

DUST AND AIR QUALITY MANAGEMENT PLAN

*Revised in response to DoE Review
Version 2 - 26 April 2005*



Australia

TABLE OF CONTENTS

1.	INTRODUCTION.....	1
2.	AIR QUALITY ISSUES.....	2
2.1	OVERVIEW.....	2
2.2	POTENTIAL FOR DUST EMISSIONS.....	2
2.3	POTENTIAL CONTAMINANTS WITHIN THE SOIL.....	3
2.4	LOCATION AND SURROUNDING USES.....	3
3.	AIR QUALITY MONITORING.....	4
3.1	OVERVIEW.....	4
3.2	AIR QUALITY MANAGEMENT OBJECTIVE.....	4
3.3	AIR QUALITY ZONES.....	4
3.4	SITING OF STATIONS.....	5
3.5	ASBESTOS FIBRES.....	5
3.5.1	Monitoring Program.....	5
3.5.2	Analytical Method.....	6
3.5.3	Air Quality Standards.....	6
3.6	PARTICULATES.....	7
3.6.1	Monitoring Program.....	7
3.6.2	Analytical Method.....	7
3.6.3	Air Quality Standards.....	7
4.	DUST MANAGEMENT.....	9
4.1	OVERVIEW.....	9

4.2	DUST MANAGEMENT.....	9
5.	CONTINGENCY RESPONSE	10
5.1	CORRECTIVE ACTION DURING REMEDIAL WORKS	10
5.2	NOTIFICATION OF DUST EXCEEDENCE.....	10
6.	REFERENCES.....	11

1. INTRODUCTION

A Dust and Air Quality Management Plan (DAQMP) has been prepared to manage the issue of nuisance dust and adverse air quality during the remediation phase. The objective of the plan is to ensure that nuisance and contaminated dust including asbestos fibres are not generated during the remedial works and are minimised as best as practical in accordance with ALARA (as low as reasonably achievable) principles. Air quality is to comply with regulatory guidelines set for the protection of human health.

This DAQMP specifically addresses the following:

- measures and practices to minimise the generation of dust;
- monitoring for fine particulates and airborne asbestos fibres;
- monitoring for nuisance dust;
- location of air quality monitoring sites;
- identify regulatory guidelines and compliance criteria; and
- nominate action levels and contingency measures in the event that air quality approaches or is likely to exceed the relevant compliance criteria.

Section 2 outlines background information, Section 3 details the proposed monitoring program with dust management outlined in Section 4. Contingency response to adverse air quality is detailed in Section 5.

2. AIR QUALITY ISSUES

2.1 OVERVIEW

The Proponent recognises the need to control dust emissions during the remediation phase in order to maintain the health and well being of people who are involved in the remedial works and those that work and live in areas adjacent to the site. The location of the site in relation to nearby users is described in Section 2.4.

The major potential sources of dust generation will be from earthmoving activities associated with the excavation of contaminated soil. Due to the presence of low levels of contaminants in the fill, special efforts are required to minimise the generation of dust.

Dust is generated when there is sufficient wind velocity and frequency to lift fine particles from the ground surface. The susceptibility of the particles to lift is a function of the presence of any ground cover, compaction and the moisture content of the ground. Dust is measured as Total Suspended Particles or TSP, which refers to particles that can remain suspended in the atmosphere but not necessarily inhaled into the lung.

Particles generally greater than 75 microns (μm) are unlikely to become airborne. As such it is those contaminants that are contained within the $<75\mu\text{m}$ fraction that represent a potential hazardous dust emission, as they could be inhaled. Whereas contaminants contained within larger particles represent a potential hazard through either ingestion or dermal contact.

The following subsections describe the potential for dust to be generated from the remediation program and the potential human health risks. The proposed monitoring program is outlined in Section 3.

2.2 POTENTIAL FOR DUST EMISSIONS

Remediation activities will involve the handling of up to $3,000\text{m}^3$ of low-level contaminated soil that contain levels of heavy metals on average that are in compliance with commercial landuse health based criteria. .

