For the attention:
Hoagy Moscrop-Allison
Senior Planner – Major Assessment
City Development Branch
Council of City of Gold Coast

Dear **Hoagy Moscrop-Allison,**

Objection submission COM/2019/81 - The likelihood of Actinolite Asbestos in the Nucrush quarry

Please find below further information that I think should be considered re this development Application and its Environmental Submission.

Reedy Creek comparison

In the proposed Boral Reedy Creek quarry case the Gold Coast Council commissioned an independent report by Buckley Vann Town Planning Consultants.

In the City planning Committee meeting of Wednesday 27th November 2013 (Attachment A1, Item 4) the Council acknowledged it did not support the Boral Reedy Creek quarry proposal due to, but not limited to, the impacts on traffic, road network, conflicts with the Gold Coast Town Planning Scheme and the impacts on ecological and environmental values. All these aspects have sharp parallels to the Nucrush proposed quarry development application.

The council meeting (Attachment A1, Item 5) also referenced the Buckley Vann independent report in its submission in the interests of **protecting the public from impacts of quarrying**.

Having identified quantities of the mineral actinolite (Attachment A2), the independent report said the actinolite could be hazardous under certain circumstances. The report went on to say "Were the actinolite to exist in an asbestiform state within the mineral assemblage of the rocks to be quarried and crushed, or within the seams or veins in the rock mass, then it could pose as a significant health issue for people exposed to its dusts"

No details of the form of the actinolite, or any assessment of any risks it might pose to human health from dust generated from quarrying activities, were provided in the Boral EIS.

Having identified quantities of the mineral actinolite in this independent report the Council amended section 50a) (Attachment A1, Page 24) to read: "50a) Prior to commencement of the use, an assessment of the health risks to residents of exposure to quarry dusts arising from the occurrence of the mineral actinolite within the rock proposed to be quarried and processed, is to be prepared by a suitably qualified consultant" and "50b) The EMP must also require measurement of asbestos-form actinolite in samples of airborne particulates collected in conjunction with ongoing silica monitoring. Should this proportion be significantly higher than (double or more) the May 2005 Geochempet petrographic analysis result of 3%, then a health risk assessment of exposure of nearby residents to

asbestos must be undertaken, and a management plan prepared that ensures the VicEPA asbestos and silica criteria are met at sensitive receptors".

Hanson Wolfdene Quarry, Darlington Range

This quarry in the Darlington range contains three percentactinolite according to its Petrographic Analysis (Attachment B1).

How do these findings affect the Nucrush Quarry?

Given, that the Reedy Creek quarry is due South of Oxenford and the Darlington Range quarries (due north) also contain actinolite it is highly probable that the Nucrush Oxenford Quarry site will also.

If you look at the aerial photo, Attachment A3, it can clearly be seen the relationship of the three sites in question and the makeup of the area.

If you compare the geographical features of the Oxenford quarry (Attachment A4) and the proposed Reedy Creek quarry (Attachment A5) it is obvious to see they are geographically very similar.

Given the facts above it must be assumed that the Oxenford petrographic makeup will in all likelihood also contain the asbestos mineral actinolite also. Further, from the lack of detailed Petrograhic Analysis submitted (Attachment B2) there is nothing to suggest this assumption is incorrect.

Therefore, as per the Reedy Creek case, I think it is imperative that an independent report is commissioned.

<u>What is Actinolite and how does it effect us?</u>

Asbestos is any one, or a combination of, six minerals. Actinolite being one of these six (Attachment C1).

The actinolite asbestos, found in quarries, is the highly friable type (Attachment C2). This is the loosely packed asbestos that is easily crushed.

Fibrous actinolite is one of the six recognised types of asbestos, the fibres being so small that they can enter the lungs and damage the alveoli (Attachment C3).

Actinolite was historically acknowledged as a less hazardous form of asbestos. However, longitudinal studies have shown the shorter and thinner fibres may be just as hazardous and that the fibre size may be too thin to be detected by standard optical techniques (Attachment C4). Cracker dust supplied from quarries has been known to contain actinolite asbestos mineral fibres. Actinolite can occur in both asbesriform (low diameter and high aspect ratio) and non-asbestiform (cleavage fragment). All forms of asbestos, including actinolite are classified as 'Group 1 human carcinogens'.

Relatively low concentrations of fibrous actinolite dust had significant impacts on tumour incidence in experimentation (Attachment C4 again).

Evidence from Pilbara cracker dust has morphologies indicative of cleavage fragments there is also evidence that shows several nodes of highly asbestiform morphologies were associated with road base and pathway fill constructed from the quarry dust. Recent evidence published by F. Baumann (2011) from the study of asbestos containing road base material has suggested a correlation between low concentration serpentinitic (chrysotile/antigorite) containing road base fibres and mesothelioma. According to the article, short fibres are not usually taken into account in air monitoring analysis due to their lower aspect ratio. An article published by Suzuki Y et al (2005) suggests shorter fibres may in fact contribute to mesothelioma, contrary to currently accepted paradigms.

Queensland Department of Health

The Queensland department of health reports (Attachment C5): "The fibres of asbestos can be split by mechanical energy into progressively finer fibres of microscopic size. Respirable fibres are considered responsible for adverse health effects caused by asbestos. To be respirable a fibre needs to have a diameter of less than three micrometres and a length of greater than five micrometres; and a length to width ratio of greater than three to one. Fibres of a diameter less than one micrometre are considered the most hazardous. This same article also acknowledges the greater risk where communities are located near asbestos mines or mills.

Safe Work Australia

Safe Work Australia says (Attachment C6):

"Asbestos becomes a health risk when its fibres are released into the air and breathed in. Breathing in asbestos fibre can cause asbestosis, lung cancer and mesothelioma"

"You can't see asbestos fibres with the naked eye and because they are very light they can be blown long distances by the wind".

"Friable asbestos is a material containing asbestos that when dry, is in powder from or may be crushed or pulverised into powder form … This material poses a higher risk of exposing people to airborne asbestos fibres".

Mining and Quarry Safety and Health Regulation 2017 (MQSHR) - SSE Duty of Care

The Mining and Quarry Safety and Health Regulation 2017 requires that the Site Senior Executive (SSR) ensures the following (Attachment C7):

- Action is taken to prevent exposure to workers or
- If exposure cannot be prevented then action taken to protect the health of persons at the mine/quarry from the effects of asbestos.

Has the Nucrush quarry SSE clearly established that the product it is producing does not contain actinolite? Given the geological features of the product and the presence of actinolite within its neighbours sites, it would be culpably negligent to not have verified the safety of the product with respect to the asbestos risk.

