## Boral Cement Limited

## Berrima Works

# Dust Management Plan

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# 1. PURPOSE

This Management Plan applies to the Boral Berrima Cement Works site located at New Berrima, NSW.

The Plan has been prepared to meet the requirements of the Pollution Reduction Program 6 (PRP 6) "Control of Fugitive Dust" incorporated into the site's Environmental Protection Licence (EPL) No 1698 by the NSW Environmental Protection Authority (EPA).

The overall aim of the Dust Management Plan is to reduce offsite dust impacts to below the adopted values of:

- Deposited Dust - measured as annual rolling mean of 4 $g/m^2$/month (as per A/NZ Standard 3580) using dust deposition gauges placed in the EPA-approved boundary locations;
- $PM_{10}$ and Total Suspended Particulate (TSP) - measured using HVAS equipment located offsite in Berrima Rd. as follows:
  - annual rolling mean for TSP of 90 $\mu g/m^3$ (as per *NSW Action for Air 1998* – TSP goal), and
  - 24-hr mean for $PM_{10}$ of 60 $\mu g/m^3$, with 7 exceedences allowed per annum (as per NSW *Action for Air 2009 Update* – $PM_{10}$ goal for Illawarra Region).

The Dust Management Plan applies to all aspects of the Boral Cement operations in Berrima and will be implemented over a period of time. The focus will be on activities identified in the plan as High and Medium Priority as reduction of dust generation potential in these areas is expected to have the biggest effect on the overall dust mitigation success.

# 2. SCOPE

This Plan addresses:

- Current plant dust issues and limits;
- Identification all major dust sources including those arising from the upgrade of Kiln 6 and the installation of Cement Mill 7;
- Monitoring dust emissions from the plant;
- Compliance with relevant legislative requirements;
- Provision of measures to manage the impact of all the dust issues at the site; and
- Management of non-compliance, if identified.

## 3. DEFINITIONS

| Term | Definition |
|---|---|
| *EMS* | Environmental Management System. A collection of formally approved documents that define the Company's management practices aimed at protection of environment and minimisation of any adverse impacts on land, air, water and the community. |
| *SOP* | Standard Operating Procedure. A formal procedure for undertaking complex and recurring tasks where neither physical nor environmental layout will change. |
| *SWMS* | Safe Work Method Statement. |

## 4. RESPONSIBILITIES

The following general responsibilities apply in relation to this Management Plan:

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| *Employees* | Responsible for ensuring that the dust issues for their work are minimised. This includes:<br>➢ Observing any dust emission standards and procedures that apply to their work or operations;<br>➢ Taking action to minimise or prevent dust emissions;<br>➢ Identifying and reporting dust emissions;<br>➢ Monitoring, reporting and assisting in the control of dust emissions to keep within approved levels. |
| *Team Leaders / Front Line Supervisors* | Responsible for minimisation of dust emissions arising from work methods and the working environment. This includes:<br>➢ Identifying, reducing and preventing dust emissions;<br>➢ Monitoring operations and maintenance work to ensure dust emissions are maintained within approved levels;<br>➢ Initiating action to prevent dust incidents;<br>➢ Identifying, reporting and recording dust emission incidents; |

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| | ➢ Initiating corrective actions to overcome dust emission incidents. |
| *Production Manager, Technical Manager and Engineering Manager* | Responsibility and authority to ensure that the site environmental dust objectives are achieved. This includes:<br>➢ Ensuring staff are trained with respect to dust awareness, responsibilities, instructions and procedures;<br>➢ Ensuring dust emission incidents are investigated and corrective and preventative action taken;<br>➢ Ensuring operations comply with the conditions of Development Approvals, Environmental Protection Licence and relevant legislation;<br>➢ Reviewing operations and implementing strategies to reduce dust emissions from the Works.<br>➢ Developing and implementing contingency plans as required to remedy dust emissions and minimise dust complaints. |
| *HSE Advisor* | Responsible for:<br>➢ Ensuring periodic dust monitoring is carried out.<br>➢ Ensuring that an appropriate management plan is developed and implemented if dust emission limits are found to have been exceeded.<br>➢ Reviewing dust emission complaints received to determine if particular dust issues/trends are being identified. |
| *Site Operations Manager* | Responsible for:<br>➢ Approving any communications to external parties on dust generating activities before their release.<br>➢ Ensuring all personnel are aware of licence, DA and other regulatory requirements relating to dust.<br>➢ Implementing Boral environmental policy on site;<br>➢ Ensuring site environment performance objectives and targets are established, monitored and achieved;<br>➢ Defining responsibilities for the EMS;<br>➢ Ensuring the availability of resources;<br>➢ Communicating the importance of the EMS and meeting the statutory and regulatory requirements;<br>➢ Conducting management reviews of the EMS;<br>➢ Ensuring that material environmental incidents are immediately reported to 5 compulsory Government Authorities;<br>➢ Verifying the implementation of corrective and preventive actions; and<br>➢ Recognising and responding to community concerns. |

