

Karara Mining Limited

Environmental Procedure – Dust Monitoring

CORP-EN-PRO-1005

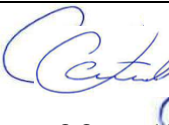

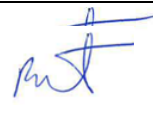
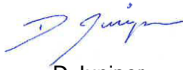


8 April 2022

SYNOPSIS

This ‘Dust Monitoring Procedure’ forms part of Karara Mining Limited Corporate Standards and describes the procedures specification that shall be used for all works within Karara Mining Limited.

Disclaimer

“This document has been prepared by Karara Mining Limited for their exclusive use (“the Purpose”). Use of this document other than for the Purpose is not permitted.”

CORP-EN-PRO-1005 KARARA CORPORATE STANDARD					
REV	DESCRIPTION	ORIG	REVIEW	KML APPROVAL	DATE
5	Reissued for use	 C Courtauld	 J Baker	 P Burton	14-Sept-18
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1 PURPOSE AND SCOPE

The purpose of this procedure is to assess and monitor the potential impacts upon visual amenity and vegetation health within the Greater Karara Iron Ore Project (the Project) from dust emissions generated as a result of mining and mining related activities, including post closure.

The Project consists of all Karara Mining Limited (KML) mining and processing activities along with associated infrastructure including haul roads, the railway line, the 330kV power line and the below ground raw water pipeline or any areas disturbed during mining operations.

Dust emissions associated with KML's operations at the Geraldton Port are managed under the Mid-West Port Authority's (MWPA) Licence to Operate, approved under Part V of the *Environmental Protection Act 1986* (Western Australia [WA]). All environmental monitoring at the Geraldton Port is undertaken by the MWPA and is therefore not covered under this procedure.

This procedure does not incorporate occupational health and safety monitoring, or reporting requirements for dust emissions.

1.1 Objectives

The objectives of this procedure are to detail the processes and criteria to ensure that the Project;

- Monitor air quality criteria on sensitive receptors (buildings used for residential purposes);
- Monitor air quality criteria on ecological receptors (dust deposition at which plant health is affected);
- Assess monitoring results against internal standards (KML's Trigger and Threshold criteria's) and external standards (National Environment Protection Measure [Ambient Air Quality], NEPM);
- Implement contingency actions when standards are exceeded; and
- Reporting to government agencies of dust monitoring results and performance of dust control measures.

This procedure supports the KML Environmental Management Plan (CORP-EN-PLN-1020), KML Environmental Plan - Dust Management (CORP-EN-PLN-1010), and the KML Environmental Plan - Flora and Vegetation Health Monitoring (CORP-EN-PLN-1012). Compliance with this procedure and supporting documentation is mandatory and is applicable to all KML employees and contractors.

2 DEFINITIONS

Table 1: Definitions

Term	Definition
DWER	Department of Water and Environmental Regulation
EMS	Environmental Management System
GD	Ground Disturbance
GIS	Geographic Information System
g/m ² /month	Grams per square metre per month
KML	Karara Mining Limited
Meteorological / Weather Station	Instruments and equipment that captures weather data
mg/L	Milligram per litre
Monitoring	Systematic sampling and, if appropriate, sample analysis to record changes over time as a result of mining activities and operations
MWPA	Mid-West Ports Authority
NATA	National Association of Testing Authorities
NEPM	National Environment Protection Measure
NPI	National Pollutant Inventory
PEC	Priority Ecological Community
PER	Public Environmental Review
PM ₁₀	Particulate matter 10 micrometres (µm) or less in diameter. A health indicator for the fine particles of respirable dust capable of being inhaled into the lungs.

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Term	Definition
The Project	Greater Karara Iron Ore Project
Receptor	A designated place at which an impact may occur (e.g. priority flora and people)
SWP	Safe Work Procedure
$\mu\text{g}/\text{m}^3$	Micrograms per cubic metre
WA	Western Australia

3 PLANNING

3.1 Legal and Other Requirements

KML assess and monitor dust impacts on ambient air quality and sensitive receptors to meet the requirements of Ministerial Statements 805 and 806 (Karara and Mungada Iron Ore Projects, respectively) and the Karara Beneficiation Plant Licence (L8721/2013/2). In addition to the above, the relevant Commonwealth and State legislation to this procedure are summarised below:

- *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
- *Environmental Protection Act 1986* (WA)
- *Biodiversity Conservation Act 2016* (WA)
- *Conservation and Land Management Act 1984* (WA)
- *Mining Act 1978* (WA)
- *National Environment Protection (National Pollutant Inventory [NPI]) Measure* (Commonwealth)
- *Environmental Protection (NEPM-NPI) Regulations 1998* (WA)
- *NEPM: Ambient Air Quality 2015* (Commonwealth)

For a detailed explanation of how each of the above acts relates to the Project, refer to the Environmental Legal Register or contact the KML Environment Department.

