Chapter 1

Introduction

In WA, the Department of Water and Environmental Regulation (DWER) administers the *Contaminated Sites Act 2003* (CS Act). DWER seeks Department of Health (DOH) advice on asbestos-related issues given the significance of asbestos exposure to human health

These Guidelines have the same status as the DWER Contaminated Sites Guidelines. They are to be used in conjunction with the Assessment and Management of Contaminated Sites (DWER, 2021) (external site) and the National Environmental Protection (Assessment of Site Contamination) Measure (ASC NEPM) ASC NEPM, Schedule B1, Section 4 Asbestos Materials in Soils (external site).

Any departure from these Guidelines should be fully justified with relevant information and evidence documented in site reports.

1.1 Scope of the guidance

These Guidelines apply to the identification, assessment, remediation and management of sites suspected or known to be contaminated with asbestos in Western Australia.

Contaminated is defined under the CS Act as:

In relation to land, water or a site, means having a substance present in or on that land, water or site at above background concentrations that presents, or has the potential to present, a risk of harm to human health, the environment or any environmental value.

1.2 Role of the Department of Health

There is provision in the CS Act for DOH to provide advice in matters relating to public health. As asbestos contamination is mainly a public health matter, the DOH is involved in establishing guidance around assessing and managing asbestos contaminated sites. In addition, the DOH has a broader role in administering public health legislation and in public health assessment.

The *Health (Asbestos) Regulations 1992* set out requirements for the handling, demolition and removal of asbestos associated with building structures for residential sites. Further information on the scope and application of these regulations is available from: https://ww2.health.wa.gov.au/Articles/A_E/About-asbestos.

1.3 Consultative process

Asbestos contaminated sites often attract significant stakeholder and community interest and concern. Appropriate public and stakeholder consultation is required throughout the stages of site investigation, remediation and management as described by Schedule B8 of the ASC NEPM (external site). This should include information provision and collection and complaint resolution. The extent of consultation will vary with the size, sensitivity and complexity of the site.

Consultation with stakeholders should be an interactive process where possible and not just an awareness-raising and information session. The need for adequate risk communication and understanding risk perception applies to asbestos, which can be an emotional issue and can become difficult to manage if an investigation becomes contentious.

Engage in proactive and effective community and stakeholder consultation and risk communication in accordance with Schedule B8 of the ASC NEPM.

1.4 Asbestos-containing materials

There is a history of production and widespread use of asbestos materials in WA. Crocidolite asbestos, primarily used in asbestos cement products, was extensively mined at Wittenoom until the mine ceased operation in 1966. Imported amosite asbestos was also used in these products until 1984, and chrysotile asbestos was used in building products until 1987. A total ban on asbestos occurred in 2003, which included friction and industrial products.

The term ACM is used to describe any material known to contain commercial forms of asbestos in any bonded or non-bonded form. Asbestos has been historically used in the manufacture of a huge variety of products and materials, typically to give that material additional strength, durability or resistance to fire, heat, electricity, damp or mould. Examples of asbestos-containing materials are provided in Table 1.

Table 1 List of common asbestos-containing products

Automotive Parts brake pads; clutches; hood liners; gaskets; valves
Cement cement; cement pipes; cement wallboard; cement siding; tabletops
Construction Materials acoustical and decorative plaster; adhesives, putties, and mastics; compressed sheet packing; electrical panel partitions and wiring; fireproofing and prevention materials (e.g. curtains, blankets); gaskets; heating and electrical ducts; insulating board; joint compounds; millboard; pipe and equipment insulation; spray-on and blow-in insulation; taping compounds (thermal); textured paints and coatings; vinyl sheet flooring; linoleum backing paper and wall coverings
Laboratory Equipment Bunsen burners; ceramics; clamps; filters; fume hood; gloves; ovens and furnaces; sealants; tubes and sleeves
Textiles cloth; curtains; personal protective clothing; rope; felt; rugs; thermal paper products; yarn

A gallery of common products is available from: https://asbestosawareness.com.au/gallery-videos/ (external site).