If the Nucrush quarry SSE has failed to check for the presence of Actinoite, as appears to have happened, I am of the opinion that they are culpable in neglect in the duty of care for the workers at the site and also sensitive receptors around the quarry. Similarly, it would seem imperative that the Gold Coast Council do not also overlook this highly important aspect of the development application also.

Department of Natural Resources, Mines and Energy

The Department of Natural Resources, Mines and Energy states (Attachment C8): "An Australia-wide ban on the manufacture and use of all types of asbestos (and asbestos containing materials) took effect on 31 December 2003".

Asbestos was banned in Australia making it illegal to import, store, supply, sell, install, use or re-use asbestos materials.

Surely, if there is a very real risk that this quarry is extracting and using product containing a high volume of asbestos, as seems to be happening, then this would be contrary to the asbestos ban as from 31 December 2003?

Clearly, if actinolite is found in the quarry rock then Nucrush would be committing a crime in storing, supplying and selling asbestos material. It must surely be established the actinolite content of the greywacke being quarried as a matter of urgency?

Conclusion

The submitted data is clearly insufficient as the petrographic analysis fails to discuss the constitution of the rock over and above the free silica as quartz crystal component (Attachment B2). No worthwhile analysis can be performed on the submitted environmental data if the contents of the rock has not been correctly disclosed over and above the 49% silica.

The extremely limited petrographic information provided, along with the analysis of further quarries in the area, lead me to assume there is an extremely high chance of the quarried rock containing approximately three percent friable actinolite asbestos.

How can the Gold Coast Council be expected to consider this development application appropriately without even knowing the composition of the rock? And thus not being able to make a thorough investigation into the effects of crushing said rock.

Will the Gold Coast Council commission an independent review (as per the remarkably similar Boral Reedy Creek development application case where actinolite was identified)?

The petrographic analysis presented is clearly insufficient for the task at hand in establishing the effects of crushing up to a million tonnes of rock at such close planned proximity to sensitive receptors. If there is three percent actinolite within the rock, as suspected, this would mean crushing 30,000 tonnes of asbestos material every year. That is about 600 tonnes every single week of just 'actinolite' being processed and this equates to **120 tonnes of actinolite daily!**

The actinolite asbestos articles referenced contain damning evidence of the extreme health risk associated with this form of asbestos.

It would seem impossible to make an informed decision based on the insufficient data that has been submitted. Without an independent analysis into the constitution of the rock and its possible short term and long term health effects I do not believe it would be appropriate to seriously consider this development application.

Accepting this flawed and incomplete development application, as this appears to be, would, I believe, be culpably negligent when considering the devastating effect that this might have in the longer term of the local residents, the quarry workers and the environment.

Can the possibility of processing and producing approximately 120 tonnes of actinolite asbestos every single day be ignored?

And it should also be remembered that there is an Australia-wide ban on storing, supplying and selling any products containing asbestos. If this product contains actinolte it would appear illegal to process it on the clear and sensible grounds of health and safety for everyone both now and in the future.

Thank you for considering my objection,

Attachment A1 - City Planning Meeting Re Reedy Creek and Actinolite

05 - Boral Reedy Creek Actinolite Council motion.pdf

Adopted Report
(Part 1 – Items 1 – 2)
of the
City Planning Committee Meeting
held
Wednesday, 27 November 2013

ITEM 1 (Continued)
REVIEW OF ENVIRONMENTAL IMPACT STATEMENT FOR GOLD COAST QUARRY – LOT 105 ON SP144215 & LOT 901 ON RP907357 – OLD COACH ROAD, REEDY CREEK AND TALLEBUDGERA CREEK ROAD, TALLEBUDGERA VALLEY – DIVISION 13
PD97/621/02
Committee Recommendation Adopted At Council 3 December 2013

Changed Recommendation

COMMITTEE RECOMMENDATION CP13.1127.001
moved Cr Gates seconded Cr Caldwell

That Council resolves as follows:

4 That Council's submission advise the Coordinator-General that Council does not support the Gold Coast Quarry EIS in its current form due to the outstanding issues raised in Council's submission, including but not limited to the impacts on traffic, road network and the proposed site access location, conflicts with the Gold Coast Planning Scheme 2003, and the impacts on ecological and environmental values.

5 That in the event the Coordinator-General approves the Gold Coast Quarry EIS despite Council's strong objection, the conditions as detailed in Appendix B of Buckley Vann Town Planning Consultants independent report be included with Council's submission in the interests of protecting the public from the impacts of quarrying.

Page 24
8 Condition 50 of Appendix B of Buckley Vann Town Planning Consultants independent report be amended as follows:

50a) Prior to commencement of the use, an assessment of the health risks to residents of exposure to quarry dusts arising from the occurrence of the mineral actinolite within the rock proposed to be quarried and processed, is to be prepared by a suitably qualified consultant.

The risk assessment is to address:-

1) Mode of occurrence and concentration of the mineral within the geology of the site

2) Whether the mineral actinolite occurs in an asbestos form ('asbestiform')

3) If the mineral actinolite is identified in an asbestos form, then further risk assessment is to include:-

(i) Specific composition and structure of the mineral;

(ii) Potential for the mineral to be liberated and transmitted by quarrying activities;

(iii) Likelihood of the dust being inspired by site employees or the general public;

(iv) Adoption of a suitable medical model of toxicity to humans; and

(v) Preparation of a risk management plan setting out detailed control measures to ensure the health and safety of residents is not impacted by dusts generated from quarrying activities.

50b) The EMP must also require measurement of asbestos-form actinolite in samples of airborne particulates collected in conjunction with ongoing silica monitoring. Should this proportion be significantly higher than (double or more) the May 2005 Geochempet petrographic analysis result of 3%, then a health risk assessment of exposure of nearby residents to asbestos must be undertaken, and a management plan prepared that ensures the VicEPA asbestos and silica criteria are met at sensitive receptors. CARRIED

Attachment A2- Gold Coast Bulletin Report re Actinolite and Boral Reedy Creek

Gold Coast Bulletin

GOLD COAST

Independent project review says mineral dust could pose a 'significant health issue'

ANDREW POTTS COUNCIL REPORTER, GoldCoastBulletin
December 3, 2013 6:19am

A HAZARDOUS asbestos-type material which threatens to pose "significant health - issues" has been discovered on the site of the planned quarry in Reedy Creek.

An independent review of the Boral project, commissioned by the Gold Coast City Council, has revealed quantities of the mineral actinolite - one of six asbestos minerals - exists in the area.

The report, by town planning consultant Buckley Vann, said the actinolite could be hazardous under certain circumstances.

