Management of asbestos in recovered fines and recovered materials for beneficial reuse in NSW

Discussion Paper – Submission Form

Submitter Details

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If this is a confidential submission, please tick here: ☐

Responses to questions

You can respond to any questions that are relevant to you. If you only want to submit data or any other relevant information, please email them to asbestosreview@chiefscientist.nsw.gov.au.

Thresholds and screening levels

Question 1: What factors should be considered when deriving a threshold or screening level for asbestos in recovered fines and material for beneficial reuse?

Prior to determining an acceptable asbestos in soil/ fines guideline value, an acceptable asbestos in air quality guideline would typically need to be in place. Modelling can then be carried out on soil/ fines to determine the reasonably expected airborne concentrations considering form, type and concentration of asbestos in soil, likely disturbance, soil to air relationship and conditions of the developed site. This would then be compared to the acceptable air quality guideline to assess long-term chronic exposure risks.

The lack of air quality guidelines has proven a limitation to generating soil quality guidelines in other countries, such as the UK.

Assuming that the soil threshold is relevant to the protection from long-term/ chronic health effects to future users at the waste/ soil destination site, rather than short-term exposure by workers, other factors to consider include

1) type and concentration of asbestos present (to assess potential for fibre release),
2) end use location (at or below surface) and potential for future disturbance, and
3) site setting (nearby residents, potential for tracking back to home, site user groups and activities) which will influence dust/ fibre generation rates and receptor exposure.

Considerations for the asbestos content of the material would include:

1) concentration by weight of fragments of ACM (either large and easily identifiable or very small, but with fibres bound to the matrix and only identifiable under a microscope), and
2) details on ACM type (chrysotile, amosite, crocidolite), form (cement sheet, lagging, rope…), condition of the matrix (intact, high weathered, friable…) to assess potential for fibre release,

Adequate laboratory analysis results of representative samples of the fines/ soil for asbestos content (noting the discrepancy in the minimum LoR of 0.01% wt/wt by the PLM method and the 0.001% required by the Australian National Environment Protection Measures), including free fibres or fibre bundles concentration and respirable fibre content will be required.

A soil to dust relationship will be required to determine reasonably likely airborne respirable fibre concentrations (f/mL) from the source soil/ fines. UK guidance as detailed in CIRIA C733 Asbestos in soil and made ground: a guide to understanding and managing risks uses the soil to air concentration relationship presented in the Addison et al, 1988 paper. Laboratory analysis (see question 9) may also be carried out to measure the soil to air concentrations for specific materials.

Ground conditions, including soil types and moisture content is also known to influence the potential for airborne fibres to be released from the soil/ fines matrix.

An acceptable excess lifetime cancer risk (ELCR) will also need to be agreed. 1 in 100,000 people is generally accepted in the UK. The WA Guidelines state that the ELCR should be as close as possible to 1 in 1M.

An asbestos in soil generic guideline value for a single w/w concentration of asbestos, i.e. % or mg/kg has not been generated in the UK, partly due to the lack of an equivalent acceptable asbestos in air quality guideline and that asbestos at equal concentrations has different potential to release respirable fibres depending on the type and form, i.e. friable asbestos has the potential to release a greater number of respirable fibres than non-friable ACM of equal weight.

Asbestos waste management at recycling facilities

Question 2: Can you provide any data on annual volumes of C&D waste being recycled or alternatively sent to landfill? Data on rejected loads due to asbestos presence and any other data related to all TOR items is welcomed.

Please email data together with this form to asbestosreview@chiefscientist.nsw.gov.au

Question 3: Can you provide any other information on the potential presence of asbestos in recycled C&D material?

i. Information on the methods of separating and removing asbestos from waste that can inform alternative approaches?

ii. What reuse scenarios are there for recycled waste, including end-products and their use?

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Question 4: While this section focuses on C&D waste, are there other waste types which are suitable for beneficial reuse which have the potential to be contaminated with asbestos?

Site won soils proposed for reuse on the site of origin.

Management of asbestos in soil

Question 5: Is it appropriate for the health screening levels for asbestos in soils to apply to asbestos in waste? Note that the threshold level in this instance refers to a level where further action is required.

i. Why or why not?

Soil properties (sand, silt and clay content and moisture) are known to influence the potential for dust/ fibre release to air. The applicability of soil to air models would need to be assessed against the physical properties of the waste material. Consideration would need to be given to the variability of the waste, which may have a higher coarse and lower fines fraction resulting in lower moisture retention and higher fibre release potential.

Question 6: Health screening levels are not the only tool used for managing asbestos in soils. If threshold levels in soils were to be applied to asbestos in **waste for beneficial reuse**,

i. what other tools can support managing asbestos in waste for beneficial reuse?
ii. what would be the limitations, costs or feasibility of safely removing asbestos in waste?
iii. are there certain scenarios where recycled C&D material should not be reused?
iv. are there certain scenarios where reuse of recycled C&D material could result in land legacy issues?

i. use of emerging Artificial Intelligence tools, such as Swinburne University's Smart-phone system for identifying asbestos, which can be utilised cost effectively at the gate of the recycling facility and along the processing line.

Standards and guidelines for asbestos in waste

Question 7: Are there other standards or guidelines that would be applicable for managing asbestos in waste for beneficial reuse that can be provided?

CIRIA C733 Asbestos in soil and made ground: a guide to understanding and managing risks (Item Detail (ciria.org)) sets out the framework for assessing the long-term (chronic) risks to health of users of the site with soils containing asbestos, in the absence of a generic soil assessment criteria within the UK. The variability of forms and types of asbestos in soils to health risks has proven a limitation to the use of generic assessment criteria for asbestos in soils in the UK.