3.2 Roles and Responsibilities

All KML employees and contractors shall ensure compliance by implementing this procedure. The main body of this procedure should be referred to where clarification is required. Table 2 highlights the roles and responsibilities associated with this procedure.

Table 2: Roles and Responsibilities

Role	Responsibility
<i>All KML Employees and Contractors</i>	<ul style="list-style-type: none"> • All personnel shall take all necessary measures outlined in this procedure to control dust emissions during operations, material handling and other potentially dust generating activities. • Immediately report all excessive dust events to the KML Environment Department.

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Role	Responsibility
	<ul style="list-style-type: none"> Any non-compliance with this procedure requires an incident report be submitted to the KML Environment Department.
<p><i>KML Area Managers</i></p>	<ul style="list-style-type: none"> Ensure all personnel are inducted, made aware of the requirements of this procedure prior to commencement of work and are provided with appropriate support. Ensure the requirements of this procedure are implemented within their area of responsibility and ensure all employees and contractors comply with this procedure.
<p><i>KML Site Environment Department</i></p>	<ul style="list-style-type: none"> Provide environmental advice and assistance to personnel as required. Coordinate the delivery of environmental training to key personnel. Liaise with supervisors and Managers to identify and rectify dust issues associated with operational activities. Investigate environmental incidents and co-ordinate the completion of corrective actions as required. Facilitate site-based environmental monitoring and data collection for environmental compliance reporting. Maintain all monitoring equipment and documentation (hard copy files and/or electronic files) for auditing purposes.
<p><i>KML General Manager HSEC</i></p>	<ul style="list-style-type: none"> Overall responsibility for development, implementation, maintenance and compliance with this procedure. Report to Senior Management on matters of environmental compliance. Overall responsibility to ensure that KML can meet its environmental objectives and targets in relation to dust. Provide advice and support to the Area Managers to ensure compliance with legal requirements, achievement of

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Role	Responsibility
	<p>environmental objectives and continued improvement of environmental performance.</p> <ul style="list-style-type: none"> Facilitate environmental auditing and compliance monitoring as required.
<p><i>KML Environmental Department</i></p>	<ul style="list-style-type: none"> Analyse and interpret monitoring data for reporting. Regular review of monitoring data for anomalies and compliance with standards and guidelines. Investigate anomalies and non-compliances and recommend contingency actions. Request incident reports and report externally any dust emission exceedances via the Incident Reporting System.

3.3 Competence, Training and Awareness

In accordance with the Training and Competency Procedure (CORP-TR-PRO-1001) all KML personnel, contractors and sub-contractors must undertake the mandatory inductions prior to commencing work on site. Information on the management of dust and on-site reporting requirements are detailed in KML’s online and site specific inductions.

The following requirements shall be met for all personnel on the Project:

- All personnel shall undergo awareness training for dust management;
- All personnel involved in soil stripping and stockpiling shall undergo Ground Disturbance (GD) training prior to the commencement of ground disturbing works in accordance with the Environmental Procedure – Approvals Request and Ground Disturbance (CORP-EN-PRO-1004) and GD permit requirements, and the KML Environmental Procedure – Soil Resource Management (CORP-EN-PRO-1015);
- Dust awareness programs shall be displayed in key viewing areas (e.g. kitchen mess areas and workshops); and
- Toolbox meetings will provide a forum at which site personnel can raise environmental issues including issues relating to air quality and dust emissions.

The KML Training Department maintains KML’s training management system which ensures KML employee and contractor induction and training requirements.

4 IMPLEMENTATION AND OPERATION

4.1 Monitoring of Air Quality

KML has installed air quality monitoring sites in or near the sensitive receptors to monitor particulate matter and dust deposition within the Project area based on modelled deposition rates.

