

Naturally occurring asbestos



What is naturally occurring asbestos (NOA)?

Naturally occurring asbestos (NOA) refers to asbestiform fibrous minerals, several of which occur naturally in rocks and soils throughout Australia. NOA is not the result of industrial processes but is present in the natural environment.

NOA is widespread throughout certain geological areas, hence can be present as a contaminant in workplaces where mining is conducted. The NOA may be found in discrete veins or ubiquitous in rock formations and ore bodies, which may be disturbed during site activities.

NOA can be released into the air through weathering and human activities such as earthworks, mining, and farming. In areas where NOA is released into the air, respirable fibres may pose health risks to workers and the surrounding communities.



Health risks from exposure to NOA

NOA only presents a hazard if fibres of respirable size become airborne. The danger from airborne asbestos fibres is not immediately obvious because the fibres are too small to be seen with the naked eye. Also, there is often a long period between exposure and the onset of disease, excessive exposure may not be recognised quickly.¹

Most fibres are removed from the respiratory system by the body's natural defences (e.g. coughing, mucociliary escalator, and macrophages). However, fibres that reach deep into the lungs (alveolar region) can cause several health problems:

- scarring of the lung tissue (pleural plaques)
- asbestosis
- lung cancer
- mesothelioma.

The risk of contracting an asbestos-related disease depends on the:

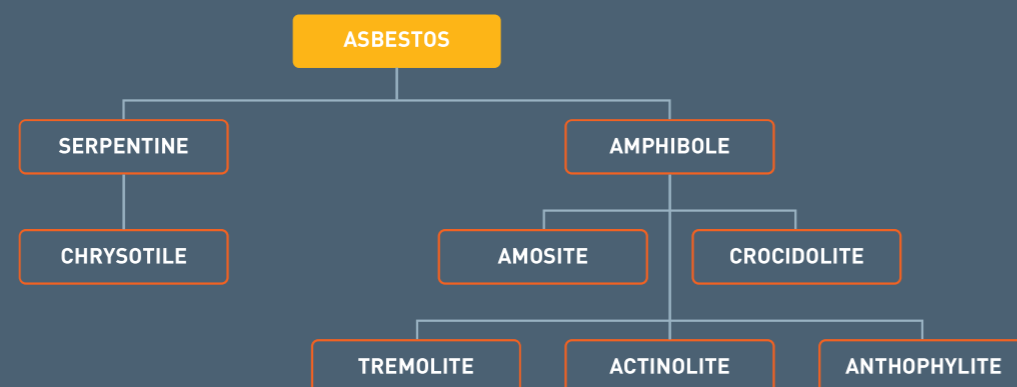
- concentration of respirable fibres in the air
- length of time of exposure
- type of fibre (mineralogy)
- size and shape of the fibres
- persistence in the lung.



NOA in mining in Western Australia

NOA is widely distributed in Western Australia. Amphibole and serpentine minerals are major components of mafic and ultramafic rocks found in Western Australia's "greenstone belts", which contain the State's major gold and base metal deposits. Amphibole minerals may also be encountered in the banded iron formations of the Hamersley Basin.

Areas with geological characteristics favourable for the formation of asbestiform minerals should be studied in detail to confirm their presence or absence by competent geologists or occupational hygienists trained in the specifics of dealing with NOA.



NOA regulatory requirements

The Work Health and Safety (Mines) Regulations 2022 outline the requirements for NOA in Part 8.4 – Management of naturally occurring asbestos. These can be summarised as follows:

- r431 duty to manage NOA
- r432 requirement for a written asbestos management plan (AMP) to be written and maintained
- r432 (4) the AMP must include information on, identification and management of NOA, procedures detailing incidents or emergencies involving NOA and identification of workers carrying out work involving NOA
- r432 (5) the AMP must be readily accessible to relevant workers, H&S Reps, PCBUs who have or intend to carry out work involving NOA at the workplace
- r433, the AMP must be reviewed and revised as necessary
- r434, the PCBU must ensure training around NOA takes place
- Part 8.5 – Division 1 outlines the requirements for health monitoring with respect to asbestos at the workplace.



Asbestos management plan (AMP)

The DEMIRS document *Management of fibrous minerals in Western Australian mining operations* gives a suggested outline of the content of an AMP.²