The CIRIA document outlines a framework for determining whether the asbestos present within the soils pose acceptable or unacceptable risks to the long-term health of site or adjacent land users based on the specifics of the site, land use and asbestos within the soil.

Question 8: Should the approach in the WA guideline (*Managing asbestos at construction and demolition waste recycling facilities*), be implemented in NSW and if so, why or why not?

i. Are there other factors that should be considered if the WA Guideline is to be implemented?
ii. Is there an alternative approach that could be considered?

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Sampling and analysis

Question 9: Apart from AS4964 and ASC NEPM, are there other sampling and analysis methods for detecting and quantifying asbestos in waste materials or recycled products that are being received and processed at recycling facilities?

i. Are you aware of any other methods/processes for sampling and analysis of asbestos that the Review should consider? If so, please provide details and basis for their relevance to this Review.
ii. How reliable and accurate are these methods in ensuring that recycled waste is not contaminated?

i. In the UK asbestos analysis is expected as part of a general contamination suite for Fill (Made Ground) samples and so positive results are quite common. The laboratory testing has 3 stages; 1) removal of large ACM fragments or fibre bundles and microscopic analysis of the soil for ACM and free asbestos fibres; 2) identification and gravimetric analysis of ACM and fibre bundles to a limit of reporting (LoR) of 0.001% w/w; and 3) identification and quantification of free fibres by dispersion and phase contrast optical microscopy, including respirable fibres in per gram of soil.

Laboratory dustiness testing of soil/ waste samples using a similar method to that presented in the Addison et al (1988) report is also widespread in the UK. Results are reported in respirable f/mL per mg/m3 of respirable dust and the moisture content of the samples can be adjusted to represent site or likely worst-case conditions on site. This allows estimates of airborne fibres to be made based on measured or expected respirable dust levels at a site.

ii. Sampling and analysis is only part of the solution. It is essential that employees at the recycling facility are trained in visually identifying as many potential ACM products as possible. At this point in time, it is our opinion that mainly cement sheet is being targeted however, there are numerous other ACM products that are potentially being processed by the recycling facility unknowingly. As mentioned previously, AI could assist in identifying potential ACM requiring confirmation by AS4964.

Risk-based approaches for managing asbestos in waste

Question 10: Would a through-chain approach to managing asbestos in waste, where each business looks to minimise or eliminate the risk from asbestos in waste for beneficial reuse, work?

i. What elements would be part of the system/approach?
ii. What would be the advantages/disadvantages of such a system?

Currently, the onus is placed mainly on the recycling facility to ensure they are not receiving waste contaminated with asbestos. More responsibility needs to be placed on demolition and waste transport contractors to guarantee that they have gone through all the required steps of ensuring no asbestos is likely to be in the load prior to it reaching the recycling facility.

If the recycling facility is expected to conduct inspections on received loads then it should be expected that the demolition contractor is proactive in ensuring that no suspect ACM is present in the structure being demolished (even once the known asbestos has been removed and a Clearance Certificate obtained) or in the waste being loaded into the truck. Equally, the waste transporter should be vigilant to actively look for potential ACM being loaded into their vehicle. This would all need to be supported by Regulation and contractor sign off.

The advantages are the responsibility is placed more evenly on all parties thus reducing the amount of asbestos finding its way into the recycling system. The disadvantage may be that less material is ultimately being recycled.

Question 11: Are there other risk-based approaches to managing asbestos in waste for beneficial reuse?

CIRIA C733 Asbestos in soil and made ground: a guide to understanding and managing risks sets out the framework for undertaking site specific quantitative risk assessments for soil containing asbestos. Risk assessments carried out in accordance with the C733 methodology are widely accepted by UK regulators. The asbestos products used in the UK and Australia which form the primary source of asbestos in soils and construction and demolition waste are relatively consistent, however an assessment to the applicability of the framework to C&D waste and Australian climatic conditions would be required.

The CIRIA document uses a 1 in 100,000 Lifetime Excess Cancer Risk threshold to determine an acceptable level if risk and the suitability of that threshold within an Australian Regulator Context would require consideration.

Based on personnel experience working in the Brownfield redevelopment industry for nearly 20 years in Australia and the UK, more variable forms of asbestos, including friable ACM seems to be identified within Made Ground in the UK, relative to Australia, where fragments of non-friable cement sheet is most commonly encountered. However, in Victoria soil testing for asbestos is not as common and assessment for asbestos is primarily via visual inspection of arisings by an environmental consultant on site, which may reduce the potential to identify smaller and friable fragments of ACM.

However, non-friable ACM unless present in significant quantities (>1%) or subject to heavy disturbance is not considered to contribute significantly to airborne fibre release within a UK content, as outlined in CIRIA C733. Therefore, despite the limited soil testing for free fibres or fragments of ACM only visible under a microscope, the risks from soil/ waste containing asbestos in Australia may potentially be lower to that of a similar quantity of asbestos in soils in the UK, based on personal experience.

General

Question 12: Is there any further information you would like to provide the Review to assist us with in responding to the Terms of Reference?

Agon has accumulated a significant dataset of occupational background and personal asbestos fibre air monitoring on sites involving excavation, stockpiling, loading out and abatement of soils containing fragments of primarily non-friable cement bound asbestos. Agon plan to present a paper containing results from over 1,200 days of background air monitoring at 6 construction sites during the handling and disturbance of soil containing asbestos at the 2024 CleanUp Conference in Adeliade. The results found that levels of airborne fibres were very rarely recorded above the limit of detection of 0.01 fibres/ml. The anonymised data could be provided to the NSW EPA in support of the asbestos review.

Email the completed form and attach any relevant data and information to asbestosreview@chiefscientist.nsw.gov.au by 31 July 2024.