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An Asbestos-Free Pacific: A Regional Strategy and Action Plan

Secretariat of the Pacific Regional Environment Programme (SPREP) and The World Health Organization (WHO)

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Foreword

The management and disposal of asbestos containing materials are currently a cause of concern in the Pacific region. Asbestos is a naturally occurring mineral fibre that has a long history of human use. Thousands of years ago ancient civilizations including the Greeks and Romans mined and wove the fibres into clothing and used them in building materials, taking advantage of their high strength and fire and corrosion resistance.

Until relatively recently modern societies have also taken advantage of asbestos' useful properties, using it in about 3000 products such as vehicle brake-linings, fibre-cement sheeting for roofs and walls, guttering, insulation and water pipes. However, just as ancient peoples noted and recorded the deleterious effects of inhaled asbestos fibres, modern studies and opinion reinforce these concerns. We are now well acquainted with the well documented health consequences associated with exposure to asbestos fibre, and these have resulted in bans and reductions of asbestos containing materials since the 1980s. Since that time there has been an overall reduction in global asbestos use, and strong advocacy for complete global asbestos bans and a zero-use policy.

Although asbestos containing materials are now banned and no longer produced in many countries, they may still be found in public and domestic buildings. In the Pacific region, the main product encountered is asbestos cement sheeting which is not a threat to health as long as it remains undamaged. However, as buildings age or become damaged, for example by extreme weather events such as tsunamis and cyclones, they can release dangerous asbestos fibres to the environment. When inhaled these fibres can lead to a number of diseases including deadly asbestosis, mesothelioma and lung cancer. Similarly, during building demolition or renovation, disturbance and breakage of asbestos containing products are likely to liberate asbestos fibres and workplace health and safety procedures need to be in place to protect exposed workers from inhaling airborne fibres.

In order to protect Pacific communities from exposure to airborne asbestos fibres and work towards an asbestos-free Pacific, we need to be careful to protect all individuals who will be exposed to potential risk, be they residents, workers in the building and waste disposal industries, or disaster response personnel.

The best means of protection may be a combination of initial stabilization of asbestos containing materials to minimize or prevent further release of fibres, followed by eventual removal and disposal. When a final disposal option for the collected asbestos is decided, we need to consider all arguments rationally and with respect to human health, and the conventions to which we have committed in order to protect the environment. This Pacific asbestos strategy and action plan outlines the steps that need to be taken to in order to do this. I am pleased to present to you a way forward for the region for the management of asbestos.

David Sheppard
Director
SPREP

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Management of Asbestos in the Pacific: A Regional Strategy

Contents

Foreword

Contents

Executive Summary

Introduction

The need for a regional Pacific approach to asbestos management

A Pacific approach to asbestos management

Vision
Policy goals
Scope

Guiding Principals

Transparency
Sound decision-making
Precautionary principle
Adherence to Regional and International Conventions
Public participation:

Implementation timeframes

Pacific thematic priorities

i. Safeguarding public health;
ii. Assessment and planning;
iii. Environmentally sound asbestos management;
iv. Coordinated asbestos removal and disposal; and
v. Financing for action.

Pacific Asbestos Strategy Action Plan (2011-2016)

Appendix 1. Asbestos disposal options
Appendix 2. PPE guidelines for asbestos handling
Appendix 3. Asbestos handling guidelines
Appendix 4. Post-disaster asbestos safety and collection guidelines
Appendix 5. Framework to collection of long-term epidemiological information
Appendix 6. National Asbestos Policy recommendations
Appendix 7: The policy context for asbestos management in the Pacific

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Management of Asbestos in the Pacific: A Regional Strategy

Executive Summary

The term "asbestos" is used to describe a group of naturally occurring minerals composed of long, thin fibres and fibre bundles. The mineral has high tensile strength, good insulating properties and is a fire retardant. However, medical information has indicated that inhalation of asbestos fibres originating may result in serious health issues including cancers in human.

Construction materials such as AC sheeting and roofing which contain asbestos fibres have been widely used in Pacific island countries for housing and building construction and even though health concerns have led to their phase-out, they are still found in many buildings. As the Pacific is subject to periodic catastrophic weather and geological events such as tsunamis and cyclones which are highly destructive to built infrastructure, asbestos containing materials are, or may become a significant waste and human health issue in many Pacific countries. Therefore, proper management and disposal of asbestos in the Pacific is critical to the maintenance of long-term community health.

This regional asbestos waste management strategy:

- *Provides background information on the health risks associated with asbestos exposure;*
- *Provides guidance on best practice in asbestos handling and disposal options;*
- *Describes an integrated framework to progressively assess, stabilize, collect and dispose of asbestos containing materials in the Pacific;*
- *Presents a draft of model National Asbestos Management Policy for further discussion and consultation prior to national adoption; and*
- *Supports co-ordination and capacity building in hazardous waste management.*

The strategy is supported by an action plan (2011-2016) which presents a five year timeframe and framework in which to improve regional asbestos management.

Development and adoption of regional and national asbestos policies will establish an appropriate framework for the Pacific that improves management of asbestos and promotes shared asbestos management responsibility by all stakeholders. Particularly important is the adoption of minimum occupational health and safety guidelines for workers and citizens involved in asbestos handling operations, either as a routine operation or as part of an emergency response scenario.

Appropriate public consultation and environmental monitoring including human exposure modelling will ensure that acceptable, cost effective options are utilised in any future disposal actions for asbestos waste and that long term planning to manage past asbestos exposure is initiated. Adoption of National Asbestos Management Policies will also ensure that the regional transport of waste asbestos is controlled through Waigani/Basel Convention protocols to ensure its safer transport and disposal.

