SOUTHERN PORTS ESPERANCE

DUST & FIBROUS MATERIALS MANAGEMENT PLAN

Document Users : **ALL EMPLOYEES**

Responsible Person : **SAFETY & SECURITY MANAGER**

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Version	Prepared	Reviewed	Approved	Date	Description
1	J Oldfield	D. Graham	D. Graham	22.05.17	Complete review. Supersedes former Asbestos Management Plan.

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1.0 PURPOSE

The purpose of this plan is to describe dust and fibrous materials and the safe management processes for dealing with these materials when discovered in the workplace.

2.0 SCOPE

This plan shall apply to all work places within the Port boundary limits and to all Port Users.

3.0 PROCEDURES

Surveys of Southern Ports Esperance buildings, services and plant have been conducted and include risk assessments and recommendations for future control measures. Results of surveys are recorded in the Southern Ports Esperance Asbestos Register (D16/1018).

Preliminary investigations and Safety Data Sheet (SDS) documentation indicate that fibrous asbestos minerals and silica content materials may be encountered in certain bulk product transported through the Port.

This document is a framework for identifying and managing the health risks to Port user from possible exposure from fibrous materials, airborne dust such as respirable dust (dust which enters the lung) and Inhalable (total) in all activities ranging from operations, maintenance and stevedoring.

3.1 INTRODUCTION

A national ban on the use, sale or importation of asbestos took effect on 31 December 2003 and is reflected in the Mines Safety and Inspection Regulations 1995.

Asbestos has been used extensively, historically throughout various industries in Western Australia. Common examples are asbestos cement sheeting, thermal insulation and electrical switchboards.

Asbestos occurs naturally in nature and therefore it is pertinent to ensure good communication with companies bringing commodities through the Port.

In all cases the aim will be to control both fibres and dust to effectively manage the risk to personnel from exposure.

Health and safety is fundamentally important with the primary objective to eliminate all those conditions and work practices that could lead to illness or personal injury.

The detail below and the current applicable regulations are considered minimum standards.

The Port of Esperance expects that all companies and personnel working within the Port to comply at all times with these minimum standards and commits to reduce exposure to all hazardous materials to As Low As Reasonably Practical (ALARP).

3.1.1 Policy

The Port of Esperance recognises that exposure to dusts and fibrous materials can be detrimental to health and pose a risk to personnel.

It is the policy statement of Southern Ports to identify hazards and manage health and safety risks to prevent injury hence no person should be exposed to harmful amounts of dust or

fibrous material whilst at a worksite and that all levels of dust or fibrous materials at the workplace should be below the exposure levels set by legislation.

The management and control of dusts and fibrous material will be approached from a risk basis, this will ensure that the identification, assessment and control of dusts and fibrous materials is continuously monitored and reviewed.

3.1.2 Requirements

Risk assessments have been carried out for common activities where dusts, asbestos or silica exposure is possible. Additional risk assessments will be conducted on a case by case basis as the need arises, such as when a new product is brought through Port, variations in moisture and/or particle size of bulk product. The current risk assessments carried out are described within this document and detail the risk associated with the activity, the monitoring protocol and the risk management procedure.

All activities will be carried out in a manner that limits airborne dust in the workplace to as low as reasonably practicable.

Various methods and technologies will be employed to ensure that levels are below legislative limits, and the aim of Port of Esperance is to keep levels to less than current legislative limits in line with expected changes in exposure levels nationally. For hazardous materials, such as asbestos and silica, dust levels will be kept as low as reasonably achievable.

Identified risks and the results of dust monitoring will be freely and openly communicated to all employees by way of induction, tool box meetings, signage, work instructions, notice boards and other means.

The strategy for managing the risk of exposure to dust has the following essential elements.

- Gathering data and information to identify hazards
- Assessing the risk
- Planning to minimise risk
- Managing risk under normal working conditions
- Managing risk under extraordinary working conditions
- Monitoring the risk
- Auditing compliance with procedures and standards.

Where there is a potential risk of exposure to fibrous materials the following will be carried out:

- Conducting baseline monitoring
- Implementing procedures to minimise dust generation
- Ensuring there is a Safe System of work (SSoW) for each task (D16/390)
- Developing and initiating educational programs, training and inductions for all employees and Port users
- Ensuring responsible persons are available to inspect areas where disturbance of fibrous materials has occurred
- Developing a positional and personal dust monitoring program consistent with likely exposure to airborne dust and fibre hazards
- Conducting regular audits of controls, procedures and sampling techniques.

The control measures are to follow the following hierarchy of controls:

- Elimination
- Substitution
- Redesign / Engineering
- Separation / Isolation
- Administrative Controls (Work Permits / Safe Work Instructions)
- Personal Protective Equipment

3.1.3 Description of Fibrous Minerals

As the name suggests, fibrous minerals occur naturally as fibres - that is, the length of the mineral crystal is much greater than its width. The ratio of the crystal length to its width is called the "aspect ratio". Mineral crystals longer than 5 micrometres with an aspect ratio more than 3, and width of less than 3 micrometres are defined as fibres (NOHSC, 1990), and are a potential health hazard if inhaled in large quantities. The Mines Safety & Inspection Regulations 1995 r.9.33.(3) define a fibre as a particle having a maximum width of 1 micrometre or less and a length greater than 5 micrometres .

Mineral fibres often occur in large, visible bundles, but individual fibres are only visible under high magnification, as the width is often less than 1/50th of a human hair.

The family of minerals broadly called "**asbestos**" falls into this category. Asbestos is divided into two groups of minerals - the **Serpentines** and the **Amphiboles**. These minerals usually occur in non-fibrous form, but under some geological conditions, they are distinctly fibrous, with aspect ratios of more than 100.

The word "asbestos" is derived from the Greek word meaning inextinguishable and the origin of its name reflects its principle characteristic of fire resistance. Asbestos has many other technical qualities such as tensile strength, durability, flexibility and resistance to heat, wear and corrosion. These properties made it useful for making a variety of products.

There are three main commercial types of asbestos - Chrysotile (white asbestos), Amosite (brown asbestos) and Crocidolite (blue asbestos). There are also three common non-commercial types of asbestos - Anthophylite, Tremolite and Actinolite.