Activities will include excavation of the soil, loading into trucks, movement of vehicles on unsealed tracks, temporary stockpiling and placement of clean sand fill. Dust could be generated as a consequence of any of these activities the severity of dust generation will be a function of the magnitude of earthworks, moisture content of the fill, prevailing weather conditions and the presence of fine particles. High wind speeds may exacerbate the potential for dust generation.

2.3 POTENTIAL CONTAMINANTS WITHIN THE SOIL

The soil to be removed is mostly comprised of sandy fill with cinder ash, gravel and rock ballast.

The ash and foundry sand component of the fill contains elevated levels of heavy metals in particular copper and lead. Asbestos fibres may be present at the annealing furnace site.

2.4 LOCATION AND SURROUNDING USES

The remediation site is surrounded by the following adjacent landuses:

- MRA offices to the north;
- TAFE and other occupied buildings to the east;
- Unoccupied parts of the Workshops site to the south;
- Helena West remediated area to the west.

3. AIR QUALITY MONITORING

3.1 OVERVIEW

This section describes the monitoring program and rationale that will apply to ensure that the removal and relocation of the contaminated soil does not result in air quality levels that exceed criteria set for the protection of human health.

Asbestos fibres are considered the most significant potential human health risk which will be a function of dust levels. Respirable or fine dust monitoring (PM₁₀) will be undertaken to confirm low dust levels which by default should ensure all other contaminant levels are low.

Heavy metal levels in the fill are low and below commercial landuse criteria. As such metals do not need to be monitored for on the proviso that dust levels are kept low.

Section 3.5 describes the monitoring program for asbestos fibres and particulates in Section 3.6.

3.2 AIR QUALITY MANAGEMENT OBJECTIVE

The objective of the air quality monitoring program is to manage earthworks to prevent the exposure of remediation workers and occupants of nearby facilities to possibly harmful levels of airborne contaminants.

The purpose of air monitoring is to confirm that personnel are not being exposed to potentially hazardous levels of contaminants rather than as a control mechanism on the level of dust management needing to be applied. As such, preventing dust emissions as low as reasonably achievable (ALARA) is the aim of the dust management program rather than performing sufficient dust suppression to simply comply with regulatory air quality criteria.

3.3 AIR QUALITY ZONES

A remediation zone will be established around those areas undergoing active earthworks to prevent unprotected personnel coming into contact with contaminated material. Air quality outside of the remediation zone will be suitable for public exposure.

Air quality within the remediation zone will be monitored to ensure compliance with occupational standards.

Air quality outside of the site boundary at publicly accessible areas will be monitored to ensure compliance with standards set for the protection of public health. This will be behind the TAFE building located on Yelverton Road. This location is also downwind of the sea breeze.

3.4 SITING OF STATIONS

The air monitoring sites will be situated so that they are representative of the particular location and contaminant being tested for. According to Australian Standard 2922-1987, *Ambient Air-Guide for the Siting of Sampling Units*, the following considerations will need to be taken into account when locating permanent monitoring sites:

- Avoiding sites with restricted air flows such as near buildings and trees. The minimum clear sky angle for the sampling inlet should be 120 degrees;
- Avoiding sites that may cause physical and chemical interference such as motor vehicle emissions;
- Avoiding sites that may adsorb and absorb contaminants such as trees. Monitoring stations should be located at least 20m from trees and leafy vegetation; and
- Locating the monitoring inlet near the human breathing zone, ie 1 to 2m above ground level.

To ensure monitoring is always undertaken downwind of the earthworks, a wind vane and anemometer will be permanently located at the MRA site.

Monitoring for public exposure will be undertaken continuously with a permanent station located behind the TAFE building on Yelverton Road. This location may not fully comply with AS 2922-1987, however it represents the most significant receptor with regard to potential exposure.

3.5 ASBESTOS FIBRES

3.5.1 Monitoring Program

Airborne asbestos fibres will be monitored using portable, personal air samplers at two locations. A sampler will be located within the remediation zone adjacent to earthworks and at the downwind boundary of the remediation zone.