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The need for a regional Pacific approach to asbestos management

Introduction

The term "asbestos" is used to describe a group of naturally occurring minerals composed of long, thin fibres and fibre bundles. The predominant use of asbestos likely to be encountered in the Pacific region is in the building and construction industry. Bonded materials containing asbestos are most common in domestic houses. The material is typically composed of a bonding compound (such as cement), which contain up to 15% asbestos. Bonded materials containing asbestos are solid, rigid and the asbestos fibres are tightly bound within the material. They are commonly called 'fibro', 'asbestos cement' and 'AC sheeting'. In contrast, friable or loosely bound materials containing asbestos are not commonly found in domestic houses. They were primarily used in commercial and industrial settings for fire proofing, sound proofing and insulation. However, they can be found in some old domestic heaters, stoves, hot water systems and associated pipe lagging and in the backing of vinyl and linoleum floor coverings. These materials can be made of up to 100% asbestos. They are quite loose and can be turned to dust with very light pressure. Loosely bound materials containing asbestos are very dangerous as the asbestos fibres can be easily transferred into the air.

All forms of asbestos have been classified by the International Agency on Cancer Research as being carcinogenic to humans and inhalation of small asbestos fibres that have become airborne can cause serious lung disease or cancer[1,2]. The greater the exposure to airborne asbestos, the greater the risk of development of lung disease or cancer. This includes the development of asbestosis (a progressive and irreversible scarring of the lung tissue that impairs breathing), mesothelioma (a cancer of the linings around the lungs and abdomen), pleural thickening (a non-malignant disease in which the lining of the lung becomes scarred) and lung cancer. These diseases may take between 10-50 years to develop following exposure to airborne asbestos fibres. No safe level can be proposed for airborne asbestos exposure because a threshold is not known to exist. Exposure therefore should be kept as low as possible[3]. In contrast, there is no consistent evidence that ingested asbestos is harmful to human health[4].

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[1] ARC (2007). *Asbestos*. International Agency for Research on Cancer, Lyon, France.

[2] WHO (2003). *Asbestos in drinking-water. Background document for preparation of WHO Guidelines for drinking-water quality*. Geneva, World Health Organization

[3] WHO (2006). *Elimination of asbestos related diseases. WHO, Geneva.* (WHO/SDE/OEH06.03)

[4] WHO (2006). *Guidelines for drinking-water quality, third edition, incorporating the first and second editions. Volume 1 Recommendations*. Geneva, World Health Organization.



Examples of asbestos used in construction in the Pacific Islands

A Pacific approach to asbestos management

As exposure to asbestos fibres can result in damage to the lungs and in cancer, planned management and disposal of asbestos in the Pacific region is critical to the maintenance of long-term community health. This regional strategy provides background information on the health risks associated with asbestos exposure and describes an integrated framework to progressively assess, stabilize, collect and dispose of asbestos containing materials in the Pacific region.

Vision

An asbestos free Pacific that reduces negative environmental and public health impacts in Pacific island countries.

Policy Goals

This asbestos management strategy has the following goals:

- To minimize the adverse effects of asbestos on the environment and health of Pacific island people
- To ensure the systematic replacement of asbestos materials with non-hazardous alternatives
- To minimize duplication of effort and maximize coordination of asbestos management activities
- To build capacity of stakeholders to promote effective asbestos management
- To ensure national policy objectives are being met

Scope

This strategy covers management of all types of asbestos and asbestos waste consistent with the classification of hazardous waste under the Waigani and Basel Conventions.

Guiding Principles

The objectives of this regional strategic framework are compatible with the objective of sustainable development. Management of asbestos waste in the region shall be in accordance with the following policy principles:

i. Transparency

All regional asbestos waste management activities shall be conducted in an open and transparent manner and Pacific Islanders shall have access to information regarding waste management where this does not infringe on the rights of individuals or private businesses.

ii. Sound decision-making

Decision-making shall be based on scientific information and risk analysis from national, regional and international sources and shall promote the optimization of resources.

iii. Precautionary principle

Where there is uncertainty about the safety of an activity, a cautious approach shall be adopted.

iv. Adherence to Regional and International Conventions

Pacific Island countries shall abide by their obligations to regional and international conventions to which they are a Party.

v. Public Participation

Asbestos waste management consider the interests and concerns of all interested and affected, when decisions are being made.

Implementation timeframe

This regional asbestos strategy will be implemented over a five year period.

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Pacific thematic priorities
To achieve the stated goals, five priority thematic areas are identified. These thematic areas cover:

i. Safeguarding public health;
ii. Assessment and planning;
iii. Environmentally sound asbestos management;
iv. Coordinated asbestos removal and disposal; and
v. Financing for action.

Safeguarding public health

The issues
Asbestos containing materials are likely to pose little risk to human health unless they are damaged or disturbed in some way that releases microscopic asbestos fibres into the atmosphere. Sawing, breaking, crushing, and natural weathering of asbestos containing materials are likely to release hazardous fibres and dust into the air, which can affect residents, workers and people in neighbouring communities. Despite this potential threat to human health from asbestos containing building materials, there are no established frameworks to collect long-term epidemiological information around human asbestos exposure in Pacific communities. Furthermore, during natural disasters, the risk of asbestos exposure to people who are the first responders to natural disasters may be high: These include emergency services personnel, volunteers and local residents.

What we want to achieve
Pacific island communities are informed and aware of the relative risks posed by asbestos containing materials.

National Occupational Health and Safety (OH&S) guidelines are developed and enforced to ensure that workers in contact with asbestos containing materials are not unnecessarily exposed to harmful asbestos fibres.

First responders are aware of and equipped to work safely in the vicinity of asbestos containing waste and data is routinely collected on human exposure to asbestos.

How we will achieve the targets

1. Undertake national public awareness campaigns to provide accurate information concerning the relative health risks posed by asbestos to Pacific Island communities.

