
Air Quality And Greenhouse Gas Management Plan

BADGERYS CREEK QUARRY AND BRICK MAKING FACILITY

September 2013

Contents

1. Introduction	3
2. Environmental Context	4
3. Regulatory Framework	8
4. Training and Resource Requirements	11
5. Management of Air Quality and Greenhouse Gas Emissions	12
6. Monitoring	18
7. Reporting and Record Keeping	21
8. AQGHGMP Forms and Procedures	22

1. Introduction

1.1. Purpose

This Air Quality and Green House Gas Management Plan (AQGHGMP) has been prepared to:

- describe the measures to ensure the relevant conditions of approval for the Badgerys Creek Quarry and Brick Making Facility are complied with;
- describe the measures to ensure commitments in the Environmental Assessment in relation to air quality are implemented;
- describe the air quality monitoring program to evaluate the performance of the Badgerys Creek operations;
- outline community engagement procedures in relation to air quality issues;
- describe the protocol to determine exceedence with relevant conditions of the project approval; and
- outline reasonable and feasible measures to maintain greenhouse gas emissions at 2007 levels, including offsetting any increases through efficiency measures.

1.2. Scope and Application

This AQGHGMP is applicable to the quarrying, rehabilitation, brickmaking, and product storage and dispatch of Boral in its Badgerys Creek operations. It will also apply to the construction of the noise attenuation bund along the eastern and northern boundaries of the active quarry and plant areas.

1.3. Interface with Environmental Strategy

In operational terms, the AQGHGMP aims to minimise the greenhouse gas emissions and air quality impacts of the quarrying and brick making activities at Boral's Badgerys Creek facility. In this way, the AQGHGMP supports the Environmental Strategy of Badgerys Creek Quarry and Brick Making Facility by helping minimise harm to the environment.

1.4. Definitions and Abbreviations

Ambient air quality	The surrounding air quality at a particular place and time made up of all sources in the environment near and far.
Deposited Dust	Dust particles that accumulate on a surface.
Emissions	A discharge of a substance such as plant or vehicle exhaust into the environment.
PM ₁₀	Particles in the atmosphere of 10µm (0.01mm) aerodynamic diameter or less.
PM _{2.5}	Particles in the atmosphere of 2.5µm (0.0025m) aerodynamic diameter or less.
Total Suspended Particulates (TSP)	Typically refers to particles 50µm (0.05mm diameter) in size or less

2. Environmental Context

2.1. Environmental Context

Boral is operating an existing quarry in Badgerys Creek, extracting clay resources for the manufacture of bricks for the construction industry. These quarrying and brick making activities have been undertaken on site for the past 30 years. Boral has received development approval to continue operations on the site, including extracting from existing and future new pits and operating the existing brick making facility to a higher capacity. The conditions of the approval require Boral to construct a noise attenuation bund along the eastern and northern sections of the facility prior to extracting material from the new pits. The noise berm would be built in three stages corresponding to the overburden removal stages for Pits 3 and 4.

Quarrying is carried out in campaigns of two- to three-month periods per year with extracted clay stored in stockpiles for brick making operations which run the entire year. Finished products are stored within the site for dispatch by trucks. The site also receives other raw materials required for brick making.

Badgerys Creek uses the following energy sources for its various activities:

- diesel for earthmoving equipment, mobile plant and delivery trucks;
- electricity for process equipment, including crushers, grinders, rollers, and extruders, and plant and office lighting and ventilation; and
- natural gas for the firing kiln, with excess heat directed to the drying.

In 2012 Boral reviewed its brick production capacity due to current uncertain economic conditions and downturn in residential housing activity. Boral determined that the reduced demand could be supplied by its Bringelly Brickworks and therefore decided to temporarily shut down production at its Badgerys Creek facility. Quarrying and brick production will be suspended during the shutdown period but ongoing facility and equipment maintenance will be carried out. Operation of the retail display facility and the occasional dispatch of bricks from the remaining inventory on-site will continue.

Boral has sought a Section 75W modification to the conditions of approval for the expansion of the Badgerys Creek operations so that relevant environmental management measures can be modified or deferred during the shutdown period.