"Were the actinolite to exist in an asbestiform state within the mineral assemblage of the rocks to be quarried and crushed, or within the seams or veins in the rock mass, then it could pose as a significant health issue for people exposed to its dusts," the report said.

No details of the form of the actinolite, or any assessment of any risks it might pose to human health from dust generated from quarrying activities, are provided in the Boral EIS.

Attachment A3 - Geographic relationship between Reedy Creek proposed quarry, Oxenford quarry and Hanson's Wolffdene Quarry

Attachment A4 - Oxenford quarry

Attachment A5 - Reedy Creek proposed quarry

Attachment B1 - Petrographic Analysis example from Hanson Wolfdene Quarry, Darlington Range

Table 1 – Modal analysis of minerals in Meta- greywacke

PRIMARY MINERALS	MODE (PER CENT)	COMMENTS
Unstrained Quartz	23	Anhedral, medium to fine grained
Moderately strained quartz	5	Anhedral, undulose extinction
Plagioclase	17	Minor alteration products
K-Feldspar	9	Minor alteration products
Groundmass contains quartz, biotite, muscovite, clay minerals	20	Fine grained
Volcanic rock fragment	5	Fine grained
Quartzite	5	Contains moderately strained composite quartz
Sedimentary rock fragments	4	Fine grained sandstone
Iron Oxides	1.1	Minor sulphides
Graphite	0.5	
Calcite	0.1	Vein
SECONDARY MINERALS		
Sericite, kaolinite, illite	5.5	Weak minerals, in matrix and feldspar grains
Actinolite	3	Acicular
Biotite	1	Weak minerals
Muscovite	0.3	Weak minerals
Chlorite	0.5	Weak mineral
Total	***100***	

Interpretation

This supplied rock is identified as meta-greywacke, a metamorphic rock formed by a process of low grade regional metamorphism. The original rock was moderately sorted, medium grained greywacke comprised of quartz, feldspar, clasts of rock fragments and silty clay matrix.

The rock generally has 37% free silica content and10% strained quartz (5% in single grains and 5% locked in quartzite) and is predicted to be innocuous in relation to alkali silica reactivity in concrete. Sulphides are present but do not exceed 1% in any provided sample. This concentration[3], taking into consideration the sample's low alkali silica reactivity,[4] is not predicted cause internal sulphide attack.

For engineering purposes the supplied rock is summarised as having the following characteristics:

- slightly weathered to unweathered meta greywacke
- hard and strong
- contains 1.1 % of iron oxides and trace sulphides
- contains 7.8% weak minerals (comprising 5.5% sericite, 1% biotite, 0.5% chlorite, 0.3% muscovite and 0.5% graphite)
- potential for mild to slow alkali silica reaction in concrete
- predicted to be suitable as a source for MRS 11.70 Coarse Concrete Aggregate, MRS 11.22 Cover Aggregates MRS 11.30/33/34/36 Dense Graded Asphalt Pavements, MRS 11.05 Unbound Pavements Types 1, 2 and 3 Rail Ballast CT147 and manufactured sand.

Free Silica Content

37% Free silica content.

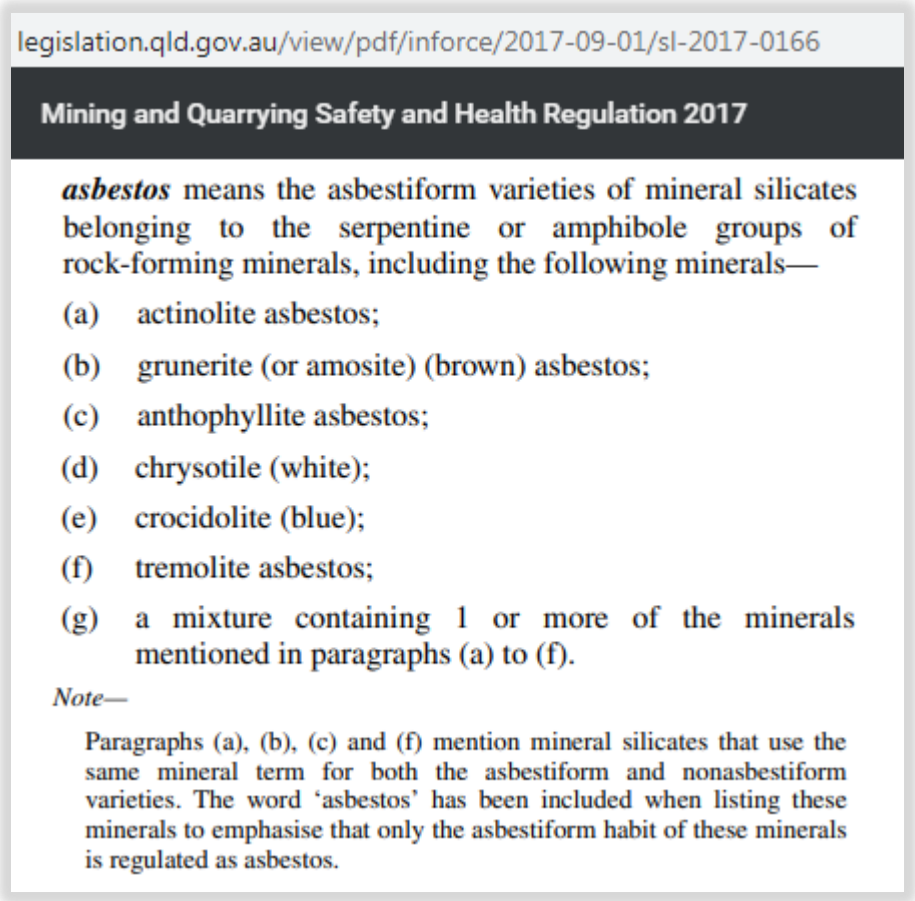
Attachment B2 - Petrographic Analysis

3.3.2 PETROGRAPHIC ANALYSIS

Petrographic analysis has been undertaken of rock samples extracted at the subject site. MWA Environmental has reviewed the supplied petrographic reports dated between 2007 and 2016 to determine the composition of Crystalline Silica contained within the rock.

The sampled aggregate contains between 19% and 57% free silica as quartz crystal, with an average of 30% across all samples. For this assessment, a conservative assessment of the second highest percentage composition at 49% has been adopted for the assessment of potential crystalline silica impacts when assessed against an annual average exposure guideline.