2. Implementation and enforcement of minimum OH&S standards for personal protective equipment (PPE) for all workers involved in routine and emergency response asbestos handling (Appendix 2).

3. Develop standardised national operating procedures (SOPs) to ensure the interim stabilisation and containment of asbestos fibres including methods for in-situ

treatment of asbestos-cement sheeting to minimize further release of fibres to the atmosphere prior to final asbestos removal (Appendix 3).

4. Develop standardised national operating procedures to ensure the minimal release of asbestos fibres into the atmosphere during asbestos removal operations (Appendix 3).

5. Integrate standardised national operating procedures for asbestos management into national disaster management and response plans, to ensure the minimal release of asbestos fibres into the atmosphere during disaster management operations (Appendix 4).

6. Establish a framework for the collection of long-term epidemiological information around human asbestos exposure including training of relevant stakeholders and follow-up of the exposed subjects with X-rays, CT Scans, and biomarker analyses (Appendix 5).

Assessment and planning

The issues

Asbestos containing materials have been widely used in Pacific island countries for housing, institutional and limited industrial construction purposes, yet there are no known inventories documenting the extent of the use of asbestos containing materials, or of country waste stockpiles. This lack of information currently hinders effective planning. Additionally, the Pacific is subject to periodic catastrophic weather and geological events such as tsunamis and cyclones which are highly destructive to built infrastructure and result in the release of dangerous asbestos fibres. As a consequence, waste asbestos is, or may become a significant future waste and human health issue in many Pacific countries, yet there is no current systematic management of this waste stream.

What we want to achieve

A comprehensive understanding of the extent and status of asbestos distribution in the Pacific to inform and be included in the development of appropriate national management frameworks and policies. These national policies will improve country management of asbestos containing materials and lead to their ultimate phase-out and removal to minimize future health risks to Pacific island communities.

How we will achieve the targets

7. Undertake a detailed inventory of the quantity and status of asbestos containing materials in buildings located within Pacific island countries, confirming its presence where necessary through use of phase-contrast optical microscopy.

8. To establish and operate an appropriate framework that improves country management of asbestos and leads to the phase-out of asbestos containing

materials, and promotes shared asbestos management responsibility by all stakeholders (Appendix 6).

Environmentally sound asbestos disposal

The issues

There are a range of potential options for the final disposal of asbestos containing material and asbestos waste currently located in the Pacific island countries and territories (Appendix 1). However, there is a lack of objective evaluation of each option. The disposal options include: do nothing with the asbestos waste; recycling and reuse of asbestos; disposal in a secure local landfill; disposal at sea; and disposal by high temperature transformation.

What we want to achieve

Consensus based, cost-effective, environmentally sensitive disposal of asbestos containing materials and asbestos waste.

How we will achieve the targets

9. Undertake national public awareness campaigns to provide accurate information concerning the relative risks posed by asbestos to Pacific Island environments.

10. Undertake comparative, objective evaluations of relevant disposal options and seek stakeholder's views and preference for asbestos disposal methods prior to removal. The options and estimated costs for alternative disposal methods for asbestos containing waste should be fully explored and explained (Appendix 1).

11. Develop national asbestos disposal policies and guidelines following assessment and consolidation of disposal options and public preferences (Appendix 1).

Coordinated asbestos removal and disposal

The issues

Removal of asbestos containing materials requires a skilled labor force and is time consuming and costly, and collected asbestos will, in most cases, have to be transported to a place of disposal. Any asbestos removal will also need to be preceded by on-site inventories and may require temporary stabilization actions.

What we want to achieve

The collection and removal of all asbestos containing materials in the Pacific region is completed on a prioritised basis taking into account the health risks posed by remaining asbestos, the degree to which asbestos can be stabilised and the best cost-effective environmental solution available for its disposal.

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How we will achieve these targets

12. Asbestos removal is guided by a national asbestos management framework.

13. Ensure that asbestos containing waste is transported in compliance with provisions concerning the transport of dangerous goods and hazardous wastes including relevant regional and international conventions (Appendix 7).

14. Where the preferred disposal method is local disposal in a secure landfill, environmental monitoring should be commenced and institutionalized to help ensure its continuity.

Financing for action

The issues

Removal of asbestos containing materials requires a skilled labor force and is time consuming and costly. National budgets currently have minimal or no allocation to deal with asbestos issues.

What we want to achieve

Sufficient funds secured for the inventory, stabilization, collection and removal of all asbestos containing materials in the Pacific region to prevent them becoming, or continuing to be a significant country waste and human health issue.

How we will achieve these targets

15. Exploit the links between asbestos waste and other sectors including health and tourism to ensure that asbestos waste management can be addressed through integrated funding proposals.

16. Prioritize asbestos waste management included in national budgets.

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Pacific Asbestos Strategy Action Plan (2011-2016)

Strategy	Action	Intended Outcome	Lead Agency	Time frame	Assumption
Pacific Asbestos Strategy endorsed	1.Conduct stakeholder consultation on draft strategy 2. Refine strategy based on consultation outcomes 3. Present Pacific asbestos strategy to 2011 SPREP Meeting	The Pacific asbestos strategy addresses the needs of Pacific Island Members Regional asbestos strategy endorsed by Members	SPREP	2011	Pacific asbestos management a SPREP priority National asbestos management a Member priority
National asbestos policies completed	1.Complete draft national asbestos policy 2. Conduct stake-holder consultation workshops on draft policy 3.Refine policy based on workshop outcomes	National asbestos policies meet the needs of Pacific Island countries National Asbestos Policy actions endorsed and supported by countries	National Environment Departments	2012	National asbestos management a Member priority
Development of SOPs for asbestos handling and removal	1.Asbestos handling guidelines adopted and enforced 2. Training of workers in asbestos management completed 3. PPE worn by all asbestos workers	Routine management of asbestos containing materials does not result in unnecessary exposure to workers and the community	WHO, NDMOs	2012	Seed funding available
Contingency planning for future natural disasters	1.Asbestos handling guidelines incorporated into National Disaster Planning 2. Training of disaster responders in asbestos management completed 3. PPE available to disaster responders	Disaster management of asbestos does not result in unnecessary exposure to workers and the community	WHO, NDMOs	2012	Seed funding available
Asbestos management funding	Funding applications submitted to US Gov Small Grants Program, Basel Small Grants Program, SAICM, AusAID, and NZAid	Funding secured for regional asbestos inventory, removal and disposal	SPREP, WHO	2012-2016	Pacific asbestos management a SPREP and WHO priority