3.1.4 Description of Dusts

Airborne contaminants that can be inhaled directly into the lungs can be classified on the basis of their physical properties as gases, vapours or particulate matter. Airborne particulates consist of discrete particles and may be further characterised as; either dusts, fumes, smokes or mists, depending upon the nature of the particle and its size. In common usage, the terms "dusts" and "particulates" are often used interchangeably. There are four factors that determine the degree of hazard associated with a specific airborne particulate namely:

- the type of particulate involved and its biological effect;
- the concentration of airborne particulates in the breathing zone of the worker;
- the size of particles present in the breathing zone; and
- the duration of the exposure (possibly in years).

The chemical composition and physical characteristics of the particulate determines not only the biological effect of the substance, but also the region of the respiratory tract that is the target of this effect. The biological effect associated with an airborne particulate may be:

- Systemic toxic effects caused by the absorption of the toxic material into the blood, for example, lead, manganese, cadmium, zinc;
- Allergic and sensitisation reactions caused by the inhalation of organic dusts from materials such as flour, grains, some woods and some organic and inorganic chemicals;
- Bacterial and fungal infections associated with the inhalation of dusts containing active organisms such as spores and other parasitic fungi;
- Fibrogenic reactions in the gaseous exchange regions of the lung due to the presence of materials such as asbestos or quartz;
- Carcinogenic response due to the presence of, for example, chromates, asbestos;
- Irritation of the nose and throat caused by acid, alkali or other irritating particulates, especially mists.

3.1.5 Inhalable and Respirable Dust

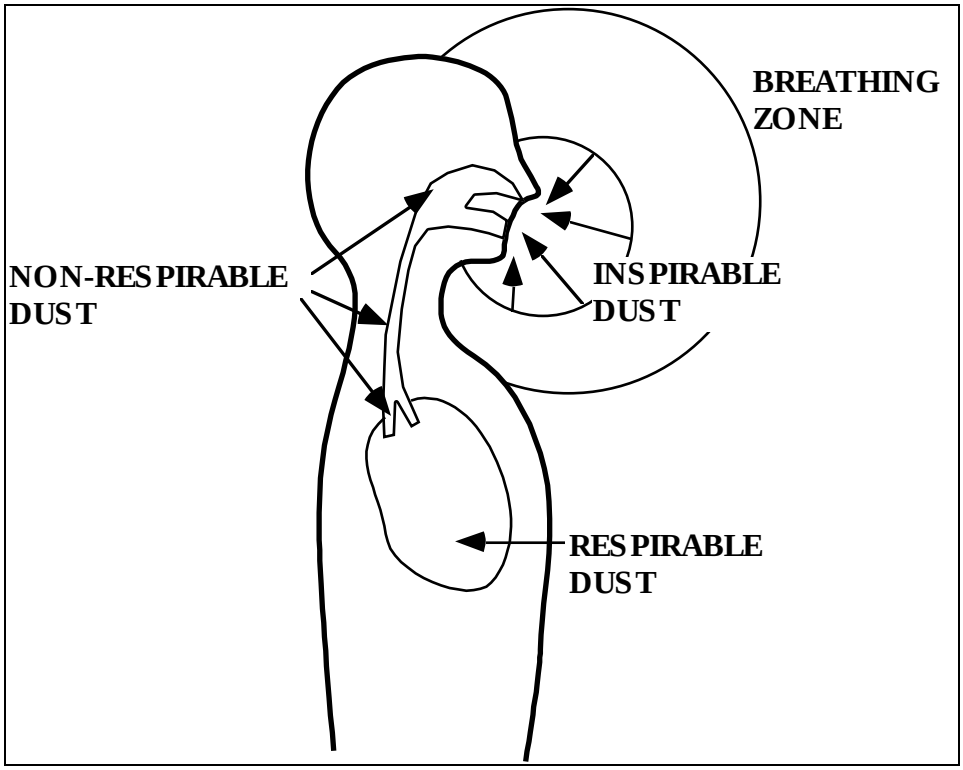
Most industrial dusts contain particles of widely ranging size. The behaviour, deposition and fate of any individual particle after entry into the human respiratory system, and the response that it elicits, depends on the nature and size of the particle.

Only part of the total quantity of dust that is present in the breathing zone is inhaled. This part is called the "Inhalable" fraction of dust and is governed by the flow rates in the nose and mouth areas, as well as the airflow around the head. Practically all of the smaller particles will be inhaled, while the inhalability of the larger particles decreases rapidly as a function of increasing aerodynamic diameter.

The Inhalable fraction of dust entering the respiratory tract may be further subdivided into "respirable" and "non- respirable" fractions. The respirable fraction is composed of the very fine dust that is able to reach the lower bronchioles and alveolar regions of the lung.

3.1.6 Silica Dust

Silica is a name that collectively describes various forms of silicon dioxide (SiO2), including both the crystalline and non-crystalline (amorphous) forms. Crystalline silica can cause a lung disease, silicosis. This condition can occur when there is a significant deposition of silica dust in the alveolar or gas exchange region of the lung.



For this reason, it is only the respirable fraction of the dust that is of concern in determining the hazard to health. Amorphous silica forms are less dangerous, and the exposure standards are more than 10 times those for crystalline forms.

Chemical compositions of Koolyanobbing Project iron ores handled and stored at the Port of Esperance vary from 1% to 10% Crystalline Silica (Quartz).

Chemical compositional of the Mt Cattlin Spodumene handled and stored at the Port of Esperance vary from 1% to 10% Crystalline Silica (Quartz).

3.2 OCCURRENCE OF FIBROUS MATERIALS

Fibrous minerals are common in the crust of the earth and its surface waters at trace levels. Serpentine minerals such as chrysotile are found in the rocks of every major mountain chain in the world. Amphibole minerals such as actinolite also occur in a variety of rocks throughout the world, but mostly in a non-fibrous form.

Asbestos minerals are prevalent in many gold, nickel and Iron ore deposits throughout the world. This should be kept in mind when handling bulk ores as intermittent occurrence of fibrous materials is possible.

3.3 OCCURRENCE OF DUSTS

Dusts can occur at almost any time when the natural materials are disturbed by natural events (wind, animals, etc) or by manmade events such as movement of product or earth (conveyor, trucking and loading operations).

Dust will always be worse if the conditions are dry and the material is in a fine form.

The activities that are undertaken at Port of Esperance may cause dust to be generated on a regular basis, therefore measures are put in place to control dust and dust making activities.

