**	**Scenario 7**
Death & Illness Lung Cancer & Mesothelioma	$24,187,596	$24,187,596
SAVINGS IN BUSINESS COMPLIANCE COSTS		
Elimination of Waste Disposal	$12,994,407	$0
Elimination of Medical Examinations		
Initial	$3,526,896	$0
Departure	$3,526,896	$0
3 Yearly	$9,463,312	$0
	$29,511,511	**$0**
INCREMENTAL COSTS TO BUSINESS		
Small Business	$6,014,403	$6,014,403
Large Business	$20,789,143	$20,789,143
	$26,803,546	**$26,803,546**
NET RESULT	**$26,895,561**	**-$2,615,951**
VARIABLES		
Death and Illness savings derived from:		
Fibre exposure	1 f/ml	1 f/ml
Number of persons exposed	22,300	22,300
Cost of Lung cancer	$667,000	$667,000
Additional Cost of Mesothelioma	5%	5%
Value of a human Life	1.5 million	1.5 million
Business Compliance Cost Savings from:		
Waste	**$1,179,000 p.a.**	**Nil**
Health Surveillance annual	**$320,000 p.a**	**Nil**
Health Surveillance 3 yearly	**$2,560,000**	**Nil**
HEPA	Nil	Nil
RPE	Nil	Nil
Air Monitoring	Nil	Nil
Business Increased Material/Proccessing Costs:		
Small Business cost impactc	Converge	Converge
Large Business capital	$8,300,000	$8,300,000
Large Business recurrent	$1,098,900	$1,098,900
Phase Out Timeframe	3 Years	3 Years

SCENARIO 6

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$731,524	$1,463,049	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
	one third	two thirds								
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$393,000	$786,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$853,333	$0	$0	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Small Business 3 year	$4,440,000	$2,220,000	$0	$0	$0	$0	$0	$0	$0	$0
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
NET RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	$2,707,965
If Nil Savings to Business	-$2,615,951

SCENARIO 7

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$731,524	$1,463,049	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
	one third	two thirds								
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Elimination of Medical Examinations										
Initial	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Departure	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3 Yearly	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INCREMENTAL COSTS TO BUSINESS										
Small Business 3 year	$4,440,000	$2,220,000	$0	$0	$0	$0	$0	$0	$0	$0
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
NET RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	-$26,803,546
If Nil Savings to Business	-$2,615,951

	PRESENT VALUE OVER 40 YEARS AT 8%	
SAVINGS IN DEATH AND ILLNESS COSTS	**Scenario 8**	**Scenario 9**
Death & Illness Lung Cancer & Mesothelioma	$24,187,596	$24,187,596
SAVINGS IN BUSINESS COMPLIANCE COSTS		
Elimination of Waste Disposal	$12,994,407	$12,994,407
Elimination of Medical Examinations		
Initial	$3,526,896	$3,526,896
Departure	$3,526,896	$3,526,896
3 Yearly	$9,463,312	$9,463,312
	$29,511,511	**$29,511,511**
INCREMENTAL COSTS TO BUSINESS		
Small Business	$6,014,403	$79,417,925
Large Business	$20,789,143	$20,789,143
	$26,803,546	**$100,207,068**
NET RESULT	**$26,895,561**	**-$46,507,961**
VARIABLES		
Death and Illness savings derived from:		
Fibre exposure	1 f/ml	1 f/ml
Number of persons exposed	22,300	22,300
Cost of Lung cancer	$667,000	$667,000
Additional Cost of Mesothelioma	5%	5%
Value of a human Life	1.5 million	1.5 million
Business Compliance Cost Savings from:		
Waste	$1,179,000 p.a.	$1,179,000 p.a.
Health Surveillance annual	$320,000 p.a	$320,000 p.a
Health Surveillance 3 yearly	$2,560,000	$2,560,000
HEPA	Nil	Nil
RPE	Nil	Nil
Air Monitoring	Nil	Nil
Business Increased Material/Proccessing Costs:		
Small Business cost impactc	**Converge**	**Do Not Converge**
Large Business capital	$8,300,000	$8,300,000
Large Business recurrent	$1,098,900	$1,098,900
Phase Out Timeframe	3 Years	3 Years

SCENARIO 8

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$731,524	$1,463,049	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
	one third	two thirds								
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$393,000	$786,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$853,333	$0	$0	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Small Business 3 year	$4,440,000	$2,220,000	$0	$0	$0	$0	$0	$0	$0	$0
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
NET RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	$2,707,965
If Nil Savings to Business	-$2,615,951