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Pacific survey of asbestos distribution	1. Regional survey of asbestos distribution 2. Complete public awareness campaign that provides accurate information on the relative environmental and health risks posed by asbestos.	Prioritised asbestos removal planning completed Prioritised asbestos stabilization planning completed Public awareness campaign completed	National Environment Departments, National Health Departments, SPREP	2012 & 2013	Seed funding available National Environment Departments have available resources
Asbestos stabilisation	Asbestos stabilisation completed	Asbestos exposure to building occupants minimized prior to asbestos removal	SPREP, WHO, National Health Departments	2012 & 2013	Funding available
Prioritised regional asbestos removal and disposal	1.Asbestos containing building material removed on a prioritized basis 2.Asbestos waste removed on a prioritized basis 3.Stockpiles of asbestos containing material disposed of	All asbestos containing materials removed and disposed of in a safe and environmentally acceptable manner	National Environment Departments, National Health Departments	2012-2016	Funding available Appropriate asbestos disposal options agreed
Long-term asbestos related epidemiological information available	1.Collection of long-term epidemiological information around human asbestos exposure commenced 2. Training of relevant stakeholders	Long- term planning for management of asbestos related illness completed	WHO, National Health Departments	2012-2016	Pacific asbestos management a WHO priority Asbestos management a national priority
Follow up long-term monitoring and epidemiological assessment	1.Routine ongoing monitoring of asbestos disposal sites 2. Ongoing monitoring of communities exposed to asbestos containing materials 3. Ongoing monitoring of asbestos disposal workers	Environmental and health impacts arising from asbestos exposure documented and managed	WHO, National Health Departments, National Environment Departments	Ongoing	Pacific asbestos management a WHO priority Asbestos management a national priority

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Appendix 1. Asbestos disposal options

Asbestos disposal options

There are a range of potential options for the final options for disposal of asbestos waste currently located on Pacific Islands and Territories. These include:

i. Do nothing with the asbestos waste;

ii. Recycling and reuse of asbestos;

iii. Disposal in a secure local landfill;

iv. Disposal at sea; and

v. Disposal by high temperature transformation.

Option i. Status Quo (i.e Do nothing).

The option of not managing asbestos waste means the potentially hazardous waste will stay where it is and will continue to degrade and possibly become friable which increases the health risks to surrounding communities. The exposed asbestos can also be disturbed during any future cyclones or other natural disasters and could be spread over a wide area, contaminating many communities. This option to do nothing is considered to be irresponsible and is not an environmentally sound management option.

Option ii: Reuse and recycling of asbestos

Reuse of asbestos is not recommended due to the inherent problems linked to the handling of asbestos and asbestos-containing materials. However, in the interim, regular maintenance of asbestos-containing structures could contribute significantly to the reduction in human exposure to asbestos prior to its disposal.

Option iii: Disposal at a local sanitary landfill or secure hazardous substance landfill

Asbestos-containing materials can be disposed of in landfill sites provided these have appropriate measures in place to prevent release of asbestos fibres, including a non-porous liner and a system for leachate collection. Asbestos contaminated waste should never be disposed of by burning. Bagged asbestos wastes are typically disposed of in specially identified cells alongside municipal solid waste. Large items such as asbestos sheets and boards should be wrapped and sealed in polythene (polyethene) with precautions taken to prevent any damage to the polythene by sharp edges of the contents. A record must be kept of the location of this waste, including the exact geographical coordinates.

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Option iv: High Seas disposal of asbestos waste

Being inert, insoluble in water and harmless when wet, the dumping of asbestos in the high seas is a potential disposal option. However, dumping at sea must be in accordance with the requirements of relevant conventions (the Noumea and London Convention and Protocols). The wastes should be properly contained and each dumping operation should be strictly controlled and monitored. Sealing of waste asbestos in concrete in second-hand shipping containers is a means of secure disposal. The shipping container should be loosely packed with asbestos, and vacant space filled with concrete so that the concrete surrounds the asbestos waste. This will prevent the asbestos from breaking up as the container disintegrates, and the added weight will also aid in keeping the asbestos submerged after dumping at sea. An appropriate location for sea disposal could be the same as a deep water place of refuge for ships as defined by the International Maritime Organisation (IMO). A place of refuge refers to a place where a ship in need of assistance can take action to enable it to stabilize its condition and reduce the hazards to navigation, and to protect human life and the environment. The features which allow a place of refuge to reduce environmental risk from distressed ships will also reduce the environmental risk from the dumped asbestos in the unlikely event that it becomes disturbed.

The Convention for the Protection of Natural Resources and Environment of the South Pacific Region (the Noumea Convention) and its Protocols obliges Parties to endeavour to take all appropriate measures to prevent, reduce and control pollution from any source and to ensure sound environmental management and development of natural resources, using the best practicable means at their disposal and in accordance with their capabilities. One of the Protocols is the Protocol for the Prevention of Pollution of the South Pacific Region by Dumping. The Noumea Protocol does allow for disposal of bulky items at sea. The London Dumping Convention and Protocols also allows for the disposal of bulky items at sea in circumstances where such wastes are generated in small islands having isolated communities and no practicable access to disposal options other than sea dumping. It is suggested that disposal of asbestos waste from Small Island Developing States fits within this category of legitimate high sea disposal.