3.4 HEALTH RISKS OF EXPOSURE TO FIBROUS MATERIALS & DUSTS

The pathway for contracting an asbestos or silica related disease is by breathing in asbestos or silica dust. The important health considerations are that:

- Asbestos and Silica related diseases are all serious and the emphasis must be on preventing the disease in the first place;
- The onset of these diseases usually occurs tens of years after exposure;
- Although different types of asbestos fibres have varying potencies, all fibrous minerals should be assumed to be equally hazardous and treated the same;
- The risk of an asbestos or silica induced disease is related to the dose inhaled over a period of time;
- Other factors such as smoking have a multiplying effect on the probability of contracting some diseases.
- These aspects will be dealt with specifically in inductions and ongoing awareness presentations.

3.5 MEDICAL SURVEILLANCE

All personnel working at the Port of Esperance shall be required to undergo as a condition of employment, a Pre-Employment medical examination.

3.6 MONITORING & ANALYSIS TECHNIQUES

3.6.1 Regulations/Guidelines and Exposure Standards

Mine Safety & Inspection Regulations 1995, Part 9 covers work practices for managing health risks associated with dust and atmospheric contaminants. Additionally there are Exposure Standards issued by the National Occupational Health & Safety Commission (NOHSC) and State & Federal Government guidelines to manage personnel from being exposed to dust and atmospheric contaminants to as low as reasonable practicable. Port of Esperance conducts personal and positional dust monitoring for fibres and other hazardous dust.

3.6.2 Fibrous Material

The Occupational Exposure Limit for exposure to fibrous minerals are;

- 0.1 fibres of crocidolite, amosite, anthophylite, actinolite, tremolite chrysotile or mixtures of these per millilitre of air, as determined by NOHSC: 3003 (2005) ASBESTOS Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust.

All PoE personnel are responsible for reporting occurrences of potential Fibrous Material to their Supervisor and the Safety & Security Manager or the Ventilation Officer. Where fibrous material is identified the Ventilation Officer shall undertake an audit of the work area.

To positively identify that a material contains asbestos, a sample must be taken for analysis. Only a competent person may take the samples for analysis because of the increased health risk of fibres being released during the process.

Mandatory CONTAM dust and fibre sampling is conducted using a small battery operated pump attached to the worker, to draw a known volume of contaminated air through a filter. At the completion of sampling the filter is sent to a National Association of Testing Authorities

(NATA) accredited laboratory and analysed for Asbestos fibres by Polarised Light Microscopy (PLM). Particles that conform to the criteria of a respirable fibre (but may not be asbestos) are counted and reported as fibres per millilitre of air. Not all fibres are counted, only those with an aspect ratio of length to width of 3:1 or more. In addition, the fibres must be greater than five micrometres in length and less than three micrometres in width to meet the regulatory definition of fibres.

The method was originally developed for controlled industrial or asbestos removal processes where the asbestos is the predominant dust. In some PoE circumstances this may not be the case. This can lead to 'masking' due to dust obscuring the fibres during counting. Scanning Electron Microscopy (SEM) analysis may be required to determine if Asbestos is present in 'overloaded' filter mediums or to discriminate what types of fibres present in initial analysis.

3.6.3 Dusts

The Exposure Standard for common dusts encountered are;

- 10 mg/m3 of Inhalable Dust as determined by AS3640
- 3mg/m3 of Respirable dust as determined by AS2985
- 0.1mg/m3 of Respirable Silica as determined by AS2985

Inhalable Dust

The determination of Inhalable dust is carried out by AS3640 over a total sampling period of not less than four hours.

In summary, dust is captured by using a small battery operated pump attached to the person to draw a known volume of contaminated air through a filter fitted with a particle size selector that captures dusts that can be "inhaled". At the completion of sampling the filter is sent to a NATA accredited laboratory, where the pre-weighed filter is reweighed and the difference noted. The average concentration is then calculated using the known sample volume and the mass.

Results expressed in milligrams per cubic metre (mg/m3)

Respirable Dust

The determination of respirable dust is carried out by AS2985 over a total sampling period of not less than four hours.

In summary, dust is captured by using a small battery operated pump attached to the person to draw a known volume of contaminated air through a filter fitted with a particle size selector that captures dusts that are small enough to reach and deposit in the lungs. At the completion of sampling the filter is sent to a NATA accredited laboratory, where the pre-weighed filter is reweighed and the difference noted. The average concentration is then calculated using the known sample volume and the mass.

Results expressed in milligrams per cubic metre (mg/m3)

Respirable Silica dust

The determination of respirable dust is carried out by AS2985 over a total sampling period of not less than four hours.

In summary, dust is captured by using a small battery operated pump attached to the person to draw a known volume of contaminated air through a filter fitted with a particle size selector that captures dusts that are small enough to reach and deposit in the lungs. At the completion of sampling, the filter is sent to a NATA accredited laboratory where the filter is subject to further

analysis by Fourier Transform Infra-Red (FTIR) spectroscopy. Calibration is against Australian Standard silica dust in accordance with NATA certifications held by the laboratory.

Results expressed in milligrams per cubic metre (mg/m3)

3.6.4 Analysis - Fibrous Material

The determination of airborne asbestos fibres will be carried out by following the Membrane Filter Method. A total sampling period of not less than four hours and preferably over a period that exceeds 75% of the routine shift will be used.

Analysis is to be conducted by a NATA accredited testing agency.

Management will calculate and report exposures in actual fibres per millilitre.

3.6.5 Scanning Electron Microscope (SEM) Analysis

When a sample result is an 'overload' or 50% or greater than the exposure standard for amphiboles (0.05 fibre/mL) it will be sent to a NATA accredited laboratory for Scanning Electron Microscope (SEM) analysis. This will identify fibre types to determine if the contaminant is in fact asbestos.

3.6.6 Analysis – Dusts

Dusts will be analysed as per Australian Standards and reported by the laboratory to the Registered Manager (or delegate where applicable).

Analysis is to be conducted by a NATA accredited testing laboratory.

3.7 ACTION LEVELS

The aim is to ensure that exposure to any contaminant is less than the statutory occupational exposure level at all times. For substances that have acute effects, such as cyanide or ammonia this must be rigidly enforced as the standards are set to prevent immediate discomfort or death. For chronic hazards such as asbestos or silica, this is less critical as long as excursions above the standard are not large and that they are balanced by periods below the standards. The standards have been set after careful evaluation of the effects of cumulative exposure to these substances.

NB. When analysing data the Occupational Exposure Limit (OEL) reduction required for extended shifts (over 8 hours) the Quebec Model calculation or a more conservative approach will be used.

For this reason, a single result slightly above the standard in the absence of other information is rarely justification to implement stringent procedures.