SCENARIO 9

Year	1	2	3	4	5	6	7	8	9	10
SAVINGS SCENARIO A) @ 1 F/ML										
Death & Illness Lung Cancer & Mesothelioma	$731,524	$1,463,049	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573	$2,194,573
	one third	two thirds								
INCREMENTAL SAVINGS TO BUSINESS										
Elimination of Waste Disposal	$393,000	$786,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000	$1,179,000
Elimination of Medical Examinations										
Initial	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
Departure	$106,667	$213,333	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000	$320,000
3 Yearly	$853,333	$0	$0	$2,560,000	$0	$0	$2,560,000	$0	$0	$2,560,000
INCREMENTAL COSTS TO BUSINESS										
Small Business 3 year	$6,660,000	$6,660,000	$6,660,000	$6,660,000	$6,660,000	$6,660,000	$6,660,000	$6,660,000	$6,660,000	$6,660,000
Large Business	$9,398,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900	$1,098,900
NET RESULT										

Sensitivity;	NPV
If Nil Savings in Death and Illness	-$70,695,556
If Nil Savings to Business	-$76,019,472

APPENDICES

The comments received as a result of the public consultation period, following the release of the Stage I EIA, were reviewed.

The following submissions were forwarded from NOHSC for our review:

Stakeholder	**Views**
WorkSafe Victoria (Victorian WorkCover Authority)	The VWA recommends that: ?? the RIS is revised and takes into account an estimate of exposed workers that is revised upwards (2 in 55,000 workers exposed); ?? Calculation of benefits take into account the number of likely cases of mesothelioma and other asbestos related diseases; ?? Benefits would also accrue from a reduction in required risk controls and health surveillance; ?? Further improvement could be achieved by the inclusion of sensitivity analysis, especially in terms of the value of life; and ?? The RIS take into account the agreed phase-out date for chrysotile asbestos, that is 31 December 2003.
Australasian Faculty of Occupational Medicine	The AFOM: ?? supports a phase-out of chrysotile asbestos as soon as possible but no later than 31 December 2003; ?? agrees that a phase-out is feasible and will reduce the need for specific exemptions; ?? believes asbestos is an occupational and environmental hazard of major proportion having already been responsible for an estimated 25,000 deaths in Australia; ?? asbestos related lung cancers are 2:1 relative to mesothelioma. ?? feels it essential for Australia to be part of a worldwide ban.
Australian Automotive Aftermarket Association Ltd	The AAAA: ?? Supports the phase out of automotive products containing Chrysotile asbestos by 31st December 2003; ?? List of exemptions should be as small as possible; ?? Phase-out and ban to be supported by appropriate legislation and/or regulation in each state and territory and federally. The AAAA also suggests mechanisms for the treatment of redundant stock and the establishment of working parties and a national monitoring committee.

Australian Council of Trade Unions	The ACTU believes: ?? Every effort must be made to achieve a complete ban as far ahead of December 2003 as possible; ?? The voluntary approach of the last decade has not reduced the volume of raw asbestos or imported products containing asbestos; ?? State based prohibitions be supported by Commonwealth customs ban on all imported raw asbestos and asbestos containing products; ?? There are very few areas where exemptions may appear to be necessary: ?? Motor vehicle brake linings and pads for light vehicles manufactured prior to 1973; and ?? Asbestos parts used by the Australian Defence Forces for some equipment (helicopters and aircraft).

In addition, the Office of Regulation Review correspondence, accompanying their assessment of the adequacy of the Stage I RIS prior to releasing it for public comment, was also reviewed as it identified areas where further information could be sought from interested parties during the public consultation period.

The following lists the persons consulted during the preparation of the Stage 2 RIS and the outcomes of that consultation.

Stage II Persons Consulted

Discussions were held with the following parties to gather cost and effectiveness data for road vehicle – frictions products.

?? Toyota - Ryde

?? Holden - Ryde

?? Brookers Brakes – West Ryde

?? Repco – West Ryde

The results of these discussions are outlined in the following Table.

Make	**Model**	**Recommended Retail Price**			**Estimated Life**	
		Asbestos	*Non-Asbestos*	*% Difference*	*Asbestos*	*Non-Asbestos*
Toyota	Camry	$50 approx	$83.40	66.8%	30,000-40,000 km	30,000-40,000 km
Toyota	Prado	$50 approx	$83.40	66.8%	15,000-20,000 km	15,000-20,000 km