# 5. REGULATORY REQUIREMENTS

Boral Cement's Berrima Cement Plant is subject a number of regulatory requirements governing the generation and management of fugitive dust emissions. These include, but are not necessarily limited to:

### 1.1.1 Protection of the Environment Operations Act 1997

Section 124 requires "the occupier of any premises who operates any plant in or on those premises in such a manner as to cause air pollution from those premises is guilty of an offence if the air pollution so caused, or any part of the air pollution so caused, is caused by the occupier's failure:

- To maintain the plant in an efficient condition, or
- To operate the plant in a proper and efficient manner."

Section 126 requires "the occupier of any premises who deals with materials in or on those premises in such a manner as to cause air pollution from those premises is guilty of an offence if the air pollution so caused, or any part of the air pollution so caused, is caused by the occupier's failure to deal with those materials in a proper and efficient manner.

### 1.1.2 Environmental Protection Licence No. 1698

Boral Cement Berrima operates under Environmental Protection Licence (EPL) No. 1698 from the NSW EPA. The following Conditions are applicable to fugitive dust emissions:

| Clause | Requirement |
|---|---|
| O1.1 | Licensed activities must be carried out in a competent manner.<br>This includes:<br>a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and<br>b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity. |
| O3.1 | The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises. |

### 1.1.3 Kiln 6 Upgrade Development Consent

The Planning Approval for Kiln 6 was granted on 12 May 2003 (last modified on 20 June 2012). The following conditions are applicable to dust emissions:

| Clause | Requirement |
|---|---|
| 3.7 | The Applicant shall design, construct, operate and maintain the cement works |

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| | upgrade in a manner that minimises dust emissions from the site. |
| 3.7A | The Applicant shall apply all reasonable and feasible measures to minimise the generation of dust from coal stockpiles, including but not necessarily limited to:<br>a) compaction of stockpile batters to minimise pick up of dust;<br>b) installation of water sprays or use of a water cart to keep stockpile surfaces wet, if dust is being generated; and<br>c) cessation of stockpile generation during periods of high wind, if dust generation cannot be controlled. |
| 3.8 | The applicant shall take all practicable measures to ensure that all vehicles entering or leaving the site and carrying a load that may generate dust are covered at all times except during loading and unloading. Any such vehicles shall be covered or enclosed in a manner that will prevent emissions of dust from the vehicle at all times. |
| 3.9 | All trafficable areas and vehicle manoeuvring areas on the site shall be maintained in a condition that will minimise the generation of emission of wind blown or traffic generated dust from the site at all times. |

### 1.1.4 Boral Group Environmental Policy

Boral Environmental Policy confirms the Group's support to the principle of sustainable development and requires that all sites and facilities comply with environmental regulations, standards and codes of practice relevant to the particular business as the absolute minimum requirement.

# 6. CURRENT DUST MONITORING

## Fugitive Coarse Dust – Deposition Gauges

Seven dust deposition gauges are located around the Berrima Works' site (see Photo 1) to record the levels of deposited dust. These gauges are sampled and analysed on a monthly basis by an independent laboratory in accordance with relevant Australian Standards. Boral Cement reserves the right to undertake periodical reviews of the number and locations of the fugitive dust monitoring devices to ensure that they remain representative of site operations.

Some of these gauges have in the past shown increases in deposited dust above the guideline levels. Also, Regulatory Authority has advised that from time to time they receive complaints regarding fugitive dust emissions from the Berrima Works premises.

Inspections undertaken by Boral environmental staff and the EPA have highlighted areas where improvements to site operations can be made to ensure that the local community and the environment are not adversely affected by the site activities.


Photo 1: Locations of Dust Deposition Gauges around Berrima Works

## Suspended Particulate - HVAS

Fine particulate that is generated predominantly through stack emissions is being monitored by a High Volume Air Sampler (HVAS) (Photo 2) that is located in a paddock at Berrima Rd, approximately 500m south-east of the Plant (see Photo 1). Total Suspended particulate (TSP) and small particle fraction less than 10 microns ($PM_{10}$) are measured.

