Australian Government
Asbestos Safety and Eradication Agency

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CHRYSOTILE KEY FACTS

What is chrysotile asbestos?

- Chrysotile is asbestos.
- Asbestos is the term used for a group of six naturally occurring mineral fibres. These fibres form two groups – serpentine and amphibole asbestos.
- Chrysotile is the only serpentine form of asbestos.
- Chrysotile is the most common type of asbestos.
- Chrysotile is the major commercial form of asbestos.

Can chrysotile cause mesothelioma?

- **Yes.** It is clear that chrysotile can cause mesothelioma (cancer of the lung or abdominal cavity linings).
- The relevant primary scientific literature is systematically analysed in several international scientific agency reports. *
- All reports document and evaluate the extensive evidence in humans (and animals) and confirm that all forms of asbestos—including chrysotile— are the only known cause of mesothelioma.

* reports include the International Programme on Chemical Safety (IPCS) Environmental Health Criteria report on Chrysotile Asbestos (IPCS–UNEP/ILO/WHO, 1998); the WHO report on Chrysotile Asbestos (WHO, 2014); the WHO's International Agency for Research on Cancer (IARC) Monograph on Asbestos (IARC, 2012); the US Department of Health and Human Services Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profile for Asbestos (ATSDR, 2001) and National Toxicology Program (NTP) Report on Carcinogens (NTP, 2016); and the US Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) Chemical Assessment Summary on Asbestos (US EPA, 1988). These reports reflect hazard assessments (i.e. IARC, 2012), as well as overall risk assessments (i.e. ATSDR, 2001; IPCS–UNEP/ILO/WHO, 1998; US EPA, 1988). Under the amended Toxic Substances Control Act (TSCA), the US EPA has also included asbestos in the first ten chemicals subject to updated risk evaluations, and a problem formulation document has recently been published (US EPA, 2018).

What other cancers can chrysotile cause?

- Chrysotile can also cause other cancers, including the most common cancer associated with asbestos exposure, cancer of the lung, as well as cancer of the larynx and ovaries.
- Chrysotile is also associated with pharynx, stomach and colorectal cancer (IARC, 2012)

What is the state of the science on chrysotile?

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- The science on the risk of developing human disease (e.g. different types of cancer and chronic lung disease) following exposure to any form of asbestos—including chrysotile—is unequivocal.

- Even a basic appraisal of the most recent primary scientific literature confirms the overwhelming evidence that asbestos—including chrysotile—is a major health concern, causing devastating disease on a global scale, from historic as well as current exposures in the workplace, in public buildings such as schools and hospitals and in non-occupational settings like homes.

- No new research is needed to prove causation between asbestos and asbestos-related diseases. Differences in the relative potency of the different forms of asbestos to cause disease is not relevant – they all cause disease. Furthermore, differences in lung bio persistence of different forms of asbestos is not relevant. It is well established that accumulation of asbestos fibres—in particular chrysotile fibres—in pleural tissue (the lung lining), causes mesothelioma (e.g. Suzuki and Yuen, 2006; Kohyama and Suzuki, 1991).

- New epidemiological data will continue to be collected for many years to come that will undoubtedly add to this already large body of existing research.

- New science should be future-focussed. For example, better understanding the level of exposure associated with asbestos-containing material in situ and with removing it; understanding the underlying mechanisms of asbestos-related diseases to improve treatment options that reduce the devastating health effects of asbestos exposure in humans and decrease the global burden of asbestos-related diseases; developing novel asbestos disposal solutions that go beyond current land-fill options (e.g. thermal or chemical conversion of asbestos), to ensure a sustainable long-term resolution to this problem.

Is 'responsible and safe' use possible?

- **No.** Chrysotile is hazardous to human health, as it can cause cancer and other diseases.

- There is no evidence that a safe threshold exists (or minimum exposure level) to prevent the adverse health effects of the use of asbestos. As there is no known level of exposure that would prevent the likelihood of asbestos-related diseases occurring, the risk to human health now and in the future when the asbestos is disturbed or deteriorates is unacceptable.

- With no known safe level of exposure, use in 'controlled' environments is not feasible as the risk of exposure cannot be eliminated.

- Workplaces can put measures in place that can minimise exposure risk, using a hierarchy of controls, but these will not prevent exposure completely unless the asbestos (or the hazard) is eliminated.

- The existence or new use of asbestos-containing materials in the built environment (homes or workplaces), places the broader community at risk also, as building materials require maintenance over time, which inevitably includes surface treatment or complete removal, and the potential release of asbestos fibres.

- Natural disasters (earthquakes, hurricane, tsunamis, and floods) also preclude a 'controlled' approach to the maintenance of asbestos-containing materials in the built environment.

Are alternative products safe, cheap and adapted to local conditions?

- **Yes.** In light of the devastating health effects that asbestos use—including chrysotile—causes, asbestos substitutes have been extensively researched over many decades. #

- Safe and effective substitutes are now possible for all products previously containing asbestos. While a single chemical cannot replace asbestos, both technologically and economically viable alternatives (including fibrous [e.g. cellulose] and non-fibrous [e.g. plastics and metals] substitutes, depending on the end-use) do exist and are being used commercially throughout the world and particularly in the countries that have banned use of chrysotile asbestos over the last nearly 50 years. All chemicals have different properties that may cause harm to human health, depending on how they are used. Safe use of chemicals can be defined by evaluating both hazard and the potential for exposure, to determine overall risk. Neither hazard, nor exposure, can be viewed in isolation to determine overall risk.