Make	Model	Recommended Retail Price			Estimated Life	
		Asbestos	*Non-Asbestos*	*% Difference*	*Asbestos*	*Non-Asbestos*
Toyota	Land Cruiser	$50 approx	$83.40	66.8%	15,000-20,000 km	15,000-20,000 km
Holden	Commodore	$77.00	$91.40	18.20%	30,000 km	30,000 km
Holden	Rodeo	$140.00	$240.00	71.40%	15,000-20,000 km	15,000-20,000 km
Ford	Falcon		$88.00	66.80%		
Brake Retailer 1	General	$77.00	Similar	0.0%		
Brake Retailer 2	Commodore	$57.00	None supplied	No comparison	30,000 km	
Brake Retailer 2	Camry	$74.95	None supplied	No comparison	30,000-40,000 km	
Brake Retailer 2	Falcon	$57.00	None supplied	No comparison	30,000-40000 km	

Australian Aftermarket Automotive Association

Further correspondence with the AAAA to gather cost and effectiveness data for road vehicle – frictions products and to clarify the number of businesses who operate in an environment where workers could be exposed to chrysotile.

In summary they believe that the price differential between asbestos and non-asbestos is currently 15% to 20%.

Stage I EIA Persons Consulted

The following specific information was sought and received during the preparation of the Stage I EIA:

Organisation	Information / Views Sought
NICNAS, Kim Patience	Cost of Friction Products comparison between Asbestos and Substitute products
Bendix Mintex	Refer below for copy of Data Requirements Listing sent
Vivacity Engineering	Refer below for copy of Data Requirements Listing sent
Richard Klinger	Refer below for copy of Data Requirements Listing sent
ACL Gaskets & ACL Specialised Gaskets	Data Requirements Listing with a particular focus on costs such as dust extraction equipment, health surveillance that may be saved if there was a blanket ban on the use of chrysotile, or saved over time if chrysotile was phased out.
Queensland Gaskets	Data Requirements Listing with a particular focus on costs

	such as dust extraction equipment, health surveillance that may be saved if there was a blanket ban on the use of chrysotile, or saved over time if chrysotile was phased out.
AA Gaskets	Data Requirements Listing with a particular focus on costs such as dust extraction equipment, health surveillance that may be saved if there was a blanket ban on the use of chrysotile, or saved over time if chrysotile was phased out.
Armwest Pty Ltd	Data Requirements Listing with a particular focus on costs such as dust extraction equipment, health surveillance that may be saved if there was a blanket ban on the use of chrysotile, or saved over time if chrysotile was phased out.
Department of Transport and Regional Services	General assessment of effectiveness of non-asbestos friction products
AMWU	Assessment of benefits of Proposed Phase-Out
NRMA Technical Dept	Effectiveness analysis of Asbestos vs. Non-Asbestos brakes
Refractories Manufacturers Association of Australia	General Assessment of impact on refractory industries.
Caltex	Assessment of the need for exemptions in specialised applications, e.g. industrial gaskets
Brake Bonders	Discussions were held with Spare Parts to gather cost and effectiveness data for road vehicle – frictions products.
Motor Mechanic "Backyard"	Discussions were held with Spare Parts to gather cost and effectiveness data for road vehicle – frictions products.
Brookers Brakes – West Ryde, Gladesville	Discussions were held with Spare Parts to gather cost and effectiveness data for road vehicle – frictions products.
Ford Australia	Discussions were held with Spare Parts to gather cost and effectiveness data for road vehicle – frictions products.
Holden Australia	Discussions were held with Spare Parts to gather cost and effectiveness data for road vehicle – frictions products.
Sundell Motors	Discussions were held with Spare Parts to gather cost and effectiveness data for road vehicle – frictions products.

It is noted that additional comments were received as a result of reviews of earlier drafts of the Stage I EIA from many of those parties listed above. In addition, the following parties provided their views on earlier drafts of the Stage I EIA:

?? Comcare: who expressed concern about the intent of Option 2 to clarify that it did not imply removal of all chrysotile *in situ*.;

?? Australian Council of Trade Unions who expressed the following concerns:

  ?? Voluntary reduction in use is not supported by specific timeframes;

  ?? Aircraft and Petrochemical industry workers are also exposed but not included in the estimated number of exposed workers;

  ?? All other substitutes are not listed as carcinogens hence the reference to uncertainty surrounding their safety is disputed.

?? NSW Workcover who state:

  ?? it would be prudent to assume that occupational exposure to airborne fibres of any substitute materials with a nominal diameter of less than 2 microns could be hazardous.; and

  ?? Air sampling tests conducted from 1979 to 1989 at a time when the occupational exposure standard was 2 fibre/ml;

  ?? During 1997 and 1998 several brake and clutch specialist vehicle workshops were inspected in the Newcastle region of NSW and the percentage of workshops in each of the following categories were found to be:

Category	**Percentage**
Aware of the use of asbestos products in the Workshop	75
Used mostly asbestos linings	50
Using asbestos linings sometimes	50
Have a grinder on the premises	25
Have local exhaust ventilation fitted to grinders and linishers	25
Have a linisher on the premises	17
Provide Personal Protective Equipment (PPE)	17
Have records of testing of local exhaust ventilation	8
Have completed a risk assessment	8
Have carried out air monitoring	8
Have carried out health surveillance	8

  ?? The results of the survey although small in number, indicate the level of awareness and compliance with the NSW Occupational Health and Safety (Hazardous Substances) Regulation 1996 is poor. This is consistent with what is found generally with small business.