2.2. Aspects and Impacts

The Badgerys Creek Quarry and Brickmaking facilities involve activities which result in greenhouse gas emissions and potential air quality impacts as shown in Table 1 below.

Table 1 Air Quality Aspects and Impacts from Badgerys Creek operations

Activity	Air Quality Aspect	Potential Environmental Impacts
Quarrying	Dust from quarrying operations, including removal of overburden and loading and unloading of materials	<ul style="list-style-type: none"> • Health and amenity impacts on neighbouring residential dwellings • Soiling of property
	Dust from handling and wind erosion of material stockpiles and exposed areas of the site	
	Wheel generated dust from access roads and haul roads	
	Exhaust emissions from earth moving equipment	<ul style="list-style-type: none"> • Increased greenhouse gas emissions • Reduction in air quality
Brick making (includes clay preparation, extrusion, drying, and packaging)	Dust from spilt materials from materials handling equipment (loaders, conveyors, etc)	<ul style="list-style-type: none"> • Health and amenity impacts on neighbouring residential dwellings • Soiling of property
	Fugitive dust from crushing and grinding equipment	
	Fugitive dust from handling or spillage of additives	
	Fugitive dust from bag house on the crushing plant	<ul style="list-style-type: none"> • Considered to be insignificant
	Hydrogen fluoride emissions from hydrated micas in clay released during brick firing	<ul style="list-style-type: none"> • Health impacts • Damage to certain vegetation
	Sulphur dioxide emissions, from sulphides in clay oxidised during brick firing, may be further oxidised in the atmosphere to form sulphuric acid	<ul style="list-style-type: none"> • Health impacts • Corrosion • Harm to flora and fauna exposed to sulphuric acid
Emission of nitrogen oxides from high temperature combustion during brick firing	<ul style="list-style-type: none"> • Air pollution 	

Activity	Air Quality Aspect	Potential Environmental Impacts
	Coarse particulate and sulphur oxides emissions from combustion of coal wash fines added to the clay raw material	<ul style="list-style-type: none"> • Health impacts • Corrosion • Harm to flora and fauna exposed to sulphuric acid
	Greenhouse gas emissions from brick kiln	<ul style="list-style-type: none"> • Particulate and gaseous pollutants
	Gas leaks from natural gas line	<ul style="list-style-type: none"> • Safety hazard
	Electricity usage (process equipment, lighting and ventilation)	<ul style="list-style-type: none"> • Increased greenhouse gas emissions
	Dust from waste stockpiles	<ul style="list-style-type: none"> • Health and amenity impacts on neighbouring residential dwellings • Soiling of property
Dispatch	Emissions from mobile plant and delivery trucks	<ul style="list-style-type: none"> • Increased greenhouse gas emissions • Reduction in air quality
	Dust from spilt and broken products	<ul style="list-style-type: none"> • Health and amenity impacts on neighbouring residential dwellings
Plant and Office	Electricity usage (lighting and ventilation)	<ul style="list-style-type: none"> • Increased greenhouse gas emissions
Sewage Treatment	Odour	<ul style="list-style-type: none"> • Amenity impacts on neighbouring residents
Construction of Noise Attenuation Bund	Dust from earthmoving	<ul style="list-style-type: none"> • Health and amenity impacts on neighbouring residential dwellings • Soiling of property
	Dust from internal haul roads	
	Exhaust emissions from construction plant	<ul style="list-style-type: none"> • Increased greenhouse gas emissions • Reduction in air quality
Shutdown Period	Occasional vehicle movements and storage yard activities	<ul style="list-style-type: none"> • Reduction in air quality • Increased greenhouse gas emissions.
	Minor maintenance activities	

2.3. Risk Assessment

Boral maintains an Environmental Risk Register for the Badgerys Creek Quarry operation. This register ranks the following potential air quality impacts (including greenhouse gas emissions) as low to medium risks:

- Dust from quarrying, internal haulage and stockpiles
- Dust from materials handling and process equipment
- Exhaust emissions from mobile plant
- Emissions from the kiln and dryer stacks
- Greenhouse gas emissions associated with:
 - operation of mobile plant
 - firing of the brick kiln using natural gas
 - operation of standby generator
 - use of electricity for process equipment and plant lighting and ventilation
- Odours from sewage treatment

The Air Quality Impact Assessment for the project also identified dust, particularly PM10 to be the primary pollutant of concern, with the highest dust concentrations predicted to occur to the north of the site.