Monitoring for particulate matter and dust deposition will be carried out in accordance with the *Australian and New Zealand Standards for Sampling and Analysis of Ambient Air (AS/NZS 3580)*.

Monitoring sites shall be reviewed and revised annually, or when significant changes to operational areas occur, so that the objectives of this procedure are achieved.

The sensitive and ecological receptors within the Project area that shall be monitored are outlined in section 4.2 of this document.

4.2 Sensitive and Ecological Receptors and Monitoring Site Selection

Monitoring locations to assess impacts on sensitive and ecological receptors have been selected and established to consider dust emission levels compared to predictive modelling undertaken during the environmental impact assessment. The environmental impact assessment included:

- Baseline flora studies (Woodman, 2008 & 2012);
- Seasonal fluctuations in the dominant wind direction;
- Predictive modelling through impact assessment (PER 2008); and
- Locations of ecological receptors (Heggies 2008).

The sensitive and ecological receptor monitoring locations were identified to be:

- Karara Homestead (sensitive receptor - air quality) and;
- Areas containing flora of high conservation significance (ecological receptors), specifically:
 - The Blue Hills vegetation complex Priority Ecological Community (PEC) located within the Project area;
 - Threatened and Priority flora species within the Karara, Blue Hills North, Terapod and Hinge mines.

The KML mine site accommodation village is considered project related infrastructure and as such is not considered as a sensitive receptor, however KML have installed an ambient air

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quality monitoring site at the accommodation village to opportunistically monitor for ambient air quality. This may be removed as determined by the KML Environment Department.

As mining operations progress, monitoring site configurations may be altered to measure dust in other appropriate areas.

Table 3 provides the areas where dust monitoring within the Project footprint is conducted.

Table 3: Areas of dust monitoring within the Project

Location	Monitoring Type
Karara Village	Particulate Matter - PM ₁₀
Karara Homestead	PM ₁₀ , Deposition
Karara Rail Loop*	Deposition
Karara Pit	Deposition
Karara TSF	Deposition
Blue Hills North	Deposition
Terapod	Deposition
Hinge	Deposition
Background Control Sites	Deposition

*Dust monitoring results not required to be externally reported.

4.3 Dust Deposition Monitoring and Frequency

To measure potential dust impacts on ecological receptors, dust deposition monitoring is undertaken on a monthly basis whereby dust deposition gauges are collected and sent to a National Association of Testing Authorities (NATA) accredited laboratory for analysis. The gauges have been located as best as practicable in accordance with the Australian and New Zealand Standard, AS/NZS3580.1.1.2016 *Guide to Siting Air Monitoring Equipment* and may be subject to change due to operational requirements.

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Dust deposition gauges comprise of a tripod, dust collection sample bottle and funnel (Figure 1). The monitoring locations and process involved for undertaking the depositional dust monitoring is outlined in the Dust Bottle Sampling SWP (EN-SWP-027).

Dust deposition monitoring sites are typically co-located with vegetation health monitoring quadrats which are monitored in accordance with the KML Environmental Plan – Flora and Vegetation Health Monitoring Plan (CORP-EN-PLN-1012).