?? Golden Triangle Resources NL in relation to a specific project for recovering magnesium metal from the Woodsreef Mine tailings. The Mine tailings contain 1 to 4%

chrysotile and will be processed to produce magnesium by an electrolytic process over a 50 to 60 year period.

Data Listing

The Data Listing sent to manufacturers and processors is provided below:

BASE CASE COSTS

1. Production tonnes / units and $ value of Australian manufactured asbestos related products.
2. Number of Workers in your company where exposure still exists (Company employs a total of ?? personnel of whom ?? would have current exposure);
3. Age Profile of employees and length of service.
4. Isolate the Costs to Industry in adherence to current State and Territory legislation , e.g. hazardous substances with respect to chrysotile asbestos:
   a) Opportunity cost of separate areas within the production plant used solely for handling raw chrysotile;
   b) Capital and ongoing maintenance / operating costs of equipment installed to control exposure to chrysotile such as dust extraction system, automated processes, negative pressure systems, vacuum systems.
   c) Local exhaust ventilation system
   d) Machines to cut gaskets
   e) Labeling costs
   f) Costs of health surveillance for employees engaged in manufacture covering chest x-ray, pulmonary function tests and physical examinations.
   g) Any other costs specifically incurred due to the storage and handling of chrysotile.
5. Costs imposed on business through the introduction of asbestos specific safe work practices:
   a) Hours per annum training staff in safe work practices both at induction and on going on the job Number of staff trained. Cost per hour to train.
   b) Proportion of time spent each day to undertake practices such as vacuuming of premises and clothing, collection of waste material into polyethylene bags appropriately labeled.
6. Costs of asbestos waste disposal per annum by licensed contractor.
7. Costs of Personal protective equipment for employee use, estimated useful life of such equipment:
   a) Face Masks with respirators
   b) Safety glasses of goggles
   c) Cotton overalls
   d) Gloves for handling materials

PHASE OUT COSTS

1. Substitutes used and unit costs of such substitutes (both fibrous and non-fibrous);
2. Risks posed by substitutes; performance rating of substitutes.
3. Dollar value of manufactured substitutes in Australia and trends.
4. Export of End Use products containing Substitutes
5. Dollar value of exports and trends.
6. Costs of plant modifications where substitutes are used:
   - ?? Capital costs
   - ?? Recurrent costs

APPENDIX 2

Background

What is Chrysotile Asbestos?

Chemical and Physical Characteristics

Chrysotile or "white" asbestos, is a fibrous variety of the magnesium silicate mineral, serpentine.

Individual chrysotile fibres are white and silky, but the colour of the mineral in veins in the ground where it is mined is usually green or yellowish (hence the name 'chrysotile' which is a Greek word meaning 'hair of gold').

Under the electron microscope the fibres of chrysotile are seen to be tubes, actually the structural layers of the mineral rolled in spiral form. The space within and between the tubes may be filled with a layered material.

Hazard

Chrysotile is a hazardous material and has been classified by NOHSC as a Class 1 Carcinogen.

Clinical and epidemiological studies have established that chrysotile causes cancer of the lung, malignant mesothelioma of the pleura and peritoneum, cancer of the larynx and certain gastrointestinal cancers. Chrysotile also causes asbestosis, a progressive fibrous disease of the lungs.

Risk of these diseases increases with cumulative lifetime exposure to chrysotile and rises also with increasing time interval (latency) since first exposure.

Chrysotile has been assessed as a Priority Existing Chemical (PEC) under the *Commonwealth Industrial Chemicals (Notification and Assessment) Act*, 1989.

Economic Use

Chrysotile occurs naturally in Australia but is no longer mined locally.

Imports into Australia of raw chrysotile are used mainly in the manufacture of friction materials and sheeting for gasket production, with a small quantity being used as a 'non-sag' additive in the manufacture of an epoxy resin adhesive. All these uses, according to their respective manufacturers, are being phased out.

Brake linings and gaskets are the main asbestos products imported for use in Australia. Chrysotile brake linings are imported for industrial applications and for use in passenger motor vehicles.

See 2.2 above for a summary of volumes of local and imported chrysotile products.