Based on this background and sound occupational hygiene principles a progressive implementation of procedures will be imposed in accordance with the table below:

Summary of Results	Recommended Action
All results < 50% of recommended standard	• No additional action necessary, • Maintain baseline air sampling program.
All results less than recommended standard and 5% of results exceed 50% of recommended standard or fibrous materials have been identified	• Classify as a Potentially Hazardous Area • Investigate workplace/work practices and control measures. • Invoke agreed work and management procedures. • Implement routine personal monitoring.

The recommended actions should be based on data accumulated over at a period of time. Caution should be exercised when only a few air-sampling measurements are available. Generally, if results are repeated more than twice, then the indication is generally confirmed by further testing.

3.8 ACTION PROCEDURES FIBROUS MATERIALS

3.8.1 Fibrous Material Found

If fibrous material (FM) is found or material having the potential to be fibrous is found it must be reported to Safety and Security Manager immediately.

The following procedure will be followed;

- The material is not to be disturbed.
- P2 masks are to be worn.
- The material will be marked with appropriate signage/notification or the immediate area will be cordoned off.
- The area will be inspected by the Safety and Security Manager and/or the Ventilation Officer.
- Port users will be advised the of affected area and subsequent access restrictions.

A review of the controls for the identified suspected fibrous material will be undertaken following the hierarchy of control:

- Elimination
- Substitution
- Redesign / Engineering
- Separation / Isolation
- Administrative Controls (Work Permits / Safe Work Instructions)
- Personal Protective Equipment

Samples will be collected and dispatched to a NATA accredited laboratory for identification. The results of this analysis should not delay the removal of the suspected material.

3.8.2 Reporting of Fibrous Materials

The DMP shall be notified in writing by the Registered Mine Manager where raw material or ACM is found in line with section 9.33 of the Mines Safety and Inspection Regulations 1995, within 24hours once positive confirmation via analytical laboratory is received.

Notification shall include the following information:

- Location of material;
- Source (ACM or Raw);
- Condition (Friable or Non-Friable);
- Form of asbestos (e.g. Actinolite);
- Approximate amount, and
- Control Plan.

3.8.3 Asbestos Containing Material

Where the presence of ACM has been identified and confirmed a risk assessment shall be conducted.

Where asbestos removal work, repair or similar associated activities are anticipated a formal risk assessment, including a SSoW must be implemented. The Ventilation Officer must approve this risk assessment and the SSoW.

The risk assessment process shall take into consideration the various factors associated with asbestos containing materials including type, condition, fibre release potential, risk to personnel, accessibility to personnel and the amount of ACM.

If the ACM is to be removed from a workplace, there must be engagement, consultation and involvement with Port users, which includes employers, employees and contractors at each step of the ACM removal process. Dependent on the quantity of ACM to be removed it is recommended to engage with the Esperance Shire Environmental Health Officers.

Persons in adjoining properties that may be affected by the asbestos removal activities must also be consulted.

3.8.4 Raw Asbestos

Where the presence of raw Asbestos (asbestos in ore) has been identified and confirmed, a risk assessment shall be conducted to ensure the development of a Safe Asbestos Control Plan. The control plan shall be developed in accordance with the level of risk. Low risk control plan can be completed internally by PoE; however for high-risk situations an Occupational Hygienist will be required to manage the program.

Workplaces contaminated with raw asbestos must be immediately quarantined until the hazard has been risk assessed and controls implemented. Access to all areas containing the material should be strictly controlled and monitored.

3.8.5 Potentially Hazardous Area

An area will be classified as a “Potentially Hazardous Area” by the Registered Manager or his delegate (as applicable) if:

Works predict the potential for fibrous material to be in the area;

- Fibrous materials has been identified by a qualified, experienced and competent person; or
- Air monitoring samples are less than the recommended standard but 5% of results exceed 50% of the recommended standard

The Registered Manager or his delegate (as applicable) may classify any area as a "Potentially Hazardous Area" at any time.

When an area has been designated as "Potentially Hazardous" the Registered Manager or his delegate will:

- Notify Port users in the area, and those who regularly use the area of the classification.
- Effectively define and signpost the area.

- Authorisation is required from the Registered Manager or his delegate before entering a Potentially Hazardous Area.
- No person shall be authorised to enter a Potentially Hazardous Area until they have had an appropriate level of training.
- All activities in a potentially hazardous shall be covered by a SSoW.
- Smoking is prohibited within a Potentially Hazardous Area.
- Machinery with air conditioners to use fresh air circulation.
- A potentially hazardous area should be frequently assessed to ensure all procedures are being met.

3.8.6 De-classification of a Potentially Hazardous area

The Registered Manager or his delegate may de-classify a Potentially Hazardous Area if:

- Inspection and interpretation indicate that hazardous fibrous materials are unlikely to be encountered and
- Monitoring results indicate that fibres in the area are below standards set and
- Future activities in the area are unlikely to expose hazardous fibres.

3.8.7 Personal Protective Equipment for Potentially hazardous areas

- The minimum respiratory protection requirement is a P2 disposable respirator

- Disposable overalls are to be worn if outside an air conditioned/pressurised cab that is within a Hazard Area
- The implications of wearing PPE within the working conditions need to be considered in individual job procedures.

3.8.8 Work performed from inside an air conditioned and pressurised cabin

In Potentially Hazardous Areas, operators will:

- Pressurise the cabin by keeping the windows closed and air conditioner running on fresh air and not recirculating.
- Where dust is visible, wait for the dust to settle before entering or exiting the cab.
- Avoid introducing potentially hazardous minerals into any cab by checking and removing all loose material from your boots and clothing prior to entry.
- Close door properly to maintain the dust seal of the cab. When parking the machine up this must also be adhered to.
- Report any window or door seal damage to your Supervisor immediately. No machine or equipment is to work in a Potentially Hazardous Area unless it can be properly pressurised.

3.8.9 Work performed outside an air-conditioned cabin

Once inside a Potentially Hazardous Area you must:

- Wear minimum P2 respirator;
- Wear disposable overalls;
- Not enter the area or exit your vehicle in the area until your respirator is correctly fitted;
- Close the windows, vents and doors when alighting from the vehicle;
- Avoid areas where your movements will readily generate airborne dust;
- Avoid areas downwind of other dust generating activities;
- Do not smoke.

If you are working on or maintaining a piece of equipment in a Potentially Hazardous Area, you must where possible, move the equipment outside of the hazardous area.

3.8.10 Personnel Exiting from a Potential Hazard Area

Thoroughly wash face and hands at end of shift and prior to crib or smoko.

All contaminated disposable overalls are to be removed prior to leaving the immediate area. Contaminated disposable overalls shall be removed while respirators are still being worn.