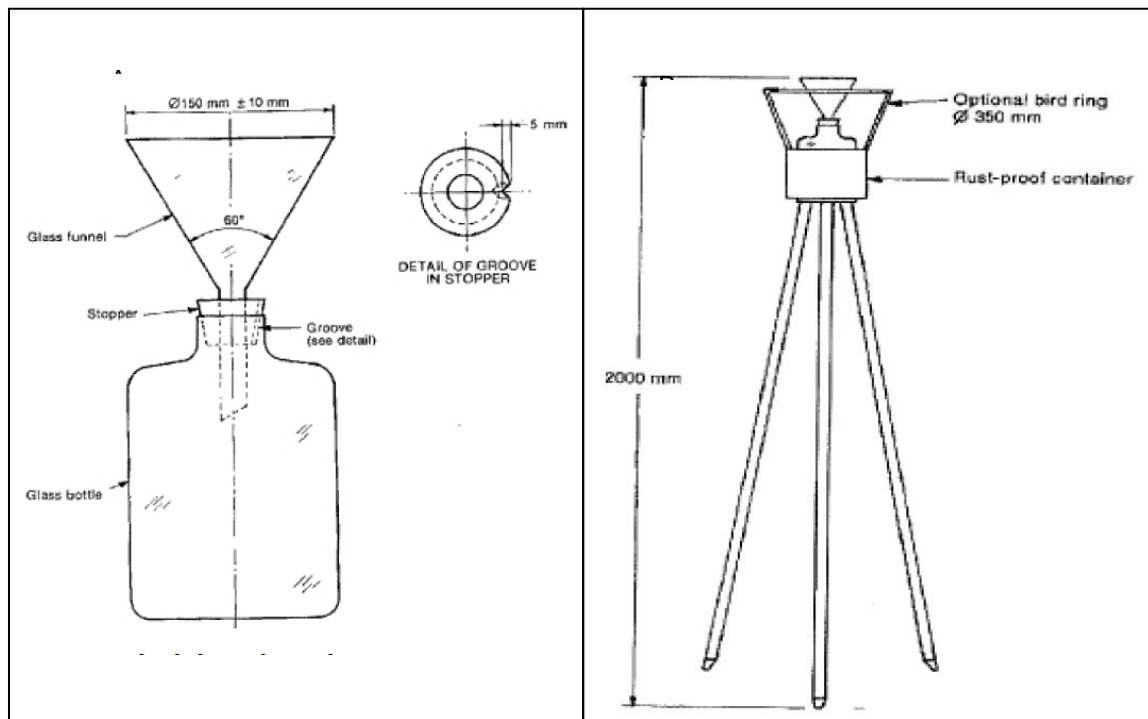


Figure 1: (A) Typical dust deposition gauge, (B) Typical stand with dust deposition gauge

4.4 Ambient Air Quality Monitoring and Frequency

Monitoring of real time ambient air quality criteria within the Project area is undertaken at the sensitive receptor sites listed in Table 3 as per NEPM 2015. These samplers continuously measure ambient (PM₁₀) dust levels. This ambient air quality data is manually downloaded or can be accessed through an online portal and reviewed by the KML Environment Department.

4.5 Meteorological Monitoring and Frequency

A meteorological station is installed at Karara Plant Site to capture parameters such as wind speed, direction, temperature, rainfall, and date of collection. Meteorological data will allow for the correlation and assessment of dust monitoring data and assist with reviewing the effectiveness of dust management practices. Meteorological data shall be collected and stored on a monthly basis.

Refer to the Karara Weather Station Download and Maintenance SWP (EN-SWP-052) for further details.

4.6 Monitoring Parameters and Assessment

KML's dust monitoring parameters are to compare and assess changes to air quality and ecological receptors and to identify if the change is a result of mining activities or natural processes. Table 4 provides a summary of the emission limits adopted by KML; these values have been obtained using the NEPM guideline values (NEPM, 2015), as well as historical dust monitoring and air quality modelling at Karara. All parameters are required to be monitored to ensure compliance with this procedure. The air quality model shall be updated every five years to reassess dust deposition trajectories and potential impact areas.

Table 4: Dust emission limits

Dust Monitoring Parameter	Emission Limit	Source
Deposition gauge	>10 g/m ² /month.	Internal KML parameter based on 2008 deposition modelling (PER, 2008).
Visual	Excessive airborne dust observed in operational management areas, as detailed in the KML Environmental Plan - Dust Management (CORP-EN-PLN-1010).	KML Department of Water and Environmental Regulation (DWER) Beneficiation licence (L8721/2013/2).
Ambient (PM ₁₀)	≥50 µg/m ³ over a 24 hour period.	NEPM, 2015.

4.7 Trigger and Threshold Criteria and Associated Response Actions

Table 5 details KML's response criteria in relation to dust emission guidelines outlined in Table 4. Response actions are implemented when results of the monitoring parameters show that either a trigger or threshold criteria has been exceeded.

The raising of a hazard or incident in INX is required to ensure that the event is captured and suitable response actions are implemented.

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A Trigger Criteria is set at a level to forewarn adverse trends that may lead towards the threshold criteria. A Threshold Criteria represents the limit of acceptable impact beyond which there is likely to be a significant effect on the environment.