Current Controls

Chrysotile is regulated in the workplace under hazardous substances legislation enacted by the Commonwealth, States and Territories.

Regulation is based on the NOHSC *Hazardous Substances Model Regulations*, which address issues/requirements such as control measures, labelling, Material Safety Data Sheets (MSDS), exposure standards, classification and health surveillance.

The Development of NOHSC Policy on Chrysotile Asbestos

Preliminary Impact Analysis 1996

In 1996, the National Occupational Health and Safety Commission (NOHSC) released a Preliminary Impact Analysis of a Proposed National Exposure Standard for the Occupational Environment for Chrysotile (White Asbestos). The Impact Analysis assessed the impact of the National Standard at three chrysotile concentrations in the air of 1.0 fibre/millilitre (f/ml), 0.5 f/ml and 0.1 f/ml.

The Impact Analysis showed that there would be no economic impact of setting the standard at 1.0 f/ml and only minimal impact at 0.5 f/ml.

Costs were identified at an exposure level of 0.1 f/ml and were related to the incorporation of engineering controls, changes to work practices and possible difficulties in measurement of air level concentrations. There were unquantifiable implications for the automotive industries in production of brake linings and gaskets.

Unknown effects were identified in the area of road safety from the introduction of non-asbestos brake linings.

The benefits of adopting a lower exposure level were seen to be minimising the risks of adverse health affects from occupational exposure to chrysotile. There were other related benefits seen including improved quality of life and avoidance of psychological costs of illness and death.

There was seen to be further unquantifiable benefits from uniformity in a national exposure standard replacing a multiplicity of State and Territory legislation.

NICNAS Report

In February 1999 the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) published its Full Public Report on an assessment of Chrysotile Asbestos: Priority Existing Chemical No. 9.

This Report is used in Section 2 below to specify the problem associated with the current use of chrysotile in Australia for which government action is proposed.

The following is a summary of some of the recommendations in the NICNAS Report relevant to this RIS:

?? Recommendation 1: Phase-out (Importation and Local Manufacture)

It is recommended that the uses of chrysotile in Australia, including manufacture for the purpose of export, be phased out over time, with the period of phase out to be determined by the relevant regulatory authorities.

?? Recommendation 4: Public Health and Safe Disposal

Continued progress towards a phase-out of chrysotile in favour of less hazardous materials is supported. This phase out should be conducted with care so that greater risks to road safety are not introduced through inferior performance of substitute materials.

?? Recommendation 8: Data Gaps and Further Studies/Research Requirements

In general, the following research is strongly supported:

?? It is recommended that research into alternatives to chrysotile should actively continue, taking into account the need to ensure that the relevant hazard information is generated to ensure that proposed alternatives present reduced risks to health and the environment.

?? At present it is not possible to identify a level of chrysotile exposure below which there would be no risk to human health. Further information on this, including full elucidation of the mechanism of action for chrysotile-induced lung disease and mesothelioma, would assist regulatory decision-making.

Stage I Economic Impact Assessment [42]

In April 2000, the National Occupational Health and Safety Commission (NOHSC) commissioned the preparation of an Economic Impact Assessment to consider the recommendation to phase out the uses of chrysotile asbestos, made in the National Industrial Chemicals Notification and Assessment Scheme's (NICNAS) Full Public Report on *Priority Existing Chemical No 9.*

The Consultancy Objective was to produce an Economic Impact Assessment (EIA) on a phase out of the uses of chrysotile asbestos in Australia, including manufacture for the purposes of export over two time periods (5 and 10 years).

The work to be undertaken by that consultancy represented one component of a project being undertaken by NOHSC to assess the impact of a phase-out of uses of chrysotile asbestos in Australia.

In addition to the economic assessment, other activities were undertaken:

?? a technical assessment of the safety performance associated with using alternatives, and other factors influencing the continued use of chrysotile asbestos; and

?? a health assessment of the alternative materials (asbestos substitutes).

A full Discussion Draft of the Economic Impact Assessment was presented to NOHSC on 26th October 2000 and subsequently released for public comment.

The following submissions were received from the public and forwarded from NOHSC for consideration in the Stage II Regulatory Impact Statement reported herein:

[42] The Stage I document was referred to throughout as an "Economic Impact Assessment". The Stage II document is referred to as a Regulatory Impact Statement.

?? Victorian WorkCover Authority;

?? Australasian Faculty of Occupational Medicine;

?? Australian Automotive Aftermarket Association Ltd; and

?? Australian Council of Trade Unions;

It is noted from NOHSC that all public comment responses favoured the phase out of the uses of chrysotile asbestos in Australia, including manufacture for the purposes of export.