All external clothing worn in an outside environment in a potentially hazardous area will be regarded as potentially contaminated.

Boots are to be cleaned upon exiting the area.

3.8.11 Contaminated PPE

Personal protective equipment should only be used where other more effective control measures are not practicable. All PPE that cannot be decontaminated should be disposed of

as asbestos waste after daily use. Apart from the standard Southern Ports - Esperance PPE requirements the following applies to Asbestos works. Asbestos-contaminated PPE ***should not be*** transported outside the asbestos work area except for disposal purposes.

3.8.12 Equipment leaving a potential hazardous area

Ensure all hand tools and equipment are washed after work within a potentially hazardous area. Dry cleaning of tools should be avoided where possible.
Equipment air filters are to be carefully removed and wet scrubbed clean or disposed of as per disposal procedures.

3.9 ACTION PROCEDURES DUSTS

3.9.1 Dusts

When excessive dust is present personnel will arrange for areas where dust is being generated to be watered or ventilated. If this is not possible the area will be vacated. While waiting for dust levels to reduce all personnel will wear dust masks.

4.0 SAMPLING STRATEGY

4.1 FIBROUS MATERIALS AND DUSTS

Sampling will be conducted for the following reasons:

- Baseline sampling campaign;
- To assess and/or isolate potential problem areas/SEGs;
- To ensure exposure controls are being effective;
- Regulatory compliance.

The strategy adopted will depend on the reason for sampling.

A sampling quota has been established which requires samples to be taken for similar exposure groups (SEGs) on a quarterly basis.

The sampling program should be statistically based and focuses on the areas where the highest occurrence of dusts and fibres occurred and/or the most likely locations that dust and fibre will be encountered (as determined by Risk-based management planning and CONTAM system procedures – DMP)

4.2 ASSESSMENT

Whenever fibrous materials have been visually identified or are suspected of being present, an initial monitoring program will be conducted to determine the baseline or background level in the area. This will be followed up by an intensive program aimed at covering all locations and occupations in the area in as short a time as possible. Data will be collected with the aim to establish exposure levels and determine clearance after completion of works.

Monitoring will be by occupation, task or static sampling.

4.3 EVALUATION OF CONTROLS

Monitoring will be conducted from time to time in specific locations or for specific work practices to ensure that control measures are effective.

This may be instigated by:

- Worker or management requests if they believe a particular task will produce high exposure levels;
- If a routine sample has suggested a problem area or work practice;
- This monitoring will be either by task monitoring or static sampling.

4.4 ROUTINE WORKPLACE AND HISTORICAL EXPOSURE LEVELS

The sampling strategy is based on occupational sampling of groups having similar job functions and essentially equivalent exposures defined as SEGs. These include Operations personnel, Boilermakers, Mechanical Fitters, Civil Maintenance, Electricians and positional sample locations.

It is anticipated that around 80% of all samples collected will be for this purpose.

4.5 REGULATORY COMPLIANCE

This requires similar sampling strategies to that for routine monitoring and comparison to the occupational exposure standards and action levels. The DMP may stipulate a minimum number of samples and occupations to be covered based on a site specific risk-based hygiene management plan.

All results will be forwarded to the DMP for inclusion into the CONTAM database.

5.0 DISTRIBUTION OF RESULTS

The Ventilation Officer shall ensure that results are available to all personnel; the results should not identity the individuals tested. Individual results will be communicated in personal emails to sampling candidates.

6.0 GENERAL - PERSONNEL

6.1 RISK ASSESSMENT

Airborne particulates are present in most operation and maintenance activities and the highest risks are when product is left to dry and fine dust is disturbed, within sheds and enclosed conveyor galleries.

The greatest risk of exposure to fibrous materials occurs when excavating and encountering old services or during construction activities on buildings built prior to 2003. People involved in building maintenance, construction, demolition, ground excavation, and other fieldwork are therefore required to be especially vigilant, and well trained in recognising, identifying and reporting suspected fibrous minerals.

6.2 MONITORING PROTOCOL

Personnel will be made aware that a monitoring program to quantify exposure to various types of hazardous dusts is occurring. In addition to routine surveillance and monitoring, specific tasks or work in specific areas will be targeted. All personnel will have the opportunity to request that they be monitored. No person on site will be permitted to refuse to be monitored (per section 9.13 of the Mines Safety & Inspection Regulations 1995). Tampering of monitoring equipment will result in disciplinary action including possible prosecution by DMP.

6.3 RISK MANAGEMENT PROCEDURE

Managers and supervisors will;

- Ensure that Port users are made aware of the risks of exposure to fibrous minerals, dusts and silica, through training and various communications methods;
- Ensure the risks of exposure are minimised in line with the hierarchy of controls so far as reasonably practicable;
- Ensure that all Port users are trained in the proper use of personal protection equipment (PPE);
- Ensure that there are employees trained to recognise fibrous minerals;
- Ensure that the risks of exposure are adequately monitored and documented;
- Ensure that all appropriate Port users are trained in the procedures to follow when working in designated hazardous areas;
- Ensure that Port users adhere to these procedures.

Port user personnel will;

- Comply with dust management and safety procedures;
- Cooperate with the Ventilation Officers requests.

7.0 IRON ORE OPERATIONS

7.1 RISK ASSESSMENT

Enclosed sheds and conveyor galleries are inherently dusty due to the large quantity of product being disturbed. Sheds and conveyor galleries should be ventilated and/or have operational sprayers to reduce dust generation. Silica, a component of Iron Ore, has the potential to result in respiratory disease when inhaled. Asbestos occurs naturally in nature, therefore there is a possibility of raw asbestos being present in ore.

When operating machinery the cabin should be sealed and pressurised using fresh air circulation. Shed clearing times are to be observed prior to entry for any personnel not operating machinery.

Risk of exposure arises when;

- Entering the shed prior to clearing times;
- Airborne particulates enters the operators cabin;
- Conveyor galleries or sheds do not have sufficient ventilation;
- Conveyor galleries and transfer towers have product build-up;

- Product quality (moisture, mineral phase, or product size) varies.

7.2 MONITORING PROTOCOL

Due to the potential for high-level dust exposures, regular monitoring of this activity is required for people working in these areas. Personnel in equipment should have minimal exposure if cabin sealing is effective and doors and windows are kept closed. Surveillance monitoring will occur for these operators.

The frequency of sampling of individuals for exposure to fibrous material, inhalable dust, respirable dust and silica shall be consistent with likely exposure.