The above risks will be mitigated by the management measures outlined in this AQGHGMP.

3. Regulatory Framework

3.1. Relevant Legislation

- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Protection of the Environment (General) Regulation 2005* (POEO General Regulation)
- *Protection of the Environment (Clean Air) Regulation 2010* (POEO Clean Air Regulation)
- *(Commonwealth) National Greenhouse and Energy Reporting Act 2007* (NGER Act)

3.2. Standards and Guidelines

- Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (OEH, 2005)
- National Greenhouse and Energy Reporting Guidelines
- AS 2922:1987 – Ambient Air – Guide for the Siting of Sample Units
- AS/NZS 3580.1.1:2007 – Methods for sampling and analysis of ambient air – Guide to siting monitoring equipment
- National Environmental Protection Measure for Ambient Air Quality

3.3. Approval Requirements

- Project Approval (under Sec 75J of the EP&A Act 1979), with the following relevant air quality criteria:

Table 2 Long-term criteria for particulate matter

Pollutants	Averaging Period	Criterion
Total Suspended particulate (TSP) matter	Annual	90µg/m ³
Particulate matter < 10µm (PM ₁₀)	Annual	30µg/m ³

Table 3 Short-term criteria for particulate matter

Pollutants	Averaging Period	Criterion
Particulate matter < 10µm (PM ₁₀)	24-hour	50µg/m ³

Table 4 Long-term criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Criterion
Deposited dust	Annual	2g/m ² /month	4g/m ² /month

3.4. Permits and Licences

- Environmental Protection Licence No. 684 (existing EPL is subject to variation following recent project approval), with the following air quality requirements

- Load Limits

Assessable Pollutant	Load limit (kg)
Coarse Particulates (Air)	8,400
Fine Particulates (Air)	33,300
Fluoride (Air)	11,700
Nitrogen Oxides (Air)	90,300
Nitrogen Oxides – Summer (Air)	
Sulphur Oxides (Air)	186,500

- Concentration Limits (measured at the Kiln Exhaust Stack)

Pollutant	Unit of Measure	100 percentile concentration limit
Nitrogen Oxides	milligrams per cubic metre	2,000
Total Solid Particles	milligrams per cubic metre	100
Hydrogen fluoride	milligrams per cubic metre	50

- Monitoring of concentration of pollutants (Kiln Exhaust Stack and Dryer Exhaust Stack)

Pollutant	Unit of measure	Frequency	Sampling Method
Chlorine	milligrams per cubic metre	Every 6 months	TM-7
Dry gas density	kilograms per cubic metre	Every 6 months	TM-23
Hydrogen fluoride	milligrams per cubic metre	Every 6 months	TM-9
Moisture content	per cent	Every 6 months	TM-22
Molecular weight of stack gases	grams per gram mole	Every 6 months	TM-23

Pollutant	Unit of measure	Frequency	Sampling Method
Nitrogen oxides	milligrams per cubic metre	Every 6 months	TM-11
Odour	odour units	Every 6 months	OM-9
Temperature	degrees Celsius	Every 6 months	TM-2
Total Solid Particles	milligrams per cubic metre	Every 6 months	TM-15
Type 1 substance	milligrams per cubic metre	Every 6 months	TM-12
Type 2 substance	milligrams per cubic metre	Every 6 months	TM-13
Velocity	metres per second	Every 6 months	TM-2
Volatile organic compounds	milligrams per cubic metre	Every 6 months	TM-34
Volumetric flowrate	cubic metres per second	Every 6 months	TM-2

4. Training and Resource Requirements

4.1. Training

The induction for all site personnel and contractors working on site will cover air quality and greenhouse gas management procedures, in particular the control of dust and emissions.