Table 5: Trigger and Threshold Criteria

Trigger Criteria	Data Collection Method	Response Actions
Excessive airborne dust observed in operational areas	Visual observation	Contact relevant supervisor; raise hazard in INX.
40-50 µg/m ³ average over a 24 hour period	Ambient (PM ₁₀) monitoring equipment	Investigate exceedance and determine if result is due to KML operations; if so, raise hazard in INX.
8 - 10 g/m ² /month	Dust deposition monitors	Contact relevant supervisor and raise hazard in INX.
Threshold Criteria	Data Collection Method	Response Actions
≥50 µg/m ³ over a 24 hour period	Ambient (PM ₁₀) monitoring equipment	Incident report submitted in INX within 72 hours of the event and follow-up internal investigation.
Greater than 10 g/m ² /month	Dust deposition monitors	Contact relevant supervisor, request an incident report, investigate exceedance and detail corrective actions in INX. Report externally to relevant agency (DWER) for exceedances of three consecutive months per monitor.

5 CHECKING

5.1 Hazard and Incident Reporting

Any exceedance of the trigger criteria shall be reported as a hazard to the KML Environment Department. Any exceedance of the threshold criteria and/or failure to follow this procedure shall be reported as an internal incident report to the KML Environment Department. All incidents are documented and investigated in accordance with the KML Safety Procedure – Incident Management (CORP-HS-PRO-1046) and documented in INX for tracking and completion of remedial actions.

5.1.1 Remedial Actions

Where an incident report is required for non-compliances, it should at a minimum detail corrective actions and preventative actions, including but not limited to the following:

- Cease work during adverse weather conditions (that is moderate to heavy winds in the direction of the sensitive receptor);
- Review dust management measures being undertaken in accordance with the KML Environmental Plan - Dust Management (CORP-EN-PLN-1010);
- Action control measures to reduce dust levels through prevention and as outlined in the KML Environmental Plan - Dust Management (CORP-EN-PLN-1010);
- Identify alternative sources of dust suppression water; and
- Minimise / restrict access to high dust areas.

5.2 Control of Records

All dust monitoring data is to be stored on the KML Environment Department Environmental Management System (EMS) Filesite storage system (Folder 7.0 Dust Monitoring) for reporting and auditing purposes. The dust monitoring data is also displayed spatially in KML's Geographic Information System (GIS).

Monthly internal data reviews are completed by the KML Environment Department to review the data required to be externally reported within Annual Environmental Reports as per the annual KML Environmental Workload Schedule.

5.3 Audits and Inspection

KML shall monitor compliance with this procedure through scheduled EMS audits. Actions arising from internal and external audits will be documented in INX.

6 DOCUMENT LIST

The documents referred to in this procedure are listed in Table 6 below.

Table 6: Document List

Document Title	Document Number
Environmental SWP – Dust Bottle Sampling	EN-SWP-027
Environmental SWP – Karara Weather Station Download and Maintenance	EN-SWP-052
Environmental Procedure – Land Rehabilitation	CORP-EN-PRO-1002
Environmental Procedure – Approvals Request and Ground Disturbance	CORP-EN-PRO-1004
Environmental Procedure – Soil Resource Management	CORP-EN-PRO-1015
Environmental Plan – Dust Management Plan	CORP-EN-PLN-1010
Environmental Plan – Flora and Vegetation Health Monitoring Plan	CORP-EN-PLN-1012
Environmental Plan – Environmental Management Plan	CORP-EN-PLN-1020
Training Procedure – Training and Competency	CORP-TR-PRO-1001
Safety Procedure – Incident Management	CORP-HS-PRO-1046

7 REFERENCES

Australian and New Zealand Standard, AS3580.1.1.2016 *Methods for Sampling and Analysis of Ambient Air – Guide to Siting Air Monitoring Equipment*.

Heggies Pty Ltd 2008, *Karara Iron Ore Project - Air Quality Impact Assessment*, Report Number 10-4873-R1. Unpublished report for Karara Mining Ltd, Perth, Western Australia.

NEPM 2015, National Environment Protection (Ambient Air Quality) Measure, National Environment Protection Council. Australian Government.

PER 2008, *Karara Iron Ore Project Public Environmental Review*.

Woodman Consulting 2008, *Haulage route from Mungada Ridge Hematite Project to Lochada Road: flora survey and plant community mapping*. A report prepared for Gindalbie Metals Ltd, Perth, Western Australia.

Woodman Environmental 2012, *Regional Flora and Vegetation Survey of the Karara to Minjar Block*. Report prepared for Karara Mining Ltd, Perth, Western Australia.