The equipment is regularly services and calibrated. Dust samples are collected and analysed every 6 days by an independent laboratory in accordance with relevant Australian Standards.

The results consistently confirm suspended dust levels well below currently adopted guideline values.

Photo 2: Location of High Volume Air Sampler near Berrima Road (with Cement Works in the far background)

# 7. RISK ASSESSMENT

A risk assessment of site activities has been undertaken determine those activities which present the highest risk of generating fugitive emissions that would have the potential to travel beyond the site boundary. Boral Cement's Environmental Risk Assessment Matrix (see CEM-ENV-010 Environmental Risk Management) has been used to assess the risks posed by each activity. Table below summarises the risk ratings for various locations and activities on the site. Management measures for these activities are detailed in relevant Sections of this document.

| Activity / Location | Probability | Consequence | Risk |
|---|---|---|---|
| Transport on unsealed haul roads | 5 | 3 | High |
| Quarry and crushing/grinding operations | 5 | 2 | High |
| Outdoor stockpile areas | 4 | 2 | High |
| No 6 Kiln stack emissions | 4 | 3 | High |
| Transport on sealed haul roads | 3 | 2 | Moderate |
| Unsealed surface areas | 3 | 2 | Moderate |
| Clinker storage silo | 5 | 3 | Moderate |
| Operational buildings | 2 | 1 | Low |
| Routine plant operations | 2 | 1 | Low |

# 8. DUST MANAGEMENT PIORITIES

For the purpose of this Plan, dust-generating activities rated in Section 4 at High and Medium risk will be addressed with the High and Medium priority.

## 8.1 High Priority

### 1.1.5 Unsealed Haul Roads

Boral Cement is aware of the high dust generating potential of unsealed internal haul roads. The volume of dust generated is related to the road type, number of truck movements, truck speed and weather conditions.

Some of the unsealed roads were sealed in the last two years, some were closed for traffic and some are still remaining.

Wheel-wash facilities have been installed in two locations on unsealed section of internal roading (before key intersections from unsealed to sealed roads) to prevent tracking of dust to sealed roads.

The following measures will be undertaken to minimise fugitive dust from the unsealed haul roads:

- Selection of dedicated main haul routes and restriction of access to other unsealed roads or areas on a 'need to use' basis.
- Progressive sealing of unsealed haul roads.
- Availability of a suitable water cart with spray facilities for use as frequently as necessary to prevent the emission of fugitive dust. Note that during windy conditions and in prolonged dry weather water spraying will be required repeatedly during the day.
- Consideration of use of dust suppression agents to reduce the need of water sprays, if viable.
- Restriction of speed to 20km/hr on unsealed haul roads.
- Discipline in immediate cleaning of any material spilled onto a road. This will prevent it being pulverised into potentially fugitive dust. Truck drivers have a responsibility to immediately report spills to the Control Room.

### 1.1.6 Quarry and Crushing/Grinding Operations

Standard operating procedures should be updated for the Quarry operations and outdoor Crushing and Grinding operations which should at least consider the following:

- Raw material storage and batch processing.
- Planning how to cope with adverse weather conditions during operations.
- Water sprays onto material during the Quarrying process including ripping, stockpiling and loading of trucks.
- Water sprays during the outdoor Crushing/Grinding process including unloading, loading into crusher, crushing, crushed material exit, creation of crushed material stockpiles and loading of vehicles.
- The location of the external crushing units to minimise impacts from dust, noise etc.
- Management of haul roads including the use of water sprays, dust suppression agents, minimising dust track out to sealed roads etc.
- Minimising dust from haul truck loads (such as covers, load wetting, etc).

### 1.1.7 Outdoor Stockpile Management

Boral Cement Berrima requires the ability to stockpile outdoors raw materials, solid fuels and in certain circumstances clinker to conduct its operations under different market conditions. The generation of dust in outdoor storage may occur during transport to and from, unloading, construction, storing and extraction from the stockpiles. The following measures will be undertaken to minimise fugitive dust from stockpile areas:

- Where possible, consolidation of existing stockpiles to reduce their overall numbers and footprint.
- Truck speed restriction to 20km/hour in stockpile areas.
- Restriction of outdoor stockpile height to a maximum of 8m outside of the quarry if available dust controls are limited.
- Compaction of stockpile batters to minimise wind pick up of dust.
- To keep stockpile surfaces wet in dry weather, installation of water sprays for all stockpiles except

clinker or use of a water cart with pumping facilities if adequate water sprays cannot be installed.