ACM contain different types and quantities of asbestos fibre. It is important to describe the type/form, and condition of all ACM identified in the field so that it may be appropriately characterised and assessed.

The term asbestos contaminated materials can also refer to a range of materials known to contain asbestos other than by original design or manufacture, such as waste and soil mixed with ACM waste, repurposed or recycled materials found to contain asbestos.

1.5 Asbestos as a contaminant

Asbestos may be present in a range of forms, sizes and degrees of deterioration. For the purposes of these Guidelines, the asbestos associated with contamination is divided into the three distinct groups described below.

1.5.1 Bonded (non-friable) asbestos-containing material (bonded ACM)

The term bonded ACM refers to bonded (non-friable) asbestos-containing material where the asbestos fibre is bound by another material or is part of a matrix; for instance, asbestos cement sheeting or vinyl tile. Bonded ACM can include broken, weathered or fragmented material that retains its basic integrity.

Bonded ACM as asbestos cement sheeting in soil is the most common form of asbestos site contamination in WA as a result of:

- widespread use in a range of construction materials
- inadequate removal and disposal of asbestos products during building demolitions
- historical widespread use as uncharacterised fill material for site landscaping
- fly-tipping on vacant or development sites.

Figure 1 Asbestos cement fragments in soil.

Typically, broken bonded asbestos cement exists in larger fragments. Bonded ACM corresponds to material that is larger than 7mm x 7mm. This size is used as it approximates the thickness of broken asbestos cement sheeting as it is the most common form of soil contamination.

1.5.2 Fibrous asbestos (FA)

Fibrous asbestos is any material containing asbestos that is wholly or in part friable (can be broken or crumbled by hand pressure), including any previously non-friable asbestos asbestos-containing material that is in a severely degraded condition such that it can be broken or crumbled by hand pressure and original friable asbestos, such as pipe lagging and other loose-fill insulation and manufacturing waste.

Figure 2 Friable test – example of hand crumbled low density fibre board found in soil originally in a rectangular form (FA).

Fibrous asbestos also includes materials that have higher asbestos content with a propensity to become friable with use, e.g. low density asbestos fibre board and textile materials or fibres contained within a less durable bond, e.g. used gaskets and textile products. FA may be more difficult to visibly distinguish when coated in soil or mixed with other material. In some cases, FA that has mixed with soil is sampled and assessed as AF.

1.5.3 Asbestos fines (AF)

Asbestos fines relate to the size of asbestos contamination present (smaller than 7 mm x 7 mm) within a soil sample. It corresponds to, but is not the same as asbestos contaminated dust or debris (external site) (ACD) (Safe Work Australia) on surfaces. ACD on surfaces is more readily identified and managed. AF includes loose fibre bundles[1] of asbestos as well as small pieces of friable and non-friable material such as asbestos cement fragments mixed within the soil.

Figure 3 Visible amount of AF on from high-pressure cleaning of an asbestos cement roof.

Concentrated amounts of asbestos fines on the soil surface may be visually observed, as in Figure 3. However, low quantities of asbestos fines or lower concentrations will need to be identified analytically by a NATA accredited laboratory. Note that there are limitations associated with reliably quantifying low levels of asbestos fines in soil.

1.6 Naturally occurring asbestos (NOA)

Asbestos is a naturally occurring mineral and present in rocks and soils in parts of Western Australia. Undisturbed naturally occurring asbestos (NOA) is not considered to be 'above background concentrations' and therefore does not meet the definition of contamination under the CS Act. However, if disturbed and redistributed in the landscape, NOA may be considered as contamination and potentially subject to management under the CS Act. Exposure to NOA is most likely during geological sampling and mining operations. Management measures similar to those for friable asbestos usually apply. More information is available from the Department of Mines, Industry and Safety Regulation (external site) and the Guidance Note on Public Health Risk Management of Asbestiform Minerals Associated with Mining.