Attachment C1 - Asbestos definition



legislation.qld.gov.au/view/pdf/inforce/2017-09-01/sl-2017-0166

Mining and Quarrying Safety and Health Regulation 2017

asbestos means the asbestiform varieties of mineral silicates belonging to the serpentine or amphibole groups of rock-forming minerals, including the following minerals—

(a) actinolite asbestos;

(b) grunerite (or amosite) (brown) asbestos;

(c) anthophyllite asbestos;

(d) chrysotile (white);

(e) crocidolite (blue);

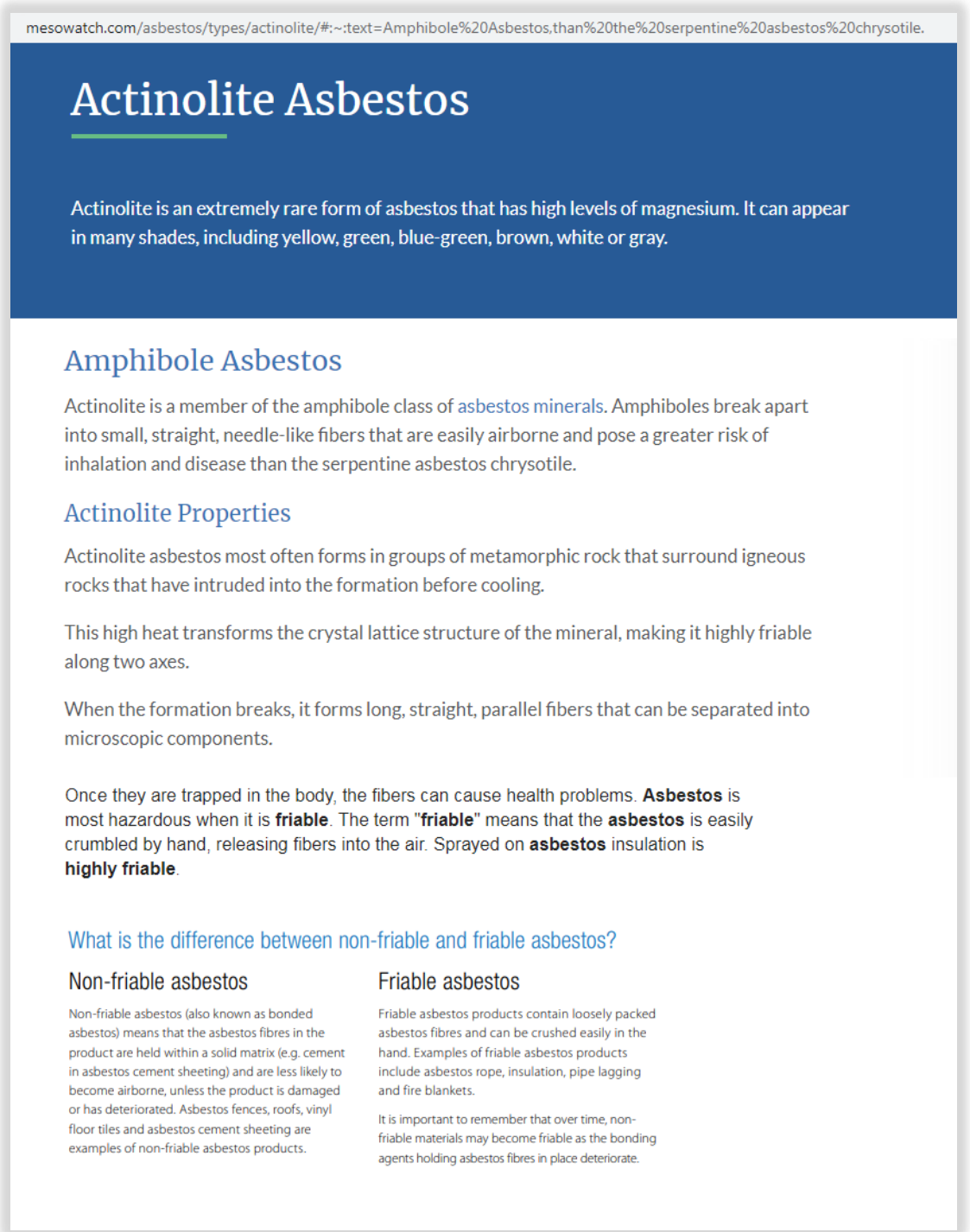
(f) tremolite asbestos;

(g) a mixture containing 1 or more of the minerals mentioned in paragraphs (a) to (f).

Note—

Paragraphs (a), (b), (c) and (f) mention mineral silicates that use the same mineral term for both the asbestiform and nonasbestiform varieties. The word 'asbestos' has been included when listing these minerals to emphasise that only the asbestiform habit of these minerals is regulated as asbestos.

Attachment C2 - Actinolite is highly friable



mesowatch.com/asbestos/types/actinolite/#:~:text=Amphibole%20Asbestos,than%20the%20serpentine%20asbestos%20chrysotile.

Actinolite Asbestos

Actinolite is an extremely rare form of asbestos that has high levels of magnesium. It can appear in many shades, including yellow, green, blue-green, brown, white or gray.

Amphibole Asbestos

Actinolite is a member of the amphibole class of asbestos minerals. Amphiboles break apart into small, straight, needle-like fibers that are easily airborne and pose a greater risk of inhalation and disease than the serpentine asbestos chrysotile.

Actinolite Properties

Actinolite asbestos most often forms in groups of metamorphic rock that surround igneous rocks that have intruded into the formation before cooling.

This high heat transforms the crystal lattice structure of the mineral, making it highly friable along two axes.

When the formation breaks, it forms long, straight, parallel fibers that can be separated into microscopic components.

Once they are trapped in the body, the fibers can cause health problems. **Asbestos** is most hazardous when it is **friable**. The term "**friable**" means that the **asbestos** is easily crumbled by hand, releasing fibers into the air. Sprayed on **asbestos** insulation is **highly friable**.

What is the difference between non-friable and friable asbestos?

Non-friable asbestos

Non-friable asbestos (also known as bonded asbestos) means that the asbestos fibres in the product are held within a solid matrix (e.g. cement in asbestos cement sheeting) and are less likely to become airborne, unless the product is damaged or has deteriorated. Asbestos fences, roofs, vinyl floor tiles and asbestos cement sheeting are examples of non-friable asbestos products.

Friable asbestos

Friable asbestos products contain loosely packed asbestos fibres and can be crushed easily in the hand. Examples of friable asbestos products include asbestos rope, insulation, pipe lagging and fire blankets.

It is important to remember that over time, non-friable materials may become friable as the bonding agents holding asbestos fibres in place deteriorate.

Attachment C3 - Actinolite, friable or fibrous can enter the lungs and damage the alveoli

en.wikipedia.org/wiki/Actinolite

Actinolite

Actinolite is commonly found in metamorphic rocks, such as contact aureoles surrounding cooled intrusive igneous rocks. It also occurs as a product of metamorphism of magnesium-rich limestones.