- Weather conditions, especially the strength and direction of wind, must be considered where any works are occurring on stockpiles. Adverse weather, in particular strong southerlies in drought conditions, can potentially cause significant impacts in the neighbouring residential area to the north of the Cement Works. When such conditions are experienced or predicted, stockpile creation and extraction activities should be stopped until the weather changes.
- Stockpile operations, due to being especially weather-sensitive, should be managed by the Production Services and Logistics in cooperation with Shift Supervisors. Work schedule should be reorganised in adverse weather to minimise stockpile disturbance. Also, increased dust mitigation measures should be employed such as more frequent automatic or manual sprinkler system operation or water truck spraying.
- Progressive removal of stockpiles from high elevation areas to more appropriate low or below normal ground level areas e.g. to shale quarry areas not required for operations.
- Construction of earth bund walls around dust-prone areas.
- Consideration of vegetation or engineered screens to be placed around stockpiles.
- Consideration of the possibility of using crusting agents for the management of dust generating stockpiles where they are to be undisturbed for more than 4 months.

Safe Work Method Statement (SWMS) must be prepared before the establishment of new stockpiles or significant handling/modification of existing stockpiles. At a minimum the SWMS should consider the following issues:

- Materials to be stockpiled;
- Location;
- Anticipated volume;
- Dust generating potential;
- Duration that the material is to be stockpiled; and
- Environmental risks, impacts and controls.

Standard operating procedures for stockpile management should also be developed and implemented to minimise the potential to generate fugitive dust.

The HSE Advisor shall be made aware prior to the commencing of any new activities or modifications to existing activities at the stockpiles which may result in generation of excessive dust or any other environmental impacts.

### 1.1.8 No.6 Kiln Stack Emissions

No. 6 Kiln at Berrima is equipped with an Electrostatic Precipitator (ESP) and a bag filter for dust arrest. The ESP trips may cause a spike of a short duration but are closely watched and controlled to avoid excessive emissions. Currently, the particulate limit is 95 mg/m3 measured as a 24-hr average by a continuous meter.

### 1.1.9 Kiln Operational Controls

Maintenance of optimal operational conditions for No.6 Kiln will ensure that the likelihood of dust emissions is minimised.

In the event when these conditions vary substantially from optimal or when dust arrestor system is

compromised, the kiln shall be stopped and restarted only when these conditions have been addressed.

## 8.2 Medium Priority

### 1.1.10 Sealed Internal Haul Roads

Boral Cement Berrima has an existing sealed internal road network for movement of materials and personnel. Sealed roads, if not maintained properly, can contribute significantly to fugitive dust. The following measures will be undertaken to minimise fugitive dust from sealed roads:

- Roads to be maintained in good working order with no large potholes.
- A street sweeper to be regularly used.
- Effective and disciplined covering of loads.
- Truck speed when carrying a covered load on sealed roads inside the plant to be limited to 50km/hr.
- Truck speed when carrying an uncovered load inside the plant, if unavoidable, to be limited to 20km/hr.
- Trucks carrying uncovered loads on internal roads, if cannot be avoided, to be loaded below 300mm of the freeboard.
- All trucks with a load must be covered on leaving the site.
- Immediate cleaning of any material spilled onto a road to prevent it being pulverised into potentially fugitive dust. Truck drivers have a responsibility to immediately report spills to the Control Room.
- Material from the interface between sealed and unsealed roads should be removed to limit the tracking of material and dust generation.
- Wheel wash facilities are provided for use by trucks entering key intersections from unsealed to sealed roads.

### 1.1.11 Unsealed Surface Areas

Exposed or unsealed areas have a potential to generate fugitive dust. The following measures will be undertaken to minimise fugitive dust from unsealed exposed areas:

- Minimising vehicle access through the use of bollards or road blocks (see Photo 3).
- Progressive re-vegetation (see Section 9),
- Progressive sealing, and
- Use of dust suppressants where temporary access is required.


Photo 3: Rock blocks in place to restrict vehicle movements to the stockpile area.

### 1.1.12 Truck Loading from Clinker Silo

Boral Cement has a clinker storage silo designed for the loading of clinker onto trains (see Photo 4) with little or no generation of fugitive dust. This facility is also used for the loading of clinker onto road trucks – with the installation of a telescopic chute in 2012 the dust emissions from truck loading operations have been significantly reduced.