In addition, the Office of Regulation Review correspondence, accompanying their assessment of the adequacy of the Stage I EIA prior to releasing it for public comment, was also reviewed as it identified areas where further information could be sought from interested parties during the public consultation period.

Workplace Relations Ministers Communiqué

Following the release of the Stage I EIA for public consultation, the Workplace Relations Minister's Council (WRMC) met in Sydney on 18th May 2001. The Federal, State and Territory and New Zealand Ministers and representatives discussed a range of important developments in workplace relations.

One of these important developments addressed matters relating to occupational health and safety and workers compensation including:

?? The phase-out of uses and importation of asbestos.

The WRMC agreed to jointly work towards the imposition of a ban on the import and use of chrysotile and other forms of asbestos in Australia to be achieved no later than December 2003. Ministers noted that a report had been requested from NOHSC out of session highlighting the outcomes of the public consultation process.

Council also noted that the Hon. Tony Abbott MP Minister for Employment, Workplace Relations and Small Business had commenced the process to implement a ban on the import of chrysotile asbestos into Australia.

APPENDIX 3

RIS Overview

Why is an RIS Required?

The Underlying Purpose of the RIS Procedure

The underlying purpose of the RIS procedure is to ensure that an approved regulation is the preferred course of action in achieving a policy objective. The RIS procedure aims to ensure that:

- Regulating is the most efficient and effective way of achieving defined policy objectives, and
- Regulating entails minimum cost to the community or produces an outcome where the expected benefits resulting from it outweigh the expected costs to the community.

The RIS must include:

- A statement of the policy objectives;
- An identification of the alternative options by which those objectives can be achieved, either wholly or in part;
- An assessment of the costs and benefits of regulating, including the costs and benefits relating to resource allocation, administration and compliance;
- An assessment of the costs and benefits of each alternative to regulating, including the costs and benefits relating to resource allocation, administration and compliance. This assessment must include the alternative of not proceeding with any action;
- An assessment as to which of the alternatives involves the greatest net benefit or least net cost to the community; and
- A statement of the consultation program to be undertaken.

General Methodology Employed

The RIS was prepared in accordance with the document:

- "*Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard-Setting Bodies*", COAG, November, 1997.

- "*A Guide to Regulation (second edition)*" issued in December, 1998, by the Office of Regulation Review.

- "*Guidelines for National Competition Policy Legislation Reviews*" - 1999 - National Competition Council.

The preparation of an RIS is required by administrative decision of Government for all reviews of existing regulation, proposed new regulation and proposed treaties involving regulation, that will affect business, or which will have a significant indirect affect on business, or which will restrict competition.

The economic costs and social aspects are to be considered together with consideration of optional ways of meeting regulation objectives. The option that produces the greatest net public good is then chosen.

This process provides for the preparation of an RIS and public consultation prior to regulating as part of the mechanism by which the option which produces the greatest net public good can be chosen.

COAG Principles and Guidelines

In April 1995 COAG adopted *Principles and Guidelines for National Standard Setting and Regulatory Action*. These principles identified that many existing regulations were unnecessarily complex, generated delays, inconsistencies and additional costs for business investment and inhibited risk taking and enterprise. COAG recommended a move away from overly prescriptive standards towards performance-based standards with the view to improving the competitiveness of business, improving safety outcomes and reducing costs to consumers.

In line with the COAG principles and guidelines, before governments decide on a path of imposed regulation, a number of questions need to be asked, including: Is regulation needed? Is regulation likely to improve market outcomes? In addition, what are the alternative approaches to dealing with the problem, including non-regulatory action? The alternative approaches to dealing with the problems associated with chrysotile include:

- maintenance of existing regulatory requirements; and
- implementation of a phase-out approach.

The application of the COAG principles and guidelines to the proposed phase out of chrysotile ensures that national OH&S Standards developed:

- are performance based;
- represent minimum regulation;
- have minimal impact on competition;
- are internationally compatible (as far as practicable); and
- are developed with a high degree of transparency through wide consultation.

The *Guidelines* developed by COAG for regulatory impact assessment has been used in the development of the Regulatory Impact Statement reported herein [43].

Economic Costs and Benefits

The focus of an RIS is on the *'economic'* costs and benefits of the various options considered to achieve the objectives identified. It is important to realise that the RIS does not consider '*financial'* costs and benefits *per se*.

Nor does the RIS consider the impact of income tax on costs. In many cases the costs incurred by businesses in complying with chrysotile exposure standards, such as staff training, capital expenditure, etc., will be tax-deductible expenses and thus be less than

[43] "*Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard-Setting Bodies*", COAG, November 1997.

the actual figure noted herein. It is important to note that in an economic analysis of the type used herein, tax effects are ignored.