The following specialised training will be required for the stated plant personnel as part of the effective implementation of the AQGHGMP:

- operation, maintenance and field calibration of real time dust monitoring equipment – HSE Officer;
- operation and maintenance of the on-site meteorological station – HSE Officer;
- operation and maintenance of the dust extraction system on the crushing plant – Maintenance Manager;
- any new reporting requirements under the NGERs scheme –HSE Officer.

4.2. Resource Requirements

Boral will engage technical service providers for the following:

- stack emission monitoring (currently EML Air Pty Ltd)
- deployment of dust deposition gauges
- collection and disposal of sewage effluent
- external analytical laboratories for the gravimetric analysis of dust deposition samples and portable sample gravimetric reference sample (analysed to determine a new calibration factor based on the actual particulate being sampled).

5. Management of Air Quality and Greenhouse Gas Emissions

5.1. Shutdown Period Management Measures

In April 2012, the proponent, Boral Clay and Concrete (NSW) announced the temporary shutdown of the quarry and brick making facility with effect from 30 March 2012. As at April 2013, the facility remained shut down. Boral will review its operations at a future stage, considering market conditions and business needs to determine when operations will recommence. During the shutdown period, activities at the facility will be limited. Hence, the opportunity for interactions with the environment during this period is limited. As there is no quarrying or other plant activity on site during the shutdown, potential dust sources are insignificant. Similarly, there will be negligible pollutant emissions. Minor fugitive dust emissions may occur from stabilised stockpiles; however these would be less than background levels.

Notwithstanding, during the shutdown period the Health Safety and Environment Manager will inspect potential dust sources and arrange for rehabilitation where any significant fugitive emissions are detected. Rehabilitation may include stabilisation or mechanical sweeping to remove residual particulates.

During the shutdown period, the HSE Manager will be based at Badgerys Creek and will maintain a weekly environmental inspection regime including:

- Property boundary integrity, internal dam levels and neighbouring creeks;
- Raw material quarry pits and access roads;
- Internal access roads (paved and unsealed);
- Water tanks - water recycling (empty) and fire fighting supply tanks;
- Waste material areas and sewage treatment plant;
- Oil store, diesel tank and chemical store;
- Internal drainage from hardstands and access roads; and
- Factory buildings (internal and external).

The HSE Manager will also maintain regular contact with neighbouring residents to resolve any issues.

5.2. General

Item	Action	Responsible Staff	When
Quarrying			
1	Control dust from loading of quarry material to haul trucks by minimising bucket drop heights.	Mining contractors	During loading operations
2	Control dust from material haulage by limiting speed on haul roads at 15 kph	Mining contractors	During hauling operations

Item	Action	Responsible Staff	When
3	Control dust from material haulage by water spraying haul roads at a rate equal to or greater than 2L/m ² /hr	Mining contractors	During loading operations
4	Control dust from trucks unloading raw or unusable quarry material by water spraying as required	Operations staff	During unloading operations
5	Control dust from active stockpiles by spraying with water and chemical additives (dust suppressants)	Operations staff	At all times
6	Stabilise long-term stockpiles and disturbed soil surfaces by revegetation	Operations staff	At all times
7	Operate and maintain vehicles and mobile plant to keep emissions at reasonable levels.	Mining contractors, Operations staff	At all times
8	Shut down engines when plant are idle over prolonged periods.	Mining contractors, Operations staff	At all times
9	Regularly consult with neighbouring agricultural producers and residents to assess the effectiveness of dust mitigation measures.	HSE Officer	Once a week during quarrying campaigns; at least once a month at other times

Brick Making

10	Install and maintain a dust extraction system on the crushing plant, with the captured dust to be returned to the process.	Maintenance Manager	
11	Maintain and repair dust control equipment as required.	Maintenance Manager	As required
12	Regularly collect and dispose all spillage and breakage within the process plant to minimise the risk of dispersing the fine portions of this material.	Plant staff	
13	Control the amount of coal fines mixed with raw clay for brick making to avoid generating excess sulphur oxides and coarse particulates.	Plant Manager	

Dispatch

14	Regularly collect and dispose all spillage and breakage to minimise the risk of dispersing the fine portions of this material.	Operations staff	At all times
----	--	------------------	--------------