- In Australia, alternatives to chrysotile have been in place since prior to 1999. This use includes in major industries covering the building and construction, automotive, and railways sectors. Chemical characteristics, advantages and limitations, and the known health effects of the substitutes have been previously summarised (NICNAS, 1999).

- The WHO is committed to providing information and economic stimulus for replacing asbestos with safer substitutes (WHO, 2014).

The Institute for Environment and Health (IEH), 2000; the National Institute of Advanced Industrial Science and Technology (AIST), 2007; the US EPA's 'Asbestos Substitute Performance Analysis' report, 1982; the European Union (EU) Scientific Committee on Toxicity, Ecotoxicity and the Environment (CSTEE) report on 'Chrysotile asbestos and candidate substitutes', 1998 and updated in 2002.

What is WHO's position?

- The World Health Organisation (WHO) considers asbestos as 'one of the most important occupational carcinogens' (WHO, 2014). Asbestos—including chrysotile—causes mesothelioma; cancer of the lung, larynx and ovaries; asbestosis (fibrosis or scarring of the lungs); and pleural disease such as plaques, thickening or effusion (leaking of fluid). The WHO recommended that elimination of asbestos-related diseases became a focus from 2003, in the 13th session of the joint International Labour Organization (ILO) / WHO Committee on Occupational Health.

- A World Health Assembly (WHA) Resolution for global campaigns to eliminate asbestos-related diseases was tabled in 2007. The WHO has also defined strategies for the elimination of asbestos-related diseases which include recognising that stopping the use of all types of asbestos is the most effective approach (WHO, 2014; IPCS–UNEP/ILO/WHO, 1998).

What is IARC's position

- The International Agency for Research on Cancer (IARC) classifies all forms of asbestos—including chrysotile—as carcinogenic to humans (Group 1). In humans, there is convincing evidence that asbestos— including the chrysotile form—causes mesothelioma; and lung,

larynx and ovarian cancer. There are also positive associations between asbestos exposure — including the chrysotile form — and pharynx, stomach and colorectal cancer (IARC, 2012).

Does ILO 162 allow for the continued use of chrysotile asbestos?

- **No.** ILO 162 (which deals with the exposure of workers to asbestos at work) should not be used to provide a justification for, or endorsement of, the continued use of asbestos including chrysotile asbestos.

- A Resolution concerning asbestos was adopted by the International Labour Conference at its 95th Session in 2006. It calls for the elimination of the future use of asbestos and the identification and proper management of asbestos currently in place as the most effective means to protect workers from asbestos exposure and to prevent future asbestos-related diseases and deaths.

- The Resolution also underlined that the ILO Convention on Safety in the Use of Asbestos should not be used to justify the continued use of chrysotile asbestos.

Why did Australia ban chrysotile?

- Chrysotile has been banned in Australia for over 15 years, as of 31 December 2003.

- 20 years ago, the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) assessed chrysotile as a Priority Existing Chemical (PEC) from an occupational, human health and environmental risk perspective (NICNAS, 1999).

- Based on the available science at the time, this report recommended that for the protection of human health, all exposures should be avoided. The same conclusions still hold true today, with the extra evidence that has been gathered since then.

- The PEC assessment of chrysotile also dealt with the issues raised around the health effects of alternative products and debunked the myth that those materials posed a greater risk to health and safety.

- The PEC assessment remains available but the banning of chrysotile means there is no basis to update it. However, given the legacy of asbestos use in Australia and continued use of asbestos-containing products in emerging countries, understanding the risk of exposure from in situ products is an important area of research.

Is a global ban needed?

- **Yes.** A total global ban is required now.

- The global burden of asbestos-related diseases is high, and will only continue to increase with continued use. There are clear lessons from the experience of countries like Australia, which was historically one of the highest per capita users of asbestos in the world (National Asbestos Profile (NAP) for Australia, 2017). Australia began restricting the use of asbestos in the 1960s and implemented a total asbestos ban on 31 December 2003. Despite this, there has been a rising trend in mesothelioma cases since the early 1980's, and it is projected that there will be

approximately 19000 mesothelioma cases diagnosed between 2015 and the end of the century (ASEA reports, 2016).

- A major concern is that even where use is appropriately regulated, chrysotile-containing building products (e.g. roof tiling, water pipes) become damaged and release asbestos fibres into the environment during the course of building maintenance, demolition and disposal of building waste, and as a consequence of natural disasters. Such exposure would be expected to occur later than the original (controlled) installation. This risk can be wholly averted by ceasing to use such products.

- Information on substitute materials and products that can be used safely is available from national, regional and international organizations. The use of non-asbestos products will not impact quality of life in emerging countries, as there are safe and effective alternatives that can be used by anyone. Totally banning asbestos represents the most effective way to eliminate asbestos-related diseases.

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