In many cases, governments will impose a fee for service such as undertaking audits of safety plans. In individual cases, the net costs to government agencies may be nil if full cost recovery practices are used. The temptation then is to assume from a government perspective that in such cases the costs of the proposal is nil. Again, from an economic point of view, this is a fallacy. Economic resources are expended and the extent to which funds are transferred from one Stakeholder to another is not a relevant consideration.

Costs and Benefits are Incremental to the Base Case (Option 1)

While the actual dollar values of the costs and benefits of the various Options reported herein should be treated with caution, the methodology that has been adopted of assessing the costs and benefits of the Options *incremental* to the Base Case, the 'do nothing' or the status quo Option.

This means that, since the assumptions have been made consistently across all Options, the expression of the *relative* merits of each of the Options is valid.

Need for Clear Specification of Objectives

The objectives of the alternative proposals will be clearly specified in outcome terms.

The starting point and the most crucial aspect for the evaluation, is the specification of the objectives in outcome terms. No appraisal of any regulation can be meaningful unless the objectives are clearly defined.

In defining the objectives, the scope of the Options is also an important issue. The Options will contain a range of elements related one to the other and these elements must not be excessively aggregated or dis-aggregated. Any linkages between the elements must be considered and taken into consideration.

Selection of the Option that has the Greater Economic Efficiency

The Option that has the greater economic efficiency will then be identified.

In accordance with the cost-benefit practice, Net Present Value is used to show whether an individual Option is worthwhile, that is, for a given discount rate, the benefits of an Option clearly exceed the costs.

As mentioned, in all cases the Options will be judged against the 'Base Case' or 'Do Nothing' Option. In the case of the impact analysis referred to herein, it is Option 1 that will be the Base Case. Option 1 assumes that the status quo is maintained. For any of the other Options to be selected they must be shown to have greater economic benefit that Option 1.

If no other Option has an economic benefit greater than Option 1 then the latter Option, the continuance of the existing regulatory régime, should continue.

If more than one of the other Options has greater economic benefit than Option 1 then the Option that has the highest economic benefit is chosen.

Consideration of the Possibility of Market Failure

The Free Market

Central to the capitalist economic system is the free market. In a market where perfect competition exists, goods and services will be exchanged at minimum price and neither the seller nor the buyer is disadvantaged. Perfect competition exists where there are a large number of potential sellers of goods and services, a large number of potential buyers of those goods and services and a high order of knowledge among both buyers and sellers of what goods and services are in the market place, their quality and their price.

Under such circumstances rational buyers will shop around until they find the goods or services they want at the minimum price on offer. Sellers with higher prices will be forced to lower their prices or withdraw from the market. Those sellers who remain in the market will have minimised their costs and thus also have minimised the consumption of scarce resources.

The free market can fail the consumer for a number of reasons, including:

- Lack of Information;
- The existence of 'externalities'; and
- The high transaction costs associated with negotiating a price.

Lack of Information

The market failures in relation to the continued use of chrysotile include inadequacies in the provision of up-to-date, consistent ***information*** relating to both the risks associated with the use of asbestos and the true costs of death and illness particularly due to the long latency. It may take anywhere from 20 to 60 years for symptoms to become apparent.

The lack of knowledge of these costs can result in a lack of appropriate management action, leading once again to higher risks.

The lack of such information increases the potential for uncontrolled exposure and increases the risk of illness occurring.

The Existence of 'Externalities'

There is also market failure with respect to ***externalities*** in the form of the costs of impacts of asbestos exposure being external to the firm and borne by government and the community.

In addition to the potential for illness involving exposure to chrysotile to result in death to workers, there is also the risk of damage to the environment. For example, chrysotile fibres released into the air could cause damage to surrounding business premises or private residences.

Release of contaminants into the air can result in pollution to waterways and plant life and the deposit of substances onto property. Most of the resulting costs for clean-up are borne by government and the community.

The High Transaction Costs Associated with Negotiating a Price

Another aspect of this market failure is that the transaction costs of reaching agreement between buyer and seller on a level of safety and the price premium for that safety are high.

Although the current legislative and legal systems may determine who is responsible or at fault for the failure to assure safe levels of exposure are maintained, the costs of actually deciding who is at fault are often very high.

High transaction costs associated with negotiating agreements and the difficulty of assigning liability mean that private markets may fail to achieve the preferred level of safety.

Justification for Government Intervention

In each of these instances, there is justification for government involvement to reduce the risks to workers, the general public, property and the environment associated with exposure to chrysotile asbestos.