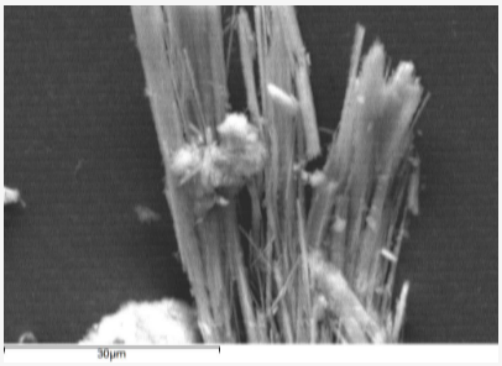
Fibrous actinolite is one of the six recognised types of asbestos, the fibres being so small that they can enter the lungs and damage the alveoli.

Actinolite asbestos was once mined along Jones Creek at Gundagai, Australia.

Attachment C4 - Actinolite asbestos and Cracker Dust

microanalysis.com.au/news/actinolite-asbestos-cracker-dust/

ACTINOLITE ASBESTOS AND CRACKER DUST



Are You Counting the Right Sized Fibres?

Actinolite has commonly been acknowledged to be a less hazardous form of asbestos. But longitudinal studies show that shorter and thinner fibres may be just as hazardous – and that the fibre size might be too thin to be detected by standard optical techniques!

Cracker dust (also known as crusher dust or quarry fines) is finely crushed blue metal or other aggregate rock which is commonly used as a base for roadways, paths, as a screed for landscaping or for hardstand areas. It is known for its good compaction properties.

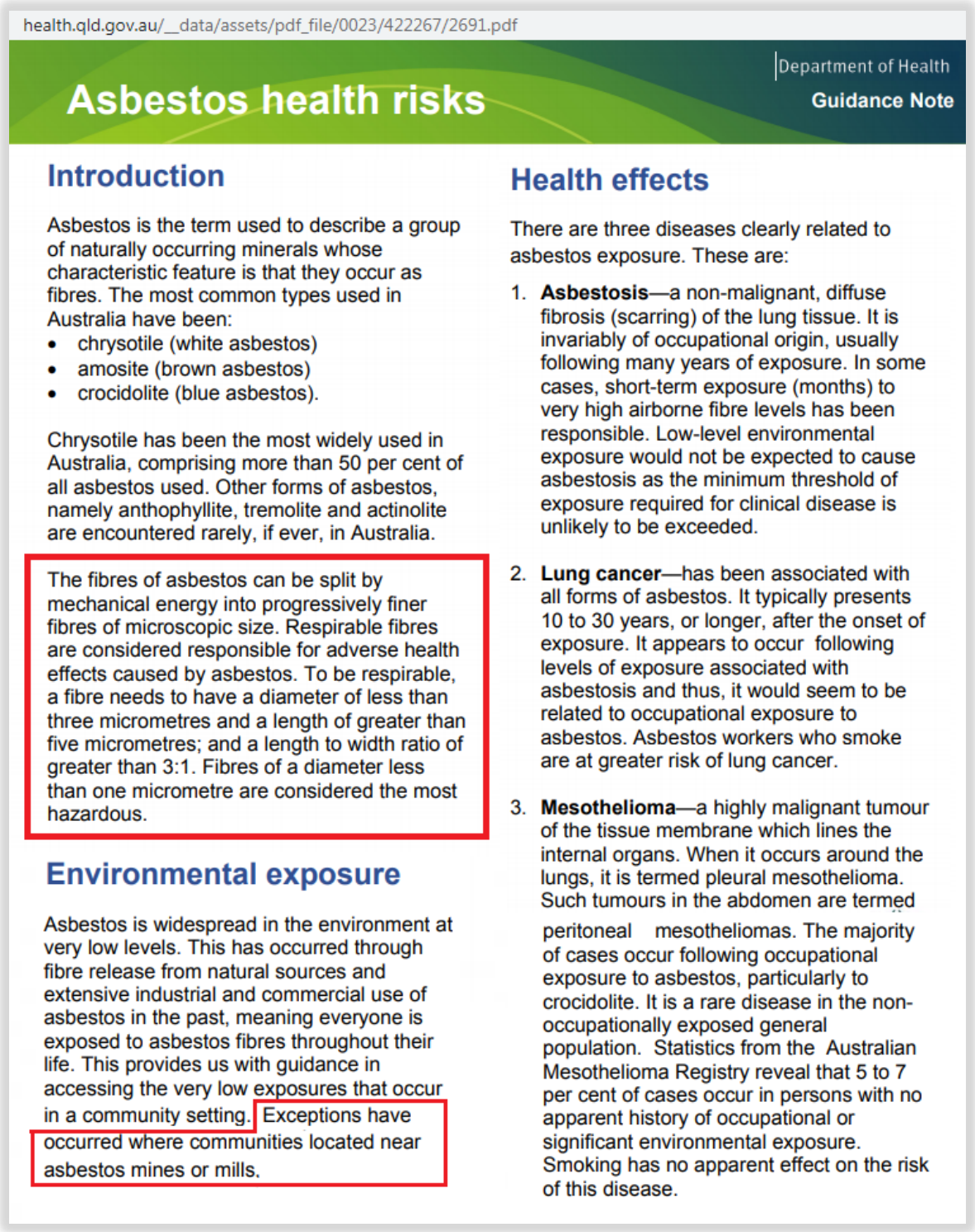
Cracker dust supplied from two quarries in the Pilbara has historically been known[1,3], to inadvertently contain actinolite asbestos mineral fibre at low concentrations. Actinolite (CAS # 12172-67-7)[6], an amphibole asbestos mineral with the chemical formula $[Ca_2(Mg,Fe^{2+})_5Si_8O_{22}(OH)_2]_n$ can occur in both asbestiform (low diameter and high aspect ratio) and non-asbestiform (cleavage fragment) morphologies. All forms of asbestos (chrysotile, crocidolite, amosite, tremolite, actinolite and anthophyllite) as well as other highly acicular mineral fibres (richterite, erionite, winchite, fluoro-edenite) are classified as group 1 human carcinogens[2].

Actinolite is an intermediate-member mineral of the solid-solution series from the magnesium-rich tremolite to the iron-rich ferro-actinolite. The International Agency for Research on Cancer (IARC) quotes a study conducted in 1989 by Pott et al[9]., which concludes that relatively low concentrations of fibrous actinolite dust had significant impacts on the tumour incidence in intrapleural experiments on rats. Similar dust loadings with blue asbestos, otherwise known as crocidolite (Davis et al., 1991, Roller et al., 1996) have shown comparable levels of tumour incidence in rats. Studies by Cook, P. et al.,(1982)[10] suggest ferroactinolite is more potent to health compared to amosite/grunerite (brown asbestos).