The present rail loading system from the clinker silo comprises three chutes configured to fit and seal over the three openings of a normal rail wagon. The chutes are connected to a single counterbalance system which makes them raise and lower together. With rail wagons, the two outer chutes are used for loading and the central chute is used for extracting the displaced air & fugitive dust to a dust collector where the dust is recovered and fed back to the wagon via one of the loading chutes.

The proprietary telescopic central loading chute assembly from a US company is designed to fill at a very high rate and is equipped with an integral dust collection system. The chute commences filling the truck close to its floor with detection devices automatically raising the chute while maintaining a minimal gap between the loaded materials and the enclosing chute skirts. The integral dust filter returns the collected dust to the truck.

The loading operations have to be closely watched in case process upsets result in elevated fugitive dust emissions.

Photo 4: Silo for the loading of clinker into trains and trucks

## 8.3 Low Priority

Areas/activities rated Low Risk will be treated with low priority in the implementation of this Plan as they are currently not considered to be major contributors to the dust issue on site. However, as most of the measures described below refer to good housekeeping and good manufacturing practice, the following activities will be implemented to minimise any future increases in dust originating from these areas.

### 1.1.13 Operational Buildings

Operational buildings generally contain plant and machinery or are used for storage. The following activities will help to contain and minimise dust inside the buildings:

- Building doors/gates are to be kept closed/sealed to contain dust and noise, as well as improve safety and visual amenity.
- Dust collectors to be regularly maintained to provide effective de-dusting. They should be periodically inspected and their maintenance planned in accordance with those inspections. Records to be kept of the inspections and of any remedial work carried out;
- Any excessive dust accumulated indoors to be regularly cleaned/removed;
- Dust spills and dust accumulated outside of buildings to be promptly removed;
- Clinker, being a material with high dust-generation potential during handling, should be stockpiled indoors as far as possible. This also prevents product losses due to inadvertent contact with moisture.

### 1.1.14 Routine Plant Operations

All plant operations including those of **Kiln, Cooler, Cement Mills, Raw Mills, Crushing, Cement**

**Storage, Dispatch** and other operations mentioned previously are to be conducted in a manner that minimises fugitive dust emissions. Standard Operating Procedures (SOPs) and Safe Work Method Statements (SWMS) should specifically address environmental issues, in particular fugitive dust minimisation. Specific actions, procedures and processes are to be incorporated to all potentially dust-generating activities.

Special attention should be given to eliminating or minimising impacts from plant operational activities such as those below which have previously resulted in high fugitive dust emissions:

- Cleaning of blocked Kiln Preheater cyclones.
- Spillages and their cleaning from buildings at high elevations.
- Material transfer points due faulty or inadequate dust collection systems, belt cleaning equipment etc.
- Operation of equipment such as elevators, silos etc., with faulty ventilating dust collectors.
- Process faults due to incorrect procedures such as those that sometimes occur with K Damper, RM7 Fresh air damper etc.
- Process buildings and storage buildings with open or faulty doors.

## 9. LANDSCAPING AND REVEGETATION PROGRAMME

A major re-vegetation programme is being undertaken on site. The planting program is to accomplish the following main functions:

- Provide wind breaks for areas where dust may be generated through daily operations such as storage, loading, unloading etc.
- Reduce dust pickup from exposed areas. Vegetation is the most effective way of control of fugitive dust from exposed areas.
- Capture and immobilise dust generated during operations.
- Increase visual amenity.
- Enhance natural habitat.

Trees, shrubs and ground cover varieties indigenous to the local area are being planted along with Hydromulching incorporating native seed mixes. The initiative is following the Pollution Reduction Program (PRP 9) that was included in the Berrima Licence in 2012. The program stipulates the following deadlines:

- April 2013: 3,500 plantings (completed)
- April 2014: 12,330 plantings (completed)
- March 2015: 9,400 plantings (in progress).

## 10. COMMUNICATION AND TRAINING

Boral Cement commenced an Environmental Awareness training programme for its employees in the financial year 2011-12. Refresher training is every 3 years to reinforce the learning from the basic course. The EA training includes, among others:

- Environmental legislative requirements applicable to Berrima Works;
- Responsibilities of each level of employees in ensuring environmental compliance and improvement;
- Typical environmental breaches / non compliances, how they can be minimised or reduced and reporting protocols;
- Video and photographic recordings of environmental incidents including fugitive dust emissions and their rectification (before and after) to generate performance improvement and encouragement;
- Training of Berrima personnel, especially truck drivers and road maintenance staff, in terms of compliance with this Management Plan.

Boral Cement also communicates its environmental performance as required to Regulators, Senior Management, employees and local community in appropriate formats such as reports, newsletters etc.