If materials are identified, the frequency of monitoring should be increased.

7.3 RISK MANAGEMENT PROCEDURE

Managers and supervisors will;

- Ensure that Port users are made aware of the risks of exposure to fibrous minerals, dusts and silica, through training and various communications methods;
- Ensure that Port users are trained in the proper use of personal protection equipment (PPE);
- Ensure that the risks of exposure are adequately monitored and documented;
- Ensure that Port users adhere to these procedures.

Port user personnel will;

- Ensure equipment cabins are sealed and fresh air circulation is on;
- Restrict time spent inside sheds or conveyors while not in a sealed cabin;
- Ensure appropriate PPE is donned;
- Ensure shed access procedures are adhered to.

8.0 SULPHUR OPERATIONS

8.1 RISK ASSESSMENT

Enclosed sheds and conveyor galleries are inherently dusty due to the large quantity of product being disturbed. Conveyor galleries are ventilated and wet washed to reduce dust generation. Sulphur dust is an irritant to the membrane lining of the nose and throat and can cause burning of the eyes. Sulphur dust in high concentrations is explosive.

When operating machinery the cabin should be sealed and pressurised using fresh air circulation. Cabins should be swept out at the end of each shift to eliminate product build-up and dust within the cabin.

Risk of exposure arises when;

- Airborne particulates enters the operators cabin;
- Conveyor galleries do not have sufficient ventilation;
- Conveyor galleries and transfer towers have product build-up;
- Product quality (moisture and prill size) varies.

8.2 MONITORING PROTOCOL

Due to the potential for moderate-level dust exposures, regular monitoring of this activity is required for people working within the sulphur circuit. Personnel in equipment should have minimal exposure if cabin sealing is effective and doors and windows are kept closed. Surveillance monitoring will occur for these operators.

The frequency of sampling of individuals for exposure to respirable dust and fibrous material shall be consistent with likely exposure.

If materials are identified the frequency of monitoring should be increased.

8.3 RISK MANAGEMENT PROCEDURE

Managers and supervisors will;

- Ensure that Port users are made aware of the risks of exposure to sulphur minerals dusts, through training and various communications methods;
- Ensure the risks of exposure are minimised in line with the hierarchy of controls so far as reasonably practicable;
- Ensure that Port users are trained in the proper use of personal protection equipment (PPE);
- Ensure that the risks of exposure are adequately monitored and documented;
- Ensure that Port users adhere to these procedures.

Port user personnel will;

- Ensure equipment cabins are sealed and fresh air circulation is on;
- Ensure appropriate PPE is donned;
- Excessive dust is reported immediately and supressed to avoid risk of explosion;
- Ensure shed access procedures are adhered to.

9.0 SPODUMENE DUST

9.1 RISK ASSESSMENT

Enclosed sheds could be inherently dusty if product is allowed to dry out due to the large quantity of product being disturbed. Silica, a component of Spodumene, has the potential to result in respiratory disease when inhaled. Asbestos occurs naturally in nature, therefore there is a possibility of raw asbestos being present in ore.

When operating machinery within the shed the cabin should be sealed and pressurised using fresh air circulation. During operations or prior to clearing times, minimum P2 respiratory protection with organic vapour protection should be worn by any personnel not operating machinery in the shed.

Risk of exposure arises when;

- Working within shed while dry product is disrupted;
- Dry airborne particulates enters the operators cabin;
- Airbrake pressure release causes product on a dry shed floor to become airborne;
- Product quality (moisture, mineral phase, or product size) varies.

9.2 MONITORING PROTOCOL

Due to the potential for dust exposures, regular monitoring of this activity is required for personnel working within the Spodumene shed. Personnel in equipment should have minimal exposure if cabin sealing is effective and doors and windows are kept closed. Surveillance monitoring will occur for these operators.

The frequency of sampling of individuals for exposure to fibrous material, inhalable dust, respirable dust and silica shall be consistent with likely exposure.

If materials are identified the frequency of monitoring should be increased.

9.3 RISK MANAGEMENT PROCEDURE

Managers and supervisors will;

- Ensure that Port users are made aware of the risks of exposure to fibrous minerals, dusts and silica, through training and various communications methods;
- Ensure that Port users are trained in the proper use of personal protection equipment (PPE);
- Ensure that the risks of exposure are adequately monitored and documented;
- Ensure that Port users adhere to these procedures.

Port user personnel will;

- Ensure equipment cabins are sealed and fresh air circulation is on;
- Restrict time spent inside shed while not in a sealed cabin;
- When out of a sealed cabin prior to clearing times, a Class 'P2' face mask with protection for organic vapours is to be donned;
- Ensure shed access procedures are adhered to.

10.0 MAINTENANCE

10.1 RISK ASSESSMENT

Maintenance work is inherently dusty due to the disruption of fine dust particles during works. Work areas should be wet washed or vacuumed prior to disruption to reduce dust generation.

When welding or performing hot works appropriate respiratory protection is to be donned by those who are undertaking the task or those that may be exposed to the airborne contaminants in the vicinity and that natural or mechanical ventilation should be used where possible. Particular care should be used when maintaining equipment where there is a build-up of unwanted by-products (e.g. baghouses, fume extractors, etc.) as the concentration of contaminants is much higher.

Risk of exposure arises when;

- Airborne particulates are disturbed during works,
- Work area does not have sufficient ventilation,
- Work areas have by-product build-up,
- Respiratory protection equipment and filters are not appropriate to the contaminant or are properly maintained.

10.2 MONITORING PROTOCOL

Due to the potential for high-level dust exposures, regular monitoring of this activity is required for personnel working within the maintenance department. Personnel should survey their workplace prior to starting works and implement dust controls following the hierarchy of control. Surveillance monitoring will occur for these operators.

The frequency of sampling of individuals for exposure to inhalable dust (including welding fumes), respirable dust, silica and fibrous material shall be consistent with likely exposure.

If materials are identified the frequency of monitoring shall be increased.

10.3 RISK MANAGEMENT PROCEDURE

Managers and supervisors will;

- Ensure that Port users are made aware of the risks of exposure to fibrous minerals, dusts, silica and welding fumes, through training and various communications methods;
- Ensure the risks of exposure are minimised in line with the hierarchy of controls so far as reasonably practicable;
- Ensure that Port users are trained in the proper use of personal protection equipment (PPE);
- Ensure that the risks of exposure are adequately monitored and documented;
- Ensure that Port users adhere to these procedures.