To date there has been limited epidemiological research conducted into the health impacts of different morphologies of asbestos fibres. NIOSH, 2009[4] and Dodson et al., 2006[5] showed that fibre aspect ratio and size play an associated role in fibre-diseases development – asbestosis being correlated with the surface area of biopersistant fibres, – fibrosis with fibres > 2 µm long, – mesothelioma with fibres longer than 5 µm and thinner than 0.1 µm (below optical resolution limits), – lung cancer with fibres longer than 10 µm and thicker than 0.15 µm². Composition (particularly iron) and biosolubility are also known to be influencing factors in a fibre's potency.

Whilst there is evidence to show that actinolite from cracker dust in the Pilbara has morphologies indicative of cleavage fragments, there is also evidence that shows several nodes of highly asbestiform morphologies were associated with road base and pathway fill constructed from this quarry dust (see figure 1) – d50 diameter, 0.4 µm, aspect ratio >15:1. Recent evidence published by F. Baumann et al.,(2011)[7] from the study of asbestos containing road base material in New Caledonia, has suggested a correlation between low concentration serpentinitic (chrysotile/antigorite) containing road base fibres and mesothelioma. According to the article, short fibres such as antigorite are not usually taken into account in air monitoring analyses due to their lower aspect ratio. An article published by Suzuki Y et al.(2005)[8], suggests shorter fibres may in fact contribute to mesothelioma, contrary to currently accepted paradigms.

Attachment C5 - Queensland Department of Health and Asbestos fibres



health.qld.gov.au/__data/assets/pdf_file/0023/422267/2691.pdf

Department of Health

Guidance Note

Asbestos health risks

Introduction

Asbestos is the term used to describe a group of naturally occurring minerals whose characteristic feature is that they occur as fibres. The most common types used in Australia have been:

- chrysotile (white asbestos)
- amosite (brown asbestos)
- crocidolite (blue asbestos).

Chrysotile has been the most widely used in Australia, comprising more than 50 per cent of all asbestos used. Other forms of asbestos, namely anthophyllite, tremolite and actinolite are encountered rarely, if ever, in Australia.

The fibres of asbestos can be split by mechanical energy into progressively finer fibres of microscopic size. Respirable fibres are considered responsible for adverse health effects caused by asbestos. To be respirable, a fibre needs to have a diameter of less than three micrometres and a length of greater than five micrometres; and a length to width ratio of greater than 3:1. Fibres of a diameter less than one micrometre are considered the most hazardous.

Environmental exposure

Asbestos is widespread in the environment at very low levels. This has occurred through fibre release from natural sources and extensive industrial and commercial use of asbestos in the past, meaning everyone is exposed to asbestos fibres throughout their life. This provides us with guidance in accessing the very low exposures that occur in a community setting. Exceptions have occurred where communities located near asbestos mines or mills.

Health effects

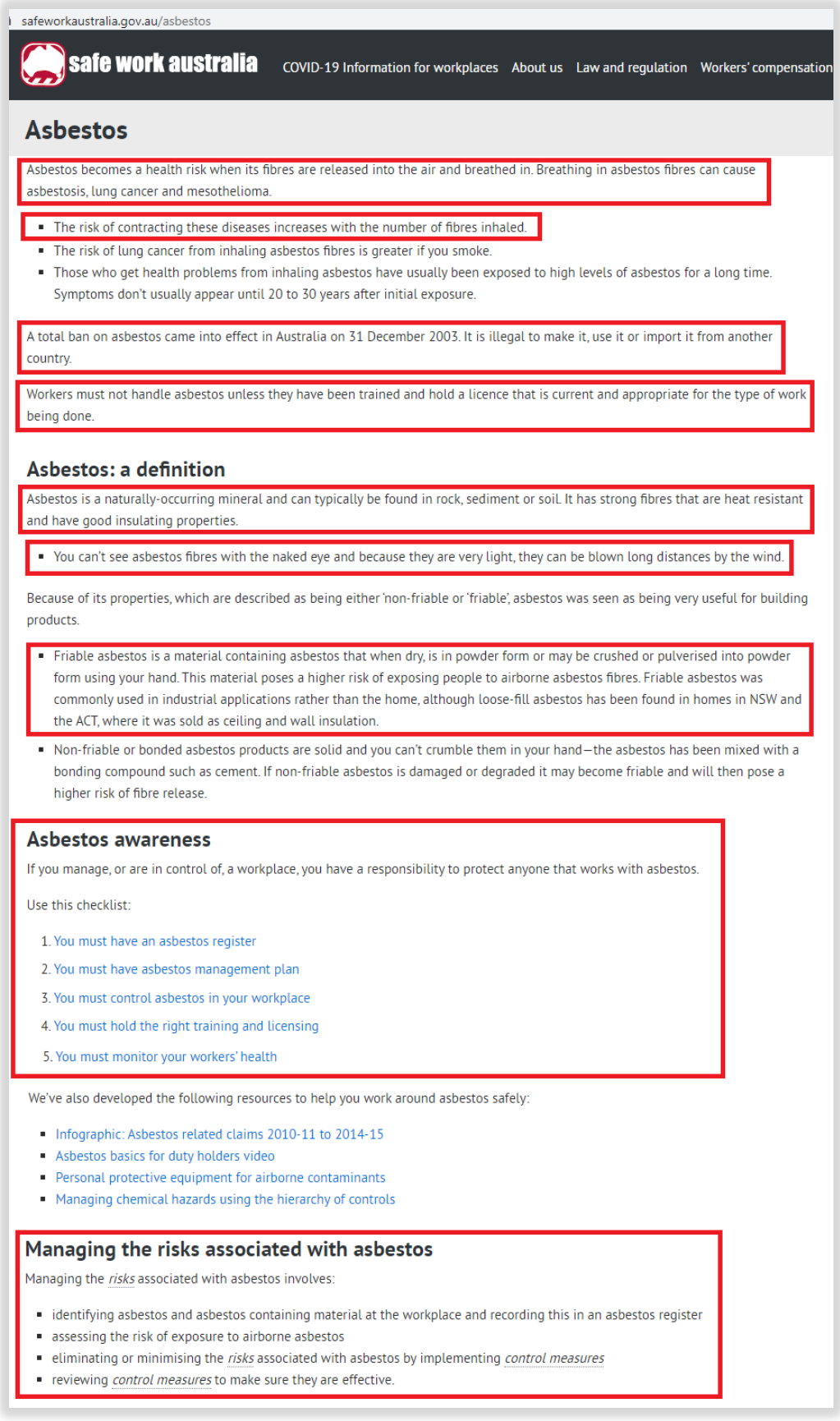
There are three diseases clearly related to asbestos exposure. These are:

1. **Asbestosis**—a non-malignant, diffuse fibrosis (scarring) of the lung tissue. It is invariably of occupational origin, usually following many years of exposure. In some cases, short-term exposure (months) to very high airborne fibre levels has been responsible. Low-level environmental exposure would not be expected to cause asbestosis as the minimum threshold of exposure required for clinical disease is unlikely to be exceeded.