The personal air samplers are to be used in accordance with occupational testing procedures and will be undertaken for no less than 8 hours duration during each day of activity.

All monitoring results are to be maintained on a logging sheet for reference and proof of compliance to the air quality standards. All test results shall be assessed against the relevant standards as outlined in Section 3.5.3.

3.5.2 Analytical Method

Asbestos levels will be measured in accordance with the National Occupational Health and Safety Commission's (NOHSC) Membrane Filter method for the determination of airborne fibre. In the field, a known volume of air will pass through the filter with any asbestos fibres being trapped. The filter is treated to become transparent and observed using phase contrast optical microscopic techniques. Particles of conforming dimensions (includes non-asbestos fibres) are "counted" as fibres it can therefore overestimate the true amount of asbestos present (i.e. err on the side of caution). The volume of air that has passed through the filter is recorded so an average concentration of airborne fibres can be determined.

3.5.3 Air Quality Standards

The applicable standards for monitoring asbestos are provided in *Worksafe Australia Asbestos: Code of Practice and Guidance Notes, August 1988; Worksafe Australia No. 2002 Code of Practice for Asbestos Removal 1988; and the Occupational Safety and Health Regulations, 1996.*

The occupational standard for exposure to asbestos within the machinery cabin and personnel working outside within the exclusion zone is 0.1 fibres/mL for all forms of asbestos (Time Weighted Average - TWA). This also represents the work stoppage level.

In terms of protecting public health at the MRA offices (nearest receptor), the target background level will be the NATA collection and detection limit of 0.01 fibres/mL (10 times below the occupational limit). The work stoppage level will also be set at the 0.01 fibres/mL detection limit. Table 1 outlines the asbestos fibre air quality criteria.

Table 1 - Asbestos Criteria

LOCATION	TARGET CRITERIA fibres/mL	WORK STOPPAGE fibres/mL
Remediation zone	<0.1	0.1
Off-site	<0.01	0.01

3.6 PARTICULATES

3.6.1 Monitoring Program

Fine particulate (PM₁₀) dust monitoring is the primary measurement for assessing the performance of the dust management program. Such monitoring will be undertaken for off-site exposure at the TAFE monitoring site for the duration of the remedial works. Monitoring will be with a continuous air sampler capable of providing alert messages for initiating corrective action.

Given the close proximity of public areas to the work site, air quality at the remediation works will need to comply with public exposure air quality thus occupational exposure monitoring will not be undertaken.

To ensure the dust is monitored adequately at other locations around the works zone during days of activity, a portable aerosol monitor capable of recording data on a continuous basis will be located in the prevailing downwind direction of the remediation zone boundary during the course of the work day. A log book will be maintained as to the location of the monitor by GPS and description of wind conditions. This book will be provided to the DoE at the completion of works.

All monitoring results are to be maintained on a logging sheet for reference and proof of compliance to the air quality standards. All test results shall be assessed against the relevant standards as outlined in Section 3.6.3.

3.6.2 Analytical Method

Particulate monitoring for public exposure will be determined using a TEOM (Tapered Element Oscillating Microbalance) analyser in accordance with AS3590.9.8-2001.

Aerosol monitoring will be determined using a “Dust Trak” or equivalent. These results will not be used for compliance purpose but rather as a management tool for dust suppression to ensure compliance criteria are met at the remediation zone boundary.

3.6.3 Air Quality Standards

In terms of protecting public health off-site, the acceptable background level at the site boundary will be the *National Environmental Protection Measure (NEPM) for Ambient Air Quality* (NEPC, 1998). This standard represents a longer term goal for ambient air quality “that allows for the adequate protection of human health and well being”.

The NEPM specifies an ambient air quality target of $50\mu\text{g}/\text{m}^3$ for PM_{10} . The NEPM value is a 24-hour average where instantaneous levels can be considerably higher than the limit. The Air Quality Branch of the DoE has nominated air quality criteria for the works. To ensure the 24 hour average complies with the NEPM, a 15 minute average corrective action limit of $250\mu\text{g}/\text{m}^3$ and work stoppage value of $400\mu\text{g}/\text{m}^3$ will apply.