Sewage Treatment

15	Monitor sewage treatment and collection operations for any offensive odour.	Maintenance Manager	At all times
----	---	---------------------	--------------

5.3. Reactive Dust Management Program

During quarrying campaigns, a Reactive Dust Management Program will be implemented as follows:

Item	Action	Responsible Staff	When
1	<p>Ensure on-site meteorological station is operating and generating data on:</p> <ul style="list-style-type: none"> • Wind speed • Wind direction • Temperature • Rainfall 	HSE Officer	At all times
2	<p>Deploy real time dust monitors on the site boundary between the dust emitting activities and the most affected receptors.</p> <p>Equipment: Portable ambient particulate sampler, easily set up and providing simultaneous measurements of TSP, PM10 and PM2.5 size fractions, and provide a data report (for example, TSI 8533 Real-Time Dust Trak Portable Dust Monitors).</p> <p>Monitoring locations: Specific monitoring locations will be chosen based on the ongoing site activities and the prevailing weather condition. Following from the results of modelling, the focus of monitoring will be the northern and north-eastern boundaries of the site between the dust emitting activities and the receptors.</p>	HSE Officer	During extraction and haulage operations
3	Monitor real time measurements of TSP, PM10 and PM2.5 against the warning and critical levels.	HSE Officer	During extraction and haulage operations
4	Using data from the on-site meteorological station, assess whether site activities are likely to contribute to offsite impacts.	HSE Officer	When warning levels are approached

Item	Action	Responsible Staff	When
5	Alert operators when the following PM10 levels are exceeded: Warning: 80µg/m3 (15-min averaging period) Critical: 100µg/m3 (15-min averaging period)	HSE Officer	When warning levels are exceeded
6	If the site is likely to be contributing to elevated dust levels and potentially affecting receptors, undertake any or all of the following to minimise the site's dust emissions: <ul style="list-style-type: none"> At Warning level, review quarry operations and implement additional mitigation measures such as: <ul style="list-style-type: none"> controlling dust from stockpiles by water sprays or tamping (compaction) loose material; increasing the frequency of water spraying of haul roads; At Critical levels, suspend quarry operations while continuing the implementation of measures at the Warning level At return below Warning, resume normal operations. 	Mining contractors, Plant Manager, HSE Officer	When warning levels are exceeded
7	Regularly consult with neighbouring agricultural producers and residents to assess the effectiveness of dust mitigation measures.	HSE Officer	Once a week during quarrying campaigns

5.4. Efficiency Measures to Offset Increased GHG Emissions

Item	Action	Responsible Staff	When
General			
1	Implement Boral's energy efficiency strategy coupled with a focus on LEAN manufacturing.	Plant Manager	At all times
2	Collect key energy data to enable energy KPI reporting.	HSE Officer	At all times
3	Centralise automated energy data capture system, to provide more robust data in accordance with the NGER System.	HSE Officer	At all times
4	Complete Energy Efficiency Opportunities reporting.	HSE Officer	At all times
5	Apply Boral's Sustainability Diagnostic Tool (BSDT) for rating performance in sustainability management, environment and supply chain.	HSE Officer	At all times

Quarry Operations

6	Develop energy efficiency key performance indicators to drive efficiency.	Plant Manager, Mining contractors	Prior to opening Pit 3
7	Improve diesel monitoring on site.	Maintenance Manager, Mining contractors	At all times
8	Train drivers and operators in EcoDriver behavioural training, expected to reduce diesel use by over 5%.	Boral Corporate Environmental Manager	At all times
9	Improve logistics management to increase payload and allocation efficiency, and to reduce wait times. (Potential efficiency improvements are estimated over 5% across 50% of transport.)	Plant Manager	At all times
10	Increase throughput in crushers, subject to suitability of materials.	Plant Manager	At all times
11	Monitor air compressor settings and reduce leakage.	Maintenance Manager	At all times