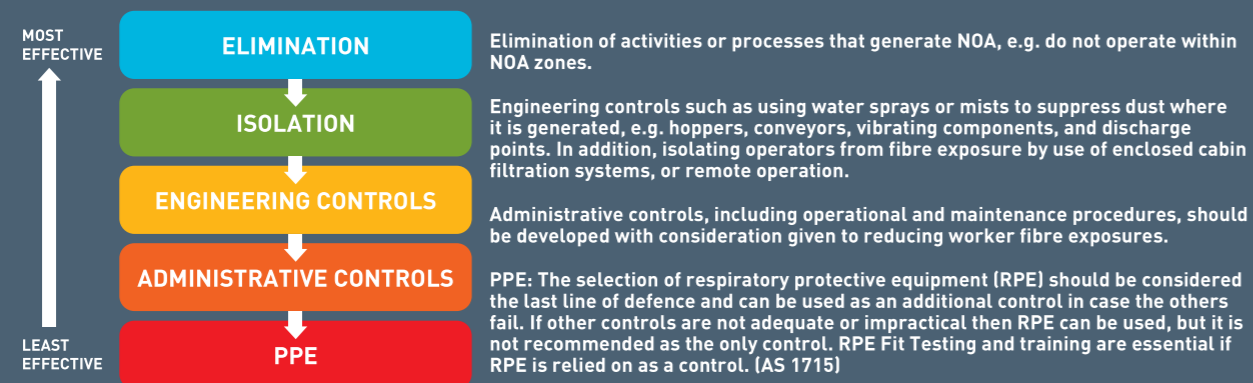
1. **Introduction**
 - Mine site location
 - Mine history and type of mining activity
 - Type of exploration activity (if any)
2. **Fibrous mineral identification**
 - Geology of the mine site
 - Mineralogy of fibre types present
3. **Fibrous mineral management**

The general principles of fibrous mineral management usually incorporate four phases:

 - Hazard identification phase
 - Evaluation and risk analysis phase
 - Control phase
 - On-going monitoring and re-assessment
4. **Employee information and training**
5. **Contractor training**
6. **Legislative requirements**
7. **Work and hygiene**
 - Personal protective equipment
 - Personal decontamination
 - Equipment decontamination
8. **Asbestos exposure assessment**
 - Legislative requirements
 - Airborne asbestos monitoring
 - Airborne asbestos action levels
9. **Asbestos removal work**
 - Plan and timeframe for receiving and assessing monitoring results
 - Asbestos removal
 - Asbestos monitoring
 - Clearance certification
 - Disposal of asbestos-containing materials
10. **Transport, storage and disposal of fibrous minerals**
11. **Incident procedures (i.e. exposure reporting)**
12. **Emergency procedures (provision of emergency dust suppression)**
13. **Drilling dust and fibre controls**
14. **Labelling and signage**
15. **Designated areas**
16. **Tailings**
 - Details of the design and operation of the tailings dam
 - Controls to minimise exposure to airborne fibres
17. **Mine site laboratory (description)**
18. **Environmental considerations and site cleanup**

Controls for NOA

Controls for NOA should be implemented based on the hierarchy of controls (r36).



Assessing exposure to airborne asbestos fibres

Regulation 49 of the Work Health and Safety (Mines) Regulations 2022 outlines that the mine operator must ensure that no person at the mine is exposed to a substance or mixture in an airborne concentration that exceeds the exposure standard for the substance or mixture.

Regulation 50 outlines that the mine operator must ensure that air monitoring is carried out to determine the airborne concentration of a substance or mixture at the mine to which an exposure standard applies if:

- a. the mine operator is not certain on reasonable grounds whether or not the airborne concentration of the substance or mixture at the mine exceeds the relevant exposure standard; or
- b. monitoring is necessary to determine whether there is a risk to health.

A risk-based approach to assess the exposure of personnel to airborne mineral fibres comprises the following general steps³:

- identify all sources of airborne mineral fibres
- carry out risk assessments and evaluate potential exposure
- implement controls
- monitor personnel and workplace
- assess air monitoring results.

Air monitoring must be conducted by a competent person, such as an appropriately qualified Mine Air Quality Technician under the guidance of a Mine Air Quality Officer and/or an appropriately qualified occupational hygienist. The monitoring must be conducted within the breathing zone of the worker and outside of any respiratory protection worn.

The hygienist will use their expertise and judgement to design an appropriate air monitoring strategy that considers the nature and duration of the process, the nature of the airborne contaminant, sampling and analysis errors, and the required statistical significance of the data set derived.

Details of all samples taken as part of a health management plan (HMP) monitoring plan must be uploaded to the DEMIRS Safety Regulation System (SRS). The workplace exposure standard (WES) for asbestos fibres is 0.1 f/mL as an 8-hour time weighed average (TWA). If there is an exceedance of the WES an investigation, along with actions to improve controls, must be documented in the SRS.

Further information is available in the CME information sheet "Workplace exposure standards for airborne contaminants."

Health monitoring

Health monitoring is required to be provided by the employer, at no cost, to workers who are at risk of adverse health effects from exposure to a hazardous substance in the workplace. The Safe Work Australia document "Health monitoring, guide for asbestos" provides information on what health monitoring should take place. Health monitoring for asbestos will generally include:

- collection of demographic, medical and occupational history
- records of personal exposure
- physical examination with emphasis on the respiratory system.

In mining, as crystalline silica is often ubiquitous in orebodies in Western Australia, the requirement for a low dose high resolution computed tomography (HRCT) scan can be required for individuals who may be exposed to both asbestos fibres and respirable crystalline silica.

The requirement or otherwise for RDCT scans should be made via consultation between the approved medical practitioner and an appropriately qualified occupational hygienist.

Further information on health monitoring is available in the CME information Sheet "Health monitoring for work with hazardous chemicals."



1 AIOH (2016) Asbestos and its potential for occupational health issues
 2 DMIRS (2015) Management of fibrous minerals in Western Australian mining operations – guideline (2nd edition)
 3 NOHSC (2005). Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003]