Port user personnel will;

- Work areas washed or vacuumed prior to maintenance being undertaken.
- Ensure appropriate specialised PPE is well maintained and donned where required;
- Establish mechanical ventilation where required;
- Excessive dust is reported immediately and supressed to avoid risk of explosion;
- Ensure procedures are adhered to.

11.0 EXCAVATION & EARTH MOVING

11.1 RISK ASSESSMENT

Earth-moving activities are inherently dusty and buried fibrous material could be encountered. Earthmoving machinery is usually slow moving, and the operator's cabin and those working on foot around machinery may be enveloped in a dust cloud.

Risk of exposure arises when;

- Dust enters the operator's cabin,
- Spotters, traffic control and other workers outside of machinery exposed to dust,
- Underground services containing fibrous materials are encountered / disturbed,
- Fibrous material present in backfill material,
- Walking around on freshly disturbed ground,

- Cleaning the machinery with compressed air,
- Cleaning and servicing air filters,
- Working in the vicinity of machinery

11.2 MONITORING PROTOCOL

Due to the potential for high-level dust exposures, regular monitoring of this activity is required for people working near or maintaining this equipment. Personnel in equipment should have minimal exposure if cabin sealing is effective and doors and windows are kept closed. Surveillance monitoring will occur for these operators.

The frequency of sampling of individuals for exposure to inhalable dust, respirable dust, silica and fibrous material shall be consistent with likely exposure.

If materials are identified the frequency of monitoring should be increased.

11.3 RISK MANAGEMENT PROCEDURE

Managers/supervisors will:

- Ensure the risks of exposure are minimised in line with the hierarchy of controls so far as reasonably practicable;
- Ensure that earthmoving machinery operator's work in effectively sealed, air-conditioned cabins.
- Ensure that cabins are maintained to avoid dust build up.

Port user personnel will;

- When out of a vehicle cabin, where operating machinery is generating dust should wear Class 'P2' face masks;
- Shall operate all equipment with windows and doors closed and ventilation system on;
- Operate equipment to minimise the generation of dust.

If any person suspects, or positively identifies the presence of fibrous minerals, that person shall:

- Immediately advise the Supervisor and the Safety & Security Manager or the Ventilation Officer.
- The Ventilation Officer shall immediately inspect the suspect area and if confirmed or unsure shall;
- Cease and barricade operations in that location.

Once the evaluation is completed, a documented SSoW will be developed. All persons involved with the task in that area are then to adhere to the requirements of the SSoW. This may involve further training or education to be conducted.

12.0 POST HOLING OPERATIONS

12.1 RISK ASSESSMENT

These activities are wide ranging and in areas where the knowledge of fibrous mineral occurrences is very vague. Vigilance on behalf of operators is essential. Generally, postholes are in the topsoil with little chance of encountering natural occurring asbestos material, however historical land filling and reclamation of a main portion of land that the Port resides on increases the risk of encountering fibrous materials and possible exposure to levels of silica dust.

12.2 MONITORING PROTOCOL

This activity is a low risk task. Whenever this activity is occurring, surveillance monitoring should occur. If asbestos materials are suspected or identified monitoring must occur.

The frequency of sampling of individuals for exposure to inhalable dust, respirable dust, silica and fibrous material shall be consistent with likely exposure.

If materials are identified the frequency of monitoring should be increased.

12.3 RISK MANAGEMENT PROCEDURE

Managers/supervisors will:

- Ensure the risks of exposure are minimised in line with the hierarchy of controls so far as reasonably practicable;

Port user personnel;

- Where dust is being generated should wear a Class 'P2' face masks;

If any person suspects, or positively identifies the presence of fibrous minerals, that person shall:

- Immediately advise the Supervisor and the Safety & Security Manager or the Ventilation Officer.
- The Ventilation Officer shall immediately inspect the suspect area and if confirmed or unsure shall;
- Cease and barricade operations in that location.

Once the evaluation is completed, a documented SSoW will be developed. All persons involved with the task in that area are then to adhere to the requirements of the SSoW. This may involve further training or education to be conducted.

13.0 HANDLING & DISPOSING OF HAZARDOUS WASTE

13.1 RISK ASSESSMENT

Hazardous identified fibrous material including asbestos contaminated waste only presents a risk if it is disturbed and dust becomes airborne. Exposure can occur because the content of the material is not known, packaging is not labelled or procedures are not followed. Used PPE rarely presents a dust risk as fibres impinge into the filter media. However biological agents may be present. Vacuum cleaner bags, residual samples and the like present greatest risk.

13.2 MONITORING PROTOCOL

This activity is a low risk task if procedures are followed. Whenever this activity is occurring, surveillance monitoring will occur.

The frequency of sampling of individuals for exposure to hazardous identified fibrous material including asbestos, shall be consistent with likely exposure. Respirable, inhalable dust and silica sampling is not anticipated.

Task monitoring will occur if a risk of exposure is identified.

RISK MANAGEMENT PROCEDURE

A copy of the hazardous and contaminated waste disposal records shall be sent to the Ventilation Officer ensuring that the:

- Contaminated waste is transported in accordance with appropriate controlled waste and dangerous waste transport laws.
- Contaminated items, (including face masks, disposable coveralls, air filters, sample bags, etc) are disposed of at an appropriate waste facility.

Port user personnel shall ensure that:

- All used PPE be placed in designated bins

13.3 TRANSPORTING AND DISPOSAL

Waste is to be collected in sealed containers (e.g. bags or drums). Bags shall be made of heavy-duty polythene 0.2mm thick, maximum 1200mm length, 900mm width and should be filled to no more than 50% of capacity. The bags should then be twisted tightly, folded over and neck secured in the folded position with adhesive tape or another effective method. All asbestos waste should be double bagged once outside of the work area immediately following the decontamination process.

Drums or bins are to be in good conditional, with lids and rims in good working order. When waste size or volume prohibits the use of drums or bags a waste skip may be double lined with 0.2mm thick polythene and used to contain non-friable asbestos.

Hard or sharp asbestos waste requires preliminary sealing or a protective covering before it is placed in the polythene to minimise the risk of damage.

Dry materials should be lightly wet down to reduce the risk of exposure if the container should be damaged. All containers should be labelled appropriately such as “Contains Asbestos”. Mechanical handling of sealed containers should be limited where possible to reduce the risk of rupturing containers.

A copy of the landfill disposal slip receipt indicating the quantity received must be returned to the Environmental department on return from the disposal site along with corresponding work permit.