Option v: High Temperature Transformation

Asbestos can be recycled by transforming it into harmless silicate glass. A process of thermal decomposition at 1000–1250 °C produces a mixture of non-hazardous silicate phases, and at temperatures above 1250 °C produces silicate glass[5]. Microwave thermal treatment can be used in an industrial manufacturing process to transform asbestos and asbestos-containing waste into porcelain stoneware tiles, porous single-fired wall tiles and ceramic bricks[6]. Both of these processes are likely to be restricted to small-scale disposal of asbestos, and would also require the trans-boundary transport of the asbestos waste prior to transformation.

[5] Gualtieri, A.F. and Tartaglia, A. (2000). Thermal decomposition of asbestos and recycling in traditional ceramics. *Journal of the European Ceramic Society* **20**: 1409–1418.

[6] Leonelli, C., Veronesi, P., Boccaccini, D., Rivasi, M., Barbieri, L., Andreola, F., Lancellotti, I., Rabitti, D. and Pellacani, G. (2006). Microwave thermal inertisation of asbestos containing waste and its recycling in traditional ceramics. *Journal of Hazardous Materials* **135**: 149–155.

Appendix 2. PPE Guidelines for asbestos handling

Asbestos materials pose little health risk unless they are damaged or disturbed in some way that releases microscopic fibres into the atmosphere. Safe handling and disposal of asbestos therefore requires a series of sequential steps to ensure that the risk of exposure to airborne asbestos is minimised:

Workers equipped and educated

1. Workers in the vicinity of asbestos should be provided with training and information about handling asbestos as well as about its safe disposal. This training should include simple and easy-to-understand information that describes what asbestos is, where it might be found, what the hazards are, and how to handle and dispose of it safely.

2. Workers should be provided with, and required to wear a half-face filter respirator fitted with a class P1 or P2 filter cartridge, or a class P1 or P2 disposable respirator appropriate for asbestos. A respirator should be worn until all work and clean up is completed. Disposable coveralls should be used to prevent the contamination of any clothing, including shoes or boots. A disposable hat and disposable gloves should also be worn. Coveralls should not be reused or have the dust shaken out of them at any time.

3. After work is completed each day, the used coveralls should be sprayed with a light mist of water, removed and then sealed in asbestos waste bags for disposal. Workers should continue to wear a respirator while removing and disposing coveralls. All workers should be provided with onsite washing facilities, and should wash before eating, drinking or smoking, and before returning home.





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Appendix 3. Asbestos Handling Guidelines

Asbestos stabilisation

Weathering of asbestos-cement sheeting can result in the erosion of the asbestos-cement resulting in the release of asbestos fibres. Fungal growth may cover the asbestos sheet and provide some protection of the surface from degradation. Where treatment of asbestos-cement sheeting is considered essential, a method that does not interrupt the *matrix* (or make up) of the asbestos-cement sheeting should be employed. Chemical treatment and sealing is the preferred method of treating asbestos-cement sheeting, as there is negligible disturbance of the asbestos-cement matrix. This usually involves the application of a fungicide either separately or included in a base primer followed by subsequent applications of chemical sealant. Both water-based coatings (emulsions) and solvent-based coatings may be used. Asbestos containing materials in storage should be appropriately sprayed with a Poly Vinyl Acetate (PVA) water solution to mitigate the release of asbestos dust to the ambient air. Ordinary paints are generally unsuitable for applying directly to weathered asbestos-cement as they do not bond well.

Routine asbestos handling and collection

Asbestos materials may pose little risk unless they are damaged or disturbed in some way that releases microscopic fibres into the atmosphere. Sawing, breaking and crushing asbestos containing materials are particularly likely to release hazardous fibres and dust into the air. Water is very effective in preventing release of asbestos fibre. Water should be applied with a garden hose or from a water container to ensure that the entire surface of the asbestos-based materials is wet but minimal runoff occurs. When cutting equipment is used to remove asbestos, the water spray should be directed at the site of the cut and the wetted material removed as the cut progresses. The wetted, asbestos-based material should be removed in sections and immediately placed in suitably labelled containers and properly sealed. Asbestos-cement sheets should be removed with minimal breakage and should be lowered to the ground, not dropped. The removed sheets should be stacked on a plastic sheet and not allowed to lie about the work site where they may be further broken.