Consideration of the National Competition Policy Agreement

General

The Commonwealth and all State and Territory Governments have agreed to a National Competition Policy to generate broad-based community benefits and to improve Australia's competitiveness in international markets.

The National Competition Policy evolved from the recognition that ultimately the ability of the Australian economy to continue to grow, provide sustainable employment and an improved standard of living, depends on how well the productive potential of the economy is utilised.

Agreements by Governments

The National Competition Policy comprises three agreements signed by all heads of government at the Council of Australian Governments in April, 1995.

The agreements are:

- Conduct Code Agreement.
- Competition Principles Agreement.
- Agreement to implement the National Competition Policy and related reforms.

These Agreements provide the legislative and policy framework for promoting competition and restricting anti-competitive activities by establishing the conditions for fair trade reforms, regardless of individual bargaining power.

Legislation Review

Clause 5 of the Competition Principles Agreement outlines the principles to be applied in review of legislation to ensure the compliance of legislation with the Competition Principles.

Clause 5(9) of the Agreement states that a review of legislation should:

- Clarify the objectives of the legislation;
- Identify the nature of the restriction on competition;
- Analyse the likely effect of the restriction on competition and the economy generally;
- Assess and balance the costs and benefits of the restriction; and
- Consider alternative means of achieving the same result including non-legislative approaches.

Consideration of the Public Good in Competition Policy

The National Competition Policy Agreement also contains a clause (1(3)) which indicates that competition policy is not intended to be applied without consideration of when competition may be contrary to the public good.

The clause lists areas for which this is so, including occupational health and safety, but it is noted that "public health" is absent.

Nevertheless, the National Competition Council has published a paper explaining the application of competition policy in such circumstances [44]. Text from that paper that is relevant to this RIS is given in Appendix 3.

The Council's paper states *inter alia*: "competition policy is not about maximising competition *per se*, but about using competition to improve the community's living standards …".

It is important to recognise that the explicit public interest provisions of the Competition Policy Agreement are not exclusive. The provisions fully admit the potential for additional public interest claims within which public health would be recognised as a reasonable candidate for consideration.

[44] "*Considering the Public Interest under the National Competition Policy*", National Competition Council, 1996.

Appendix 4

Extracts from:

"*Considering the Public Interest under the National Competition Policy*",

National Competition Council, 1996

A central feature of the National Competition Policy is its focus on competition 'in the public interest'. In this respect, the guiding principle is that competition, in general, will promote community welfare by increasing national income though encouraging improvements in efficiency. This approach is supported by a range of research, including that undertaken by the Industry Commission which projected significant gains to Australia from fully implementing the agreed competition policy reforms [45].

Despite this focus on increased competition, governments have some flexibility to deal with circumstances where competition might be inconsistent with the weighting placed by the community on particular social objectives. The aim of this paper is to point to those processes by which public interest matters can be considered within the National Competition Policy agenda. The paper offers guidance on the use of the Competition Policy Agreement (CPA) sub-clause 1(3) as a means of considering the community benefits and costs of reforms, and discusses other mechanisms available to governments to maintain anti-competitive arrangements in the public interest.

CPA sub-clause 1(3) provides for examination of the relationship between the overall interest of the community, competition and desirable economic and social outcomes. It allows governments to assess the net benefit of different ways of achieving particular social objectives:

Without limiting the matters that may be taken into account, where this agreement calls:

(a) for the benefits of a particular policy or course of action to be balanced against the costs of the policy or course of action; or

(b) for the merits or appropriateness of a particular policy or course of action to be determined; or

(c) for the assessment of the most effective means of achieving a policy objective;

the following matters shall, were relevant, be taken into account:

(d) government legislation and policies relating to ecologically sustainable development;

(e) social welfare and equity considerations, including community service obligations;

(f) government legislation and policies relating to maters such as occupational health and safety, industrial relations, and access and equity;

(g) economic and regional development, including employment and investment growth;

(h) the interests of consumers generally or classes of consumers;

(i) the competitiveness of Australian business; and

[45] Industry Commission 1995: "*The Growth and Revenue Implications of Hilmer and Related Reforms: A report to the Industry Commission to the Council of Australian Governments*".

(j) the efficient allocation of resources.

The CPA states that these factors may be considered in balancing the benefits of a particular policy or course of action against the costs, to determine the appropriateness or most effective means of achieving a policy objective.

In this respect, subclause 1(3) provides governments with a consistent approach to assessing whether the commitments to reform contained in the CPA reflects the desire of governments to make clear their view that competition policy is not about maximising competition per se but about using competition to improve the community's living standards and employment opportunities.

ENDNOTES

1. Laid before the Legislative Assembly on . . .
2. The administering agency is the Department of Industrial Relations.