2. **Lung cancer**—has been associated with all forms of asbestos. It typically presents 10 to 30 years, or longer, after the onset of exposure. It appears to occur following levels of exposure associated with asbestosis and thus, it would seem to be related to occupational exposure to asbestos. Asbestos workers who smoke are at greater risk of lung cancer.

3. **Mesothelioma**—a highly malignant tumour of the tissue membrane which lines the internal organs. When it occurs around the lungs, it is termed pleural mesothelioma. Such tumours in the abdomen are termed peritoneal mesotheliomas. The majority of cases occur following occupational exposure to asbestos, particularly to crocidolite. It is a rare disease in the non-occupationally exposed general population. Statistics from the Australian Mesothelioma Registry reveal that 5 to 7 per cent of cases occur in persons with no apparent history of occupational or significant environmental exposure. Smoking has no apparent effect on the risk of this disease.

Attachment C6 - Safe Work Australia and asbestos awareness



safeworkaustralia.gov.au/asbestos

safe work australia COVID-19 Information for workplaces About us Law and regulation Workers' compensation

Asbestos

Asbestos becomes a health risk when its fibres are released into the air and breathed in. Breathing in asbestos fibres can cause asbestosis, lung cancer and mesothelioma.

- The risk of contracting these diseases increases with the number of fibres inhaled.
- The risk of lung cancer from inhaling asbestos fibres is greater if you smoke.
- Those who get health problems from inhaling asbestos have usually been exposed to high levels of asbestos for a long time. Symptoms don't usually appear until 20 to 30 years after initial exposure.

A total ban on asbestos came into effect in Australia on 31 December 2003. It is illegal to make it, use it or import it from another country.

Workers must not handle asbestos unless they have been trained and hold a licence that is current and appropriate for the type of work being done.

Asbestos: a definition

Asbestos is a naturally-occurring mineral and can typically be found in rock, sediment or soil. It has strong fibres that are heat resistant and have good insulating properties.

- You can't see asbestos fibres with the naked eye and because they are very light, they can be blown long distances by the wind.

Because of its properties, which are described as being either 'non-friable or 'friable', asbestos was seen as being very useful for building products.

- Friable asbestos is a material containing asbestos that when dry, is in powder form or may be crushed or pulverised into powder form using your hand. This material poses a higher risk of exposing people to airborne asbestos fibres. Friable asbestos was commonly used in industrial applications rather than the home, although loose-fill asbestos has been found in homes in NSW and the ACT, where it was sold as ceiling and wall insulation.
- Non-friable or bonded asbestos products are solid and you can't crumble them in your hand—the asbestos has been mixed with a bonding compound such as cement. If non-friable asbestos is damaged or degraded it may become friable and will then pose a higher risk of fibre release.

Asbestos awareness

If you manage, or are in control of, a workplace, you have a responsibility to protect anyone that works with asbestos.

Use this checklist:

1. You must have an asbestos register
2. You must have asbestos management plan
3. You must control asbestos in your workplace
4. You must hold the right training and licensing
5. You must monitor your workers' health

We've also developed the following resources to help you work around asbestos safely:

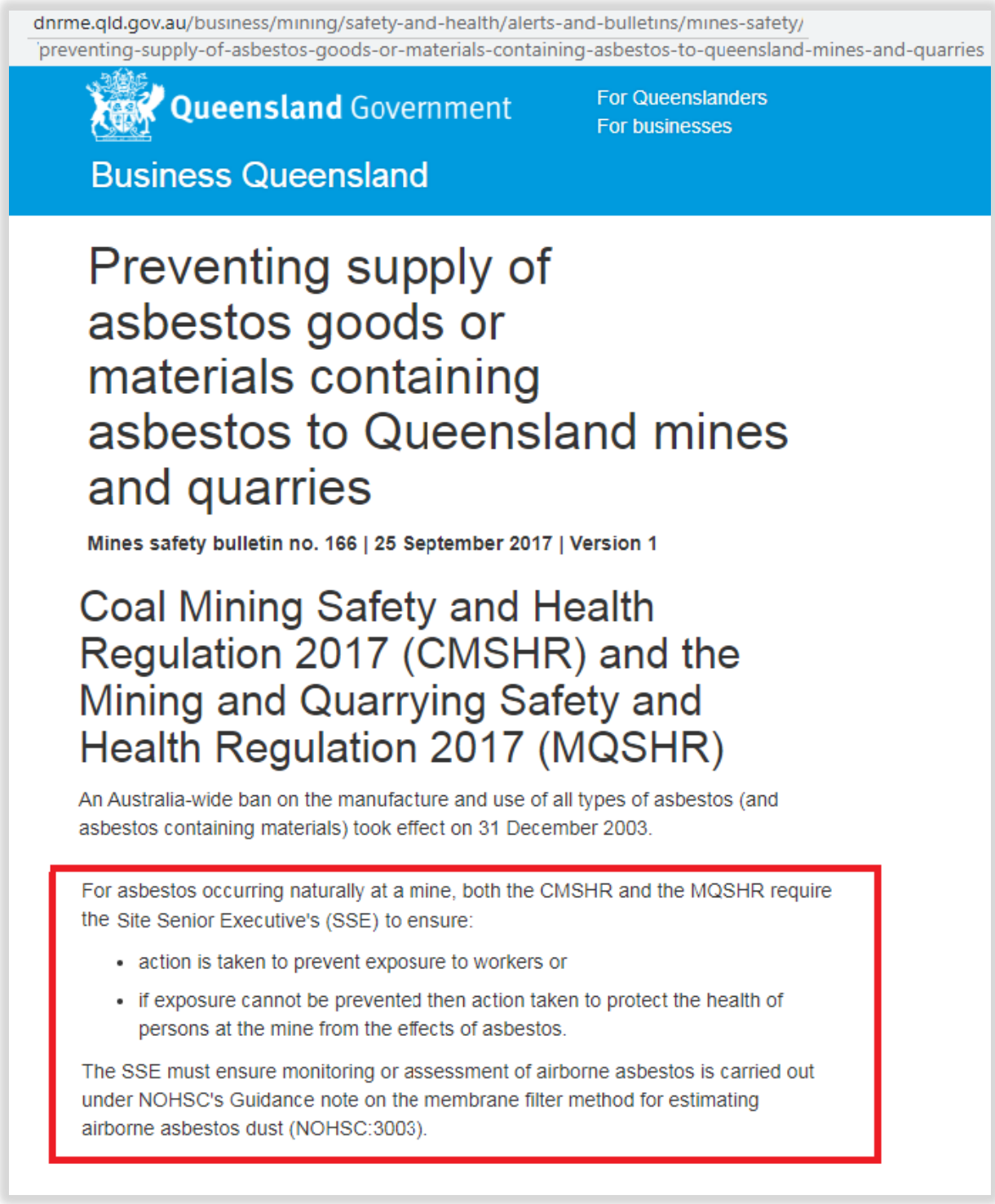
- Infographic: Asbestos related claims 2010-11 to 2014-15
- Asbestos basics for duty holders video
- Personal protective equipment for airborne contaminants
- Managing chemical hazards using the hierarchy of controls