Short-term storage of asbestos

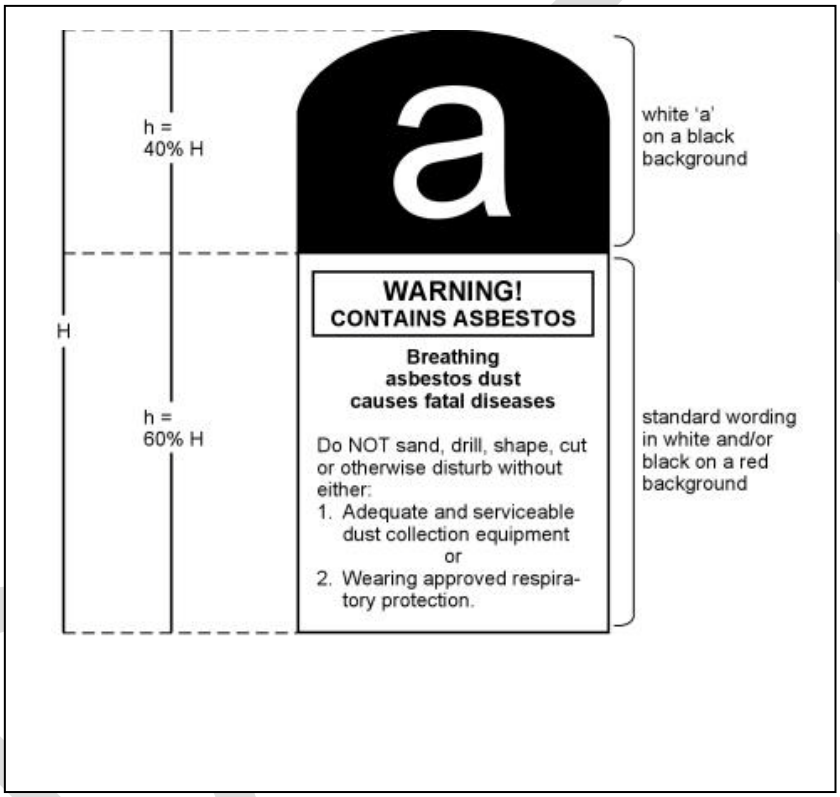
Asbestos waste must be collected into suitable sealed packaging (e.g. heavy-duty plastic bags) with labels indicating that it contains asbestos. Sealed bags should be removed from the place of generation as soon as possible, and stored safely. Where asbestos waste is present in small quantities the asbestos waste should be sealed securely in either doubled lined high density polythene (polyethylene) bags or polypropylene bags lined with low density polythene bags of thickness not less than 70 microns. Large items (e.g. asbestos sheets and boards) should be wrapped and sealed in polypropylene, with precautions taken to prevent any damage by sharp edges of the contents. Alternatively, small quantities of asbestos can be stored in metal, plastic or fibreglass drums. All stored asbestos must be labelled in the local languages and include a hazard warning, e.g. "DANGER CONTAINS

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ASBESTOS FIBRES, HARMFUL IF INHALED**, MAY** CAUSE CANCER, KEEP SEALED, AVOID CREATING DUST ".

Transportation of asbestos waste

Asbestos waste should be transported in bulk where possible. During transportation, asbestos waste containers should remain covered or sealed so that dust and fibres do not escape. Asbestos waste should be transported in compliance with provisions concerning the transport of dangerous goods and hazardous wastes.



Appendix 4. Post-disaster asbestos safety and collection guidelines

a. First response for humanitarian aid

The risk of asbestos exposure to emergency services personnel, volunteers and local residents who are first responders to natural disasters may be high. First responders may be unaware of the hazards of asbestos and may be unable to identify asbestos-containing material. It is imperative that first responders understand how to protect themselves and should be equipped with, and wear appropriate face masks. Emergency responders should have access to 'Asbestos Emergency Kits' which should include:

- Gloves and booties
- Protective eyewear
- Disposable clothing
- Half face filter masks with P1 or P2 filters
- Garbage bags
- Water containers and spray equipment (to wet asbestos materials prior to moving them)

b. Asbestos contaminated waste clean-up

During a clean-up of damaged and destroyed buildings following a natural disaster such as a tsunami or cyclone, it is likely that there will be a need to handle and break up and dispose of asbestos-containing building and insulation materials. The main principles of safe handling in this type of situation are to:

- Restrict access to sites where there are piles of building debris, and to demolition sites and waste sites. In particular, keep children away;
- Identify the locations of asbestos-containing materials and carry out a risk assessment;
- Ensure that people involved in clean-up work are adequately informed of the risks and the methods of best practice;
- Provide workers with adequate personal protective equipment;
- Minimize the disturbance of asbestos containing materials;
- Friable materials present a particular hazard and should only be removed by trained personnel following accepted procedures, with workers wearing adequate personal protective equipment;
- Minimize the release of respirable asbestos into the atmosphere by wetting. Do not dust or sweep or use a domestic vacuum cleaner because this will release fibres and dust up into the air;
- Clean surfaces contaminated with asbestos-containing materials using wet methods;
- Keep piles of asbestos-containing materials covered e.g. with tarpaulins or sheets of plastic until they can be safely stored or disposed of. Wet thoroughly before moving the materials; and
- Ensure that waste is securely stored and adequately labelled. Do not mix with other waste prior to disposal.

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Appendix 5. Framework to collection of long-term epidemiological information around human asbestos exposure including training of relevant stakeholders and follow-up of the exposed subjects with X-rays, CT Scans, and biomarker analyses.

Proposed epidemiology and diagnosis of asbestos-related diseases outline:

- Relevant studies on epidemiology of asbestos-related diseases (ARDs)
- Prevalence of benign asbestos-related diseases including pleural plaques, diffuse pleural thickening, asbestosis (total number of workers with diagnosed benign ARDs to-date) - national data, a breakdown by industries if available
- Incidence of lung cancer among workers exposed to asbestos
- Incidence of mesothelioma
- Estimate of the burden of diseases related to asbestos: disability adjusted life years (DALYs), years of potential life lost (YPLL) and deaths attributable to asbestos exposure
- Estimated economic losses due to asbestos-related diseases
- Existing international diagnostic criteria and tools
- Screening technologies for ARDs
- Clinical diagnosis of mesotheliomas (pleura, peritoneum, pericardium), asbestos-induced lung cancer, asbestosis, pleural plaques, diffuse pleural thickening, pleural effusion, and carcinoma recently attributed to asbestos exposure (laryngeal and ovarian cancers)

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Appendix 6: Recommendations for elements of a National Asbestos Policy

Vision
An asbestos free nation that reduces negative environmental and public health impacts.

Purpose
To establish and operate an appropriate management framework that improves national management of asbestos and leads to the phase-out of asbestos containing materials, and promotes shared asbestos management responsibility by all stakeholders.

Policy Goals
This asbestos management policy has the following goals:

- To minimize the unnecessary, untimely, and uncontrolled generation of asbestos waste
- To minimize the adverse effects of asbestos on the environment and health of Pacific island people
- To ensure the systematic replacement of asbestos materials
- To minimize duplication of effort and maximize coordination of asbestos management activities
- To build capacity of stakeholders to promote effective asbestos management
- To ensure policy objectives are being met

Scope
This policy covers management of all types of asbestos and asbestos waste consistent with the classification of hazardous waste under the Waigani and Basel Conventions.