Table 2 outlines the fine particulate air quality criteria.

Table 2 - Fine Particulates Air Quality Criteria

LOCATION	TARGET CRITERIA $\mu\text{g}/\text{m}^3$	CORRECTIVE ACTION RESPONSE LEVEL $\mu\text{g}/\text{m}^3$	WORK STOPPAGE $\mu\text{g}/\text{m}^3$
Off-site PM10	<50 (24 hour)	250 (15 minute)	400 (15 minute)

4. DUST MANAGEMENT

4.1 OVERVIEW

This section describes the measures that will be employed to minimise dust emissions generated as a result of earthmoving activities. The objective is to ensure that any on-site or off-site airborne contaminant emissions are kept to a minimum and comply with the relevant health protection criteria.

For the full duration of the works the Environmental Supervisor will perform a daily check as to the adequacy of dust control measures and siting of the portable dust monitor. The Supervisor will be responsible for maintaining the log book and reporting of results to the DoE.

4.2 DUST MANAGEMENT

The remediation works are anticipated to commence in early 2005 and are expected to take less than one month to complete.

Dust management will comprise wind fencing, surface stabilisation and the use of dust suppressors in the form of water trucks and sprinklers. These will be made available for the entire remediation phase.

A windscreen will be constructed on the boundaries with adjoining active properties to reduce wind flow from the remedial works onto publicly accessible areas. The windscreen will be constructed of shade cloth or hessian on a 1.8m security high-fence. This will also act as a visual screen to the remedial earthworks.

The ground surface will be thoroughly wetted down everyday with a water cart and/or sprinklers for at least one week prior to earthworks commencing. Soil removed from the site of the annealing furnace will be removed under a water spray to minimise the potential release of asbestos fibres.

Clean fill imported onto the site is to be sufficiently damp to prevent dust emissions on route. The moisture content of the fill being brought onto site will be inspected periodically by the Environmental Supervisor. If too dry, the cartage firm will be required to wet the fill at the source.

5. CONTINGENCY RESPONSE

Should air quality monitoring show that dust and airborne contaminant emissions exceed the **Corrective Action Response Levels**, dust management practices will be immediately reviewed and corrective action taken to improve air quality. If the **Work Stoppage Level** is exceeded, all remedial work creating the dust source will cease until monitored levels fall below the *Corrective Action Response Level*.

5.1 CORRECTIVE ACTION DURING REMEDIAL WORKS

The corrective action taken will typically comprise the following sequence of actions:

- Check all trucks are appropriately covered and that earthmoving machinery is operating in wetted down areas;
- Increase the water application rates over all disturbed areas;
- Reduce the level of earthmoving activity if evaporation rates are drying the fill quicker than watering can be applied;
- Apply a suitable physical dust suppressant to any inactive areas; and
- Cease all work if extreme weather conditions are the prime reason for excessive dust levels and dust suppression techniques have been ineffective in controlling the dust.

5.2 NOTIFICATION OF DUST EXCEEDENCE

The DoE will be notified in writing within 24 hours if there has been an exceedence of the corrective action or target values. Should there be a work stoppage this will be notified immediately on the day by phone and in writing.

6. REFERENCES

DEP, (2000). Annual Summary of Ambient Air Quality Monitoring in Western Australia (Technical Series 111 – January 2002).

ENV, (2003). Remediation of Area BCD, Environmental Management Program.

NEPC, (1998). National Environmental Protection Measure for Ambient Air Quality. National Environmental Protection Council.

Standards Australia, (1987). Australian Standard AS 2922 – Ambient Air-Guide for Siting of Sampling Units.

FIGURES

APPENDIX A

SITE CLASSIFICATION ASSESSMENT CHART

APPENDIX B

BUREAU OF METEOROLOGY

MONTHLY DATA FOR PERTH

AIRPORT

APPENDIX C

ANALYTICAL RESULTS FROM SIEVING EXERCISE