Brick Making

12	Continue with ongoing kiln optimisation programs to reduce clay product energy use and GHG emissions.	Plant Manager	At all times
13	Reduce waste and improve quality and productivity as part of the site continuous improvement process (Profits Enhancing Project)	Plant Manager	At all times
14	Optimise the use of compressed air.	Plant Manager	At all times
15	Use energy efficient lighting and controls.	Plant Manager	At all times
16	Improve combustion efficiency and waste heat recovery.	Plant Manager	At all times
17	Implement proposed additions to the brick making process, i.e. dust collector, air receiver and brick dipping tanks, to reduce dust and the incidence of cracking in bricks, reducing waste overall.	Plant Manager	As programmed

Transport and Supply Chain

18	Replace heavy transport fleet with trucks that meet the latest emission regulations.	Boral Corporate	Starting 2009 to 2013
----	--	-----------------	-----------------------

19	Install and maintain fuel saving design options including roof mounted air conditioners and automatic tyre inflation systems.	Boral Corporate	At all times
----	---	-----------------	--------------

5.5. Construction of Noise Attenuation Bund

Item	Action	Responsible Staff	When
1	Control dust from loading of material to haul trucks by minimising bucket drop heights.	Construction contractors	During loading operations
2	Control dust from material haulage by limiting speed on haul roads at 15 kph	Construction contractors	During hauling operations
3	Control dust from material haulage by water spraying haul roads at a rate equal to or greater than 2L/m ² /hr	Construction contractors	During loading operations
4	Control dust from trucks unloading material by water spraying as required	Construction contractors	During unloading operations
5	Operate and maintain vehicles and mobile plant to keep emissions at reasonable levels.	Construction contractors	At all times
6	Shut down engines when plant are idle over prolonged periods.	Construction contractors	At all times
7	Regularly consult with potentially affected neighbouring agricultural producers and residents to assess the effectiveness of dust mitigation measures.	HSE Officer	At least once week

6. Monitoring

6.1. Dust Monitoring

Depositional Dust

Depositional dust will be monitored using dust deposition gauges. Under the current operations there are four (4) sampling locations, namely sampling location one to four within the site.

When Boral commences the activities associated with opening of new pits and construction of the noise attenuation bund, and which involve other or additional sections of the site, the sampling locations of depositional dust will be updated to consider the most potentially affected sensitive receptors. The selection of new dust deposition gauge locations will be in accordance with AS 2922:1987 *Ambient Air – Guide for Siting Sample Units*. The standard provides that the dust gauge be placed in a clear area (with a clear sky angle of 120 degrees) and away from trees, buildings and other possible obstructions.

Samples will be collected every 30 days ± 2 days, with gauges changed as much as possible at the start of each month. Records of sampling dates and times will be maintained, with comments noting any relevant observations included on sampling forms.

Samples will be taken to Boral's laboratories for analysis as soon as possible after collection. Analysis will include insoluble solids and ash content. As organic matter included in the sample will mainly be combusted, the sample's ash content will provide an indication of soil dust that may be attributable to the quarry.

Particulate Monitoring

Particulate monitoring will be carried out using a portable particulate sampler which can be easily set up and simultaneously measure size-segregated mass fraction concentrations corresponding to TSP, PM₁₀ and PM_{2.5} size fractions.

The sampler will be deployed with the required environmental enclosure at the northern site boundary sufficiently away from dust-generating activity or any direct obstacle from sources under consideration. The sampler will be set up to allow programming and data acquisition from a PC via wireless communications.

Regular monitoring outside the quarrying campaign period will consist of TSP, PM₁₀ and PM_{2.5} measurements for 24 hours every six days on days determined by the OEH. This allows for all results throughout the State to be compared. OEH will be consulted with the proposed sampling frequencies and whether they prefer using a high volume sampler for monitoring TSP.

During quarrying campaigns, real-time readings obtained from the sampler will be assessed against the Warning and Critical levels of the Reactive Dust Monitoring Program.

The HSE Officer will:

- set up the sampler, including the environmental enclosure and protective fencing as required;
- outside of the quarrying campaign period, download and analyse monitoring data on a weekly basis;
- during the quarrying campaign period, download real-time monitoring data and assess against the Warning and Critical levels of the Reactive Dust Monitoring Program; and
- perform or otherwise submit the instrument to the relevant service provider for maintenance and calibration in accordance with the manufacturer's specifications.