Background
[To be completed, using information from previous sections of the Pacific Asbestos Strategy]

Policy Principles
The objectives of this Policy Framework are compatible with the objective of sustainable development. National asbestos waste shall be managed in accordance with the following policy principles:

Transparency
All asbestos waste management activities shall be conducted in an open and transparent manner and Pacific islanders shall have access to information regarding waste management where this does not infringe on the rights of individuals or private businesses.

Sound decision-making
Decision-making shall be based on scientific information and risk analysis from national, regional and international sources and shall promote the optimization of resources.

Precautionary principle
Where there is uncertainty about the safety of an activity, a conservative approach shall be adopted.

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Adherence to Regional/International Conventions
All obligations to regional and international conventions to which they are a Party shall be met.

Public Participation:
Asbestos waste management shall take into account the interests and concerns of all interested and affected persons when decisions are being made.

Asbestos Waste Management Policy Strategies

Objective	**To minimize the unnecessary, untimely, and uncontrolled generation of asbestos waste**
Policies	To achieve this objective, National Governments shall: I. Promote good maintenance practices of asbestos-containing structures until such time that the asbestos materials can be safely removed and disposed; II. Include asbestos waste concerns into appropriate disaster management frameworks and processes.

Objective	**To minimize the adverse effects of asbestos on the environment and people of the Pacific Region**
Policies	To achieve this objective, National Governments shall: III. Require the establishment and application of appropriate standards, guidelines, and safeguards for the maintenance of asbestos-containing materials, and for the handling, collection, transportation, and disposal of asbestos waste which ensures environmental and public health protection; IV. Promote compliance with existing obligations under regional and international conventions such as the Waigani and Basel Conventions.

Objective	**To ensure the systematic replacement of asbestos materials**
Policies	To achieve this objective, National Governments shall: V. Develop programmes which target the refurbishment or replacement of asbestos-containing infrastructure.

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Objective	**To minimize duplication of effort and maximize coordination of asbestos management activities to ensure effective implementation of the Policy.**
Policies	To achieve this objective, National Governments shall: VI. Ensure that asbestos waste management concerns are appropriately addressed in existing waste management legislation, regulations, strategies, action plans and programmes; VII. Support the inclusion of asbestos waste management into appropriate existing governance structures such as taskforces or committees; VIII. Ensure that asbestos waste management is appropriately addressed in current or future waste management planning.

Objective	**To build the capacity of stakeholders to promote effective asbestos management**
Policies	To achieve this objective, the Region shall: IX. Create opportunities to develop people's understanding, skills and general capacity and to engage with them concerning environmentally sound asbestos waste management, including the potential impacts and consequences of poor management; X. Support the processes to build institutional capacity concerning asbestos waste management.

Objective	**To ensure that the asbestos waste management policy objectives are being met**
Policies	XI. Support the development of a national register of asbestos waste (which could be integrated into systems for other hazardous wastes); XII. Require regular reporting of data and information relating to asbestos waste management activities from the persons, agencies, institutions, groups, or businesses involved; XIII. Develop an appropriate monitoring and evaluation framework, to ensure midterm review of the policy; and XIV. Report annually on disposal of asbestos waste.

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Roles and Responsibilities

In order to guarantee effective implementation of this policy, the Pacific delegation of (?) responsibilities for asbestos waste management shall be as follows:

SPREP/WHO

- Develop a strategy and action plan for asbestos management in the Pacific which details the time frame, baseline, targets, outputs and outcomes of regional asbestos management
- Take the lead in securing regional funding for asbestos management
- Provide technical support in relation to in-country asbestos management
- Provide technical support for developing policy, regulation, standards, guidelines and quality assurance concerning national asbestos waste management
- Provide expert technical advice on management of asbestos related health issues

COUNTRY ENVIRONMENT and HEALTH DEPARTMENTS

- Take the lead in collecting national asbestos data
- Take the lead in the development of national health and safety guidelines for asbestos waste management
- Take the lead in enforcement of relevant workplace health and safety legislation
- Take the lead in asbestos refurbishment, removal and disposal

Development of a regional asbestos policy will require completion of a series of steps outlined in the following Table.

Activity	**Number of Weeks**													
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**..16**
Circulation of draft Pacific Asbestos Strategy														
Complete draft national asbestos policy incorporating information from the Pacific Strategy														
Conduct stakeholder consultation workshops on draft policy														
Refine draft policy further based on workshop outcomes														
Final draft National Asbestos Policy completed														
Incorporate asbestos management policy outcomes into national waste management strategy														

Appendix 7: The policy context for asbestos management in the Pacific

a. International Framework

Rotterdam Convention

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, (the Rotterdam Convention), is a multilateral treaty to promote shared responsibilities in relation to importation of hazardous chemicals. The convention promotes open exchange of information and calls on exporters of hazardous chemicals to use proper labelling, include directions on safe handling, and inform purchasers of any known restrictions or bans. Parties can decide whether to allow or ban the importation of chemicals listed in the treaty, and exporting countries are obliged make sure that producers within their jurisdiction comply. Six Pacific countries are parties to this convention. All forms of asbestos except chrysolite (white asbestos) are subject to the prior informed consent (PIC) procedure under Annex II of the Rotterdam treaty. Several attempts have been made to include chrysolite asbestos under the Rotterdam Convention, (2006, 2008), but these have been prevented by lobbying of asbestos producing countries.

Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, (the Basel Convention), is an international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous wastes from developed to less developed countries. The Convention is also intended to minimize the amount and toxicity of wastes generated, to ensure their environmentally sound management as closely as possible to the source of generation, and to assist Less Developed Countries in environmentally sound management of the hazardous and other wastes they generate. The Basel Convention specifically lists waste asbestos (dust and fibres) as a substance to be controlled under Annex I; Y36. Ten Pacific countries are Party to the Basel Convention.

London Convention and Protocol

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, (the London Convention) is an agreement to control pollution of the sea by dumping. The *1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972* (the 1996 Protocol) updates the convention to prohibit the dumping of any waste or other matter that is not listed in Annex 1 (eg dredged material; inert, inorganic geological material; organic material of natural origin; and bulky items including iron, steel, concrete and similar materials for which the concern is physical impact) of the 1996 Protocol. Dumping of these wastes requires a permit and is limited to those circumstances where such wastes are generated at locations with no land-disposal alternatives. The 1996 protocol also prohibits the exports of wastes or other matter to non-Parties for the purpose of dumping at sea. Ten Pacific countries are Party to the London Convention /Protocols.

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WHO recommendations on elimination of asbestos-related diseasesBoth the World Health Assembly Resolution 58.22 on cancer prevention and control in 2005 and the Joint ILO/WHO Committee on Occupational health in 2003 urged that special attention should be paid to eliminating avoidable exposure to carcinogens, particularly asbestos. WHO recommends to prevent asbestos-related diseases by recognizing that the most efficient way to eliminate asbestos-related diseases is to (1) stop the use of all types of asbestos; (2) provide information about solutions for replacing asbestos with safer substitutes and developing economic and technological mechanisms to stimulate its replacement; (3) take measures to prevent exposure to asbestos in place and during asbestos removal; and (4) improve diagnosis, treatment, social and medical rehabilitation of asbestos-related diseases and establish registries of people with past and/or current exposure to asbestos. WHO, in collaboration with ILO, promotes the planning for and implementation of these measures by developing a comprehensive national programme for elimination of asbestos-related diseases.

b. Regional Framework

Noumea Convention
The Convention for the Protection of Natural Resources and Environment of the South Pacific Region (the Noumea Convention) and its Protocols obliges Parties to endeavour to take all appropriate measures to prevent, reduce and control pollution from any source and to ensure sound environmental management and development of natural resources, using the best practicable means at their disposal and in accordance with their capabilities. Ten Pacific countries are Party to the Noumea Convention.

Waigani Convention
The Waigani Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Trans-boundary Movement and Management of Hazardous Wastes within the South Pacific Region (the Waigani Convention) is similar to the Basel Convention, with the exception that the Waigani Convention does include radioactive wastes, and applies only to the Pacific Islands region. The Region's obligations under the Waigani Convention are similar to that under the Basel Convention. There are currently fourteen Pacific Region countries who are signatories to the Waigani Convention. As a Party to the Waigani Convention, these countries are obliged to (among other things):

- Ban the importation of hazardous and radioactive wastes from outside the convention area;
- Prohibit shipment to and from non-Parties, unless there is a special agreement;
- Take measures to reduce the generation of hazardous wastes at source taking into account social, technological, and economic needs;
- As far as possible, develop adequate treatment and disposal facilities for hazardous wastes; and
- Follow established procedures for the trans-boundary movement of hazardous waste to other Parties for environmentally sound disposal.

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Pacific Regional Solid Waste Management Strategy 2010-2015

The Pacific Regional Solid Waste Management Strategy 2010-2015 has a vision of "*A healthy and a socially, economically and environmentally sustainable Pacific for future generations"* through the adoption of cost-effective and self-sustaining solid waste management systems by Pacific Island Countries and Territories. The original strategy was formulate in 2005 and revised in 2009 to focus on integrated waste management (refuse, reduce, reuse, and recycling) with an emphasis on appropriate waste collection and disposal to achieve this goal. The strategy has also been simplified to include 9 key priority areas for solid waste management in the Pacific which include sustainable financing; adoption of integrated solid waste management including recycling; improved legislation; awareness, communication and education; capacity building; environmental monitoring; and improved medical waste management. Asbestos waste management is not currently included in the regional strategy but is expected to be incorporated in the next revision.

WHO Regional Framework for Action for Occupational Health: 2011-2015

The WHO Regional Framework for Action for Occupational Health was developed through consultations with Member States held in 2009 and 2010 to guide the collaboration in occupational health between countries, WHO and collaborating centers and institutions. The Regional Framework for Action has five main areas of work, or objectives: (1) to devise and implement policy instruments on workers' health; (2) to protect and promote health at the workplace; (3) to improve performance of and access to occupational health services; (4) provide and communicate evidence for action and practices; and (5) to incorporate workers' health into non-health policies and projects. Elimination of asbestos-related diseases is one of main priorities for the first area of work/objective of the Regional Framework for Action for 2011-2016.

Summary of asbestos related conventions and protocols

Country	Rotterdam Convention	Basel Convention	London Convention & Protocol*	Waigani Convention	Noumea Convention	Waste Management Strategy or Plan	National Asbestos Policy or Plan
Australia	Y	Y	Y*	Y	Y		Y
Cook Islands	Y	Y		Y	Y	Draft	Y
FSM		Y		Y	Y	Draft	
Fiji				Y	Y	Y	
Kiribati		Y	Y	Y		Draft	Draft
Marshall Is	Y	Y	*		Y	Draft	
Nauru		Y	Y	Y	Y	Draft	
New Zealand	Y	Y	Y*	Y	Y		Y
Niue				Y		Draft	Draft
Palau				Not ratified		Y	
PNG		Y	Y	Y	Y	Draft	
Samoa	Y	Y		Y	Y	Draft	
Solomon Is			Y	Y	Y	Y	
Tonga	Y	Y	Y*	Y		Y	
Tuvalu			Y	Y		Draft	
Vanuatu			Y*	Y		Draft	

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