Licences or permits are not required in Western Australia for the off-site transportation or disposal of material containing asbestos (DEC, Disposal of Material Containing Asbestos – Controlled Waste Regulations 2004). Transport and final disposal of asbestos waste material shall be carried out by a competent person and in a manner that will prevent the liberation of asbestos dust to the atmosphere

Any ACM removed from site for disposal shall be recorded and notified to Resources Safety using D16/6465. Email or fax the completed document to kalgoorlie.inspectorate@dmp.wa.gov.au or fax: + 61 8 9021 7670. A copy of the completed notification is to be filed against the relevant register entry.

14.0 DEFINITIONS AND ABBREVIATIONS

Table 1: Definitions & Abbreviations

Term	Definition
Air Monitoring	Airborne asbestos fibre sampling to assist in assessing exposures and the effectiveness of control measures. The control level for asbestos fibres is 0.01fibres/mL of air.
Airborne Asbestos Fibre	(as per NOHSC guidance notes) - any fibres of asbestos small enough to be made airborne. For the purposes of monitoring, only respirable asbestos fibres (fibres less than 3µm wide, more than 5µm long and with a length to width ratio of more than 3 to 1) are counted.
ACM	Asbestos Containing Material - Any material, object, product or debris that contains asbestos.
Asbestos	The asbestiform varieties of mineral silicates belonging to the serpentine or amphibole groups of rock-forming minerals, including actinolite asbestos, grunerite (or amosite) asbestos (brown), anthophyllite asbestos, chrysotile asbestos (white), crocidolite asbestos (blue) and tremolite asbestos.
Asbestos Removal Control Plan	A document which identifies the control measures which will be implemented to ensure workers and other persons are not at risk when asbestos removal work is being conducted in line with [NOHSC:2002(2005)].
Asbestos Removalist	A competent and licenced person who performs asbestos removal work.
Asbestos Waste	Removed ACM and disposable items used during the asbestos removal work, such as plastic sheeting used for an enclosure or to cover surfaces in the asbestos work area, disposable coveralls, disposable respirators, filters and rags used for cleaning.
Asbestos Work Area	The immediate area in which work on ACM is taking place. The boundaries of this area are determined by a risk assessment.
Clearance Inspection	Inspection, carried out by a competent person, to verify that an asbestos work area is safe to be returned to normal use after work involving the disturbance of ACM has taken place.
Clearance Monitoring	Air monitoring using static or positional samples to measure the level of airborne asbestos fibres in an area following work on ACM.
Competent Person	Person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill, for the safe performance of the specific work.
Hazard area	Areas which are suspected or confirmed with fibrous minerals and which may, upon working, consistently produce respirable fibres in concentrations in excess of the exposure standard, shall be appropriately barricaded and clearly delineated with

Term	Definition
	signs.
Friable Asbestos	Asbestos-containing material which, when dry, is or may become crumbled, pulverised or reduced to powder by hand pressure.
Health Surveillance	Monitoring of a person to identify any potential changes in their health as a result of exposure to a hazardous substance.
High Efficiency Particulate Air (HEPA) Filter	An air filter that removes 99.97 percent of all particles larger than 0.3 micron.
In situ	Fixed or installed in its original position, not having been moved.
OEL	Occupational Exposure Limit
Personal Monitoring	Air monitoring to determine a person's likely exposure to a hazardous substance. Exposure monitoring is designed to reliably estimate the person's exposure, so that it may be compared with occupational exposure standards.
Safe System of Work (SSoW)	Where ACM removal work is undertaken on a regular basis by a Licensed Removalist a Safe System of Work is to be used.
SEGs	Simular Exposure Groups is a group of Port users to have similar exposures, assuming no use of protective equipment. Grouped on type and intensity of exposure.

15.0 ROLES AND RESPONSIBILITIES

It is the responsibility of all management and supervisory personnel to ensure that hazards and safety issues are resolved as quickly as possible and the workplace is free from hazards. A Ventilation Officer is appointed to assist legislative conformance.

Table 2: Responsibilities of personnel within Southern Ports Esperance.

Role	Responsibilities
Registered Manager	• Provide the required resources for the effective implementation and application of this management plan; • Ensuring this management plan is regularly audited and reviewed, and • Ensure activities comply with relevant legislation.
Safety & Security Manager	• Development and maintenance the Asbestos register;
Ventilation Officer	• As outlined within Mines Safety and Inspection (MSI) Regulation 1995 9.6 • The development and application of an atmospheric monitoring programme to the extent that it is credible, repeatable and the data is statistically valid; • Ensure that regular monitoring occurs when tasks are carried out, in a designated area, which may disturb fibrous material; • Notification is given to the DMP District Inspector before any asbestos removal work commences; • Ensure monitoring results are communicated to Southern Ports personnel, and • Ensure appropriate control measures are implemented and monitored to

Role	Responsibilities
	ensure statutory and site requirements are met or exceeded. • Ensure all personnel undergo Fibrous Material awareness training and respiratory fit testing for persons working in designated areas.
Managers and Supervisors	• Ensuring employees and contractors are aware of the need to report incidences of potential Fibrous Material; • Ensure the proper use of PPE; • Ensure this plan and associated procedures plan are complied with.
Port users (employees and contractors)	• Follow the requirements of this management plan and associated procedures; • Comply with all monitoring requests, and • Report incidences of dust and fibrous material, ACM or suspect material within Southern Ports work areas to the Ventilation Officer.

16.0 REFERENCES & RELATED DOCUMENTS

16.1 EXTERNAL

- Guidance note on the Membrane Filter Method for Estimating Airborne Asbestos Dust
- [NOHSC:3003(2005)]
- DMP Management of fibrous minerals in WA mining operations – guideline
- Code of Practice for the safe removal of Asbestos 2nd Edition [NOHSC:2002(2005)]
- Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)]
- Exposure standards for atmospheric contaminants in the occupational environment (3rd Edition) 1995.
- Guidance note on the Membrane Filter Method for estimating airborne asbestos dust [3003 (1988)].
- WA Health Dept. 1992 Legislative Requirements for the management of wastes containing Asbestos.
- DMP Risk-based hygiene management planning and CONTAM system procedures (February 2015)
- DMP Adjustment of atmospheric contaminant exposure standards – guide (October 2016)
- AS/NZS 1715 Selection, use and maintenance of respiratory protective equipment

16.2 INTERNAL

- Asbestos Register (D16/1018)
- Fibrous / Asbestos Materials Permit (D17/522)
- Asbestos Removal Notification Form (D16/6465)
- Asbestos Disposal Registration Form (Wylie Bay Waste Facility Waste Disposal D16/83)