Managing the risks associated with asbestos

Managing the *risks* associated with asbestos involves:

- identifying asbestos and asbestos containing material at the workplace and recording this in an asbestos register
- assessing the risk of exposure to airborne asbestos
- eliminating or minimising the *risks* associated with asbestos by implementing *control measures*
- reviewing *control measures* to make sure they are effective.

Attachment C7 - Site Senior Executives role



dnrme.qld.gov.au/business/mining/safety-and-health/alerts-and-bulletins/mines-safety/preventing-supply-of-asbestos-goods-or-materials-containing-asbestos-to-queensland-mines-and-quarries

Queensland Government

For Queenslanders
For businesses

Business Queensland

Preventing supply of asbestos goods or materials containing asbestos to Queensland mines and quarries

Mines safety bulletin no. 166 | 25 September 2017 | Version 1

Coal Mining Safety and Health Regulation 2017 (CMSHR) and the Mining and Quarrying Safety and Health Regulation 2017 (MQSHR)

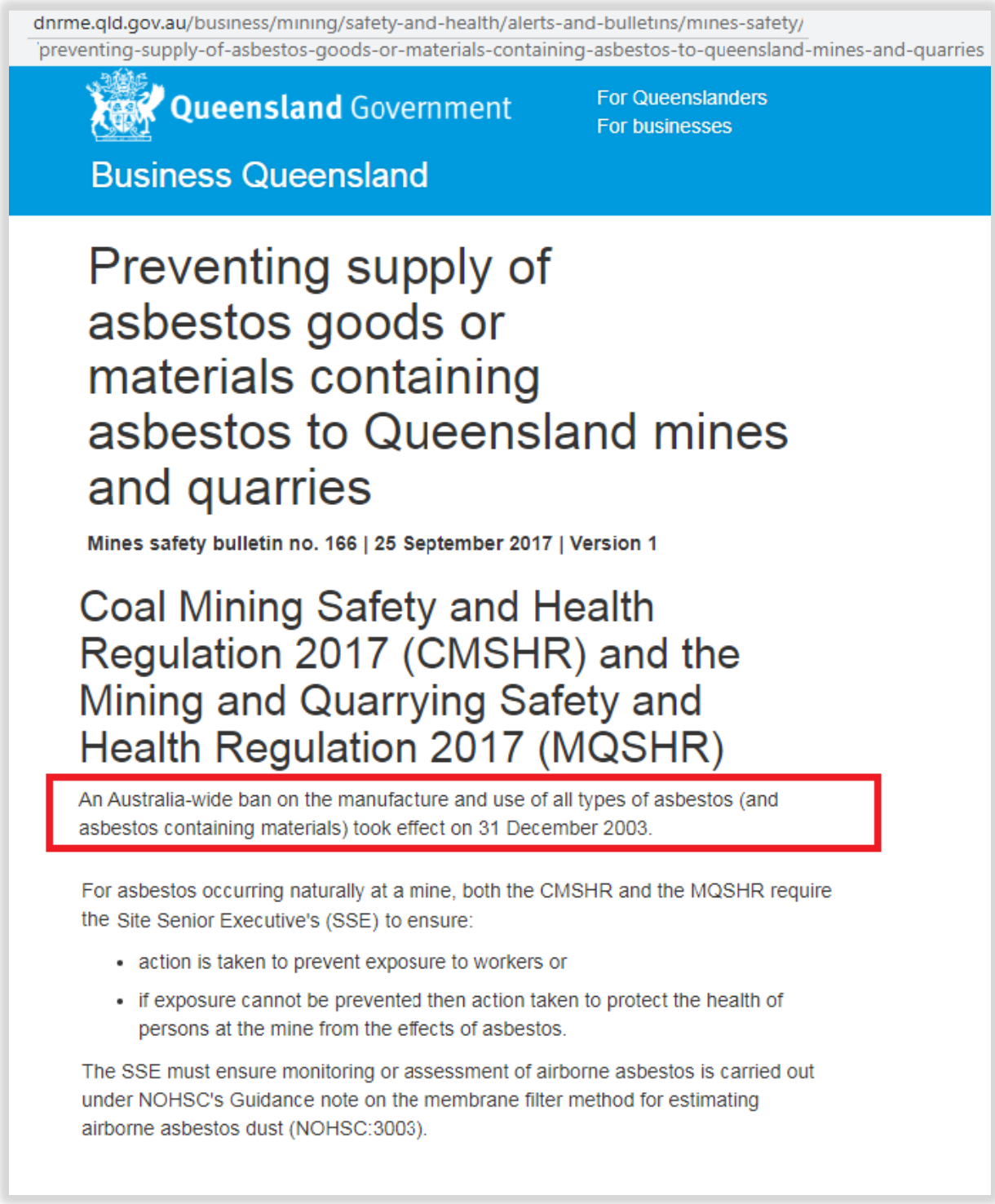
An Australia-wide ban on the manufacture and use of all types of asbestos (and asbestos containing materials) took effect on 31 December 2003.

For asbestos occurring naturally at a mine, both the CMSHR and the MQSHR require the Site Senior Executive's (SSE) to ensure:

- action is taken to prevent exposure to workers or
- if exposure cannot be prevented then action taken to protect the health of persons at the mine from the effects of asbestos.

The SSE must ensure monitoring or assessment of airborne asbestos is carried out under NOHSC's Guidance note on the membrane filter method for estimating airborne asbestos dust (NOHSC:3003).

Attachment C8 - Asbestos ban 31st December 2003



dnrme.qld.gov.au/business/mining/safety-and-health/alerts-and-bulletins/mines-safety/preventing-supply-of-asbestos-goods-or-materials-containing-asbestos-to-queensland-mines-and-quarries

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