1.7 Human health risks

The health effects of asbestos are well understood and result from inhalation exposure to airborne (respirable) fibres. If deposited in the lungs, the fibres can initiate diseases that take many years to produce serious health effects. These effects include asbestosis, lung cancer and mesothelioma. The likelihood of asbestos-related disease is related to the concentration and duration of exposure to respirable asbestos fibres (f/mL.yr). Exposure thresholds have been suggested for both asbestosis and lung cancer. An exposure threshold has not been established for mesothelioma and it remains the main health outcome of concern with regard to lower or less frequent exposures.

The presence of undisturbed asbestos material in soil does not directly translate to an increased risk to health. The risk to health is dependent on the concentration of airborne respirable fibres that can be released or created from activities at the site and the frequency and duration of recipient exposure.

The relationship between the concentration of asbestos in a source material (such as asbestos contaminated soil) and the concentration of fibres in air that results when that source is disturbed is dependent on a wide range of variables and cannot be reliably estimated or predicted for any given type and concentration of asbestos in soil.

[1] Loose asbestos fibre bundles may be visible under low power stereo microscopy. This document makes a distinction between loose fibres and "respirable" fibre (see glossary).

As such, for human health risk assessment, direct measurement of airborne asbestos fibres is recommended to inform the exposure assessment (See Section 5.9).

There are many uncertainties related to understanding the exposure to airborne asbestos fibres. Complications for completing an exposure assessment include the:

- uncertainty associated with determining the degree, nature and extent of the asbestos impacts, especially respirable fibres
- concentration of respirable dust that may be released from different soils for different activities
- duration and frequency of exposure to airborne fibres from current and future activities in a contaminated area.

1.8 Asbestos eradication and control

In addition to human health risks, consideration is given in these Guidelines to community expectations and concerns about asbestos contamination and the national strategic plan (external site) on the prioritised removal and management of asbestos in the general environment.

1.9 Competency of practitioners

Competent persons are those with sufficient skills, knowledge and experience to undertake particular tasks. Competency is developed over time and gained by various means, such as education and training, professional development and experience.

Where necessary, specialist technical advice should be obtained (e.g. assessing naturally occurring asbestos and other fibrous minerals, undertaking detailed (Tier 2) health risk assessment, air quality monitoring, planning, and completing removal/remediation works).

General and specific industry training should include:

- an outline of all applicable legislation, codes of practice and Australia Standards that apply to asbestos, including workplace health and safety, public health and waste legislation
- an understanding of public health risks associated with exposure to asbestos
- a description of common materials that have historically been used and found at asbestos contaminated sites
- specific requirements for asbestos contaminated sites investigation, assessment and reporting requirements.

An asbestos investigation and remediation action plan should be supervised by someone with:

- continuous and relevant experience with asbestos in soil contamination
- relevant tertiary qualifications in environmental science, science or engineering
- additional training and experience related to asbestos, including identification and assessment of asbestos.

1.10 Worker risk assessment

Advice on work health and safety matters is the responsibility of WorkSafe Division, Department of Mines, Industry Regulation and Safety (DMIRS). Failure to manage asbestos, during demolition activities in accordance with work health and safety (WHS) legislative arrangements, is the origin of many asbestos contaminated sites and can be prevented by complying with removal requirements. Further information is available from: https://www.der.wa.gov.au/your-environment/contaminated-sites/61-contaminated-sites-guidelines (external site).

Safe systems of work must be implemented for all contaminated site work to prevent exposing workers to airborne asbestos and prevent further degradation or distribution of asbestos contamination. Worker risks should be assessed by a person competent in assessing workplace asbestos exposure risks, such as an occupational hygienist.

Safe systems of work should consider appropriate training and supervision of site workers and include the licensing requirements for removalists. DMIRS Information sheet – Asbestos contaminated soils (external site) provides additional information on the selection of licensed removalist.

Application of WHS legislation falls outside of the scope of this document, with further information available from DMIRS.

1.10.1 Additional resources – Department of Mines, Industry Regulation and Safety

- Removal Checklist – Non Friable Asbestos (external site)
- Asbestos removalists presentation (external site)
- Frequently asked questions (external site)