During the early stages of development and quarrying campaign at Pit 3, a high-volume sampler will be deployed to sample TSP and PM₁₀ on the same dates as the portable sampler. The results from the high-volume sampler will be used to calibrate the readings from the portable sampler. The high volume sampler will be operated until the end of the first quarry campaign for Pit 3.

Target Levels and Appropriate Actions

The relevant air quality criteria for deposited dust, TSP and PM₁₀ are shown in Section III-C of this AQGHGMP. Where a warning or critical level in the Reactive Dust Management Program is exceeded (refer to Section V-B), monitoring data will be downloaded for analysis within 60 minutes of the alarm.

Servicing and Calibration

Servicing and calibration of air quality monitoring equipment will be the responsibility of the HSE Officer, with the required actions as follows:

- dust deposition gauges will be repaired and replaced as required; and
- the portable dust monitor will be subject to annual factory calibration and cleaning.

6.2. Stack Emissions

Boral will engage a specialist air quality service provided to monitor and report on the emissions from the kiln stack and dryer stack. Stack monitoring will be carried out in accordance with the sampling methods and frequencies specified in the current Environmental Protection Licence.

6.3. Greenhouse Gas Emissions

The existing system for monitoring and recording usage of energy, fuel and combustible inputs into the brick making process (for example, coal fines, charcoal, sawdust), used for calculating and reporting greenhouse gas emissions using the appropriate emission factors, will continue to be implemented and improved.

Energy reduction opportunities are managed through the *Energy Efficiency Opportunities Act 2006* (EEO Act). Boral undertook a site assessment in accordance with the EEO Act in 2010. The 2012 greenhouse gas emission levels will be maintained as per the outcomes of the EEO assessment.

6.4. Suspension of air quality monitoring during the Shutdown period

Due to the significantly reduced level of activities limited to facility maintenance, operation of the retail display and occasional dispatch of bricks from the inventory remaining on-site during the shutdown period, it is considered that air quality levels are highly unlikely to exceed criteria. Therefore, compliance monitoring for noise would not be carried out during the shutdown period.

7. Reporting and Record Keeping

7.1. Monitoring Records

Results of air quality monitoring will be recorded and retained. Monitoring records will be kept by the HSE Officer.

Records for monitoring required to be conducted under the EPL, and copies of Annual Returns (see below) will be kept for at least four (4) years.

7.2. Environmental Reporting

A summary of the air quality monitoring results will be reported by the HSE Officer to the Plant Manager on a monthly basis.

7.3. EPL Annual Returns

The HSE Officer will prepare the Annual Return in the approved form for submission to the EPA not later than 60 days after the end of each reporting period.

The Statement of Compliance in the Annual Return will be signed by the Plant Manager.

7.4. NGER Reporting

The HSE Officer will complete the NGERS reporting spreadsheet (*to be completed post recommencement of operations*) which calculates the greenhouse gas emissions from the Badgerys Creek operations.

The Boral Corporate Environmental Manager will advise any changes to the manner of calculating emissions which may arise out of new guidelines, including adoption of modified emission factors.

7.5. Corrective Action

Any exceedence of air quality criteria will be investigated by the HSE Officer to determine the cause/s. Actions will be determined to reduce relevant emission levels to the criteria.

Information on all complaints and exceedances of relevant criteria will be provided to the OEHL through the EPL annual return.

8. AQGHGMP Forms and Procedures

8.1. Forms

- Dust Deposition Sampling Form (*to be developed in time for recommencement of operations*)
- TSP Sampling Form (*to be developed in time for recommencement of operations*)
- Sample GHG Emission Calculation Sheet

8.2. Standard Procedures

- Operation, Maintenance and field Calibration of Portable Particulate Sampler (*to be provided by manufacturer or equipment lessor*)
- Collection of Samples from High-Volume Air Samplers (*to be provided by manufacturer or equipment lessor*)
- Collection of Samples from Dust Deposition Gauges (*to be provided by manufacturer or equipment lessor*)