WILPINJONG COAL
BLAST FUME MANAGEMENT STRATEGY

August 2020

Document Owner		Document Approver
Drill and Blast Engineer		Environment and Community Manager
Version	**Approval Date**	**Approver Name**
4	August 2020	Kieren Bennetts

General Description of Changes from Previous Version

Version	Date	Prepared/Reviewed By	Description of Change
1	15 May 2014	Amanda French, Clark Potter, Palaris	New strategy to meet DP&E requirements (refer Attachment 1)
2	October 16	WCPL	MOD 7
3	June 2017	WCPL	WEP
4	August 2020	WCPL	To align with progression of operations, revise fume management measures and update location of sensitive receptors

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1 Introduction

Wilpinjong Coal Pty Ltd (WCPL) has prepared this Blast Fume Management Strategy (BFMS) in accordance with correspondence received from the NSW Department of Planning, Industry and Environment (DPIE) (formally known as the NSW Department of Planning and Environment), requiring the development of a BFMS (**Appendix 1**).

The purpose of the BFMS is to document fume minimisation measures utilised at Wilpinjong Coal Mine (the Mine) for all surface blasting activities.

Many factors have been identified as contributing to post blast fume. A combination of these factors or any single factor may contribute to the production of post-blast fumes. Key factors that have been identified as contributing to post blast fume include:

- Geology;
- Meteorological conditions;
- Blast design;
- Product selection and quality;
- Blast crew education; and
- On bench practices.

Management strategies for each of these factors are provided in **Section 2.0**.

WCPL carry out three very different blasting regimes:

- Standard overburden blasts, ranging from 10 to 30 metres (m) deep;
- Pre-split blasts, ranging from 10 to 40 m deep; and
- Shallow parting blasts, ranging from 2 to 10 m deep.

If blast fume is present it will most likely be seen in an overburden or pre-split blast and rarely in the parting shots due to the small amount of explosives used. In general blast fume is not a common occurrence at the Mine.

2 Mitigation Measures

To ensure WCPL reduce the potential for fume generation, the mitigation measures in **Table 1** will be implemented.

WCPL is trialling the following as part of its blasting process to prevent blast fume events, including:

- Installation of Blastshield - a lining for blast holes that provides a barrier to stop the ingress of water and potential product degradation. Blastshield will also contain blasting product within the blast hole as intended if the surrounding material is compromised; and
- A trailer mounted blast hole dewatering pump has been sourced, to pump water from blast holes, allowing for the installation of the Blastshield.

Table 1: Blast Fume Management Measures

Key Factor	Potential Issue	Mitigation Measure
Geology	Blasting in weak/soft strata *(<20m of surface)*	• Free dig where possible (drilled holes often fail) and the high moisture content in the clay band results in significant degrade of the Ammonium Nitrate (AN) structure • Free face where possible • Reduce powder factor • Modify timing where applicable (Boxcuts)
	High moisture content in Clay holes	• Load with suitable wet hole product eg. 70% emulsion product where blast supervisor /shot firer deems a high water content
	Time between drilling & loading	• No correlation noted for holes loaded with varying delays after drilling
	Wet holes	• Gas bag of hole to prevent product contact with wet base • Use blast products suitable for wet conditions
	Mud/sediment in base of holes	• Gas bag of hole to prevent product contact with wet base
Meteorological Conditions[1]	Rain events	• Loaded shots that may be affected by rain will be assessed by the Drill and Blast (D&B) Engineer and in consultation with the Blast Supervisor.
	Strong winds	• Blast will only occur when in compliance with the Wilpinjong Blast Controller Checklist (**Appendix 2**).
Blast Design	Explosives desensitisation	• Depth can contribute to desensitisation and decked loading style applied, however the depth of drilled holes on the site does not exceed 40 m and is therefore not considered a contributor to fume.
	Blast layout	• Increased precision through GPS guided equipment.
	Priming	• Holes deeper than 15 meters are double primed to ensure full reaction of the column of bulk explosives.
	Blast delays	• Keep sleep times of loaded shots within timeframes recommended by Explosive Manufacturer. • Fume risk when blasting outside of these parameters will be assessed by the D&B Engineer in consultation with the Blast Supervisor.
Product Selection & Quality	Explosive product selected	• Selections based on Explosive Manufacturer's recommendations
	Compliance to manufactures specifications	• The site D&B Engineer in consultation with the Explosives Manufacturers' representative will continue to monitor and progress product application and management against manufacturers' specifications. This process will result in a defined site specific blast product application.
	Explosives Quality	• Confirmed by the blasting contractors Quality Control process inclusive of the following: - Mobile Processing Unit (MPU) calibrations - Product samples collected for every MPU for each shot - Gassing rates and final density recorded on Delivery docket
	Delivery system	• MPU calibrated fortnightly at a minimum or as required.
	Product rotation	• Prill stock management plan • Pre-delivery quality assurance inspection • Visual inspection on arrival at site
	Stemming materials & techniques	• Stemming diameter 16 to 28mm (Inspected by Shotfirer) • Stemming depth determined by D&B Engineer dependant on individual blast conditions
	Loading sequence & technique	• Loading procedure is driven by product selection and manufacturers specifications. • Wet holes loaded last and very low risk water will be displaced into dry holes.
	Variation to blast plan	• Any irregularities or variations to the blast plan are to be determined by the shot

Key Factor	Potential Issue	Mitigation Measure
		firer and D&B supervisor which are communicated to the D&B Engineer.
	QA & Auditing	• Explosives Manufacturers Auditing and Inspection Schedule
Blast Crew Education	Qualifications of Blast Crew	• Peabody blast crew internal policy. • Training records maintained
	Training requirements of blast crew	• Peabody blast training system incorporates the following: - Shotfirers permit; - Unsupervised handling permit; - Training to open cut site requirements; - Product development and updates; - Product Selection; and - On Bench practices.
On Bench Practices	Bench drainage techniques	• Minimise surface water where possible • Utilise hole savers and drill cuttings, • Drains for re-directing water • Trial blast hole dewatered.
	Sleep time	• Minimise sleep times of loaded shots where possible in accordance with the Explosive Manufacturer's recommendation. • Fume risk when blasting outside of these parameters will be assessed by the D&B Engineer and D&B Supervisor.
	Shot inspections	• Drill preparation, drilled shot, loading, firing
	Collapsed holes	• Holes are checked by the shot crew and shallow blocked holes are not loaded.
	Slumping Holes	• Loaded holes are checked by shot crew, slumping is reported to the D&B Supervisor and Engineer. • If dynamic water is present or the holes are slumping the blast plan will be assessed by the D&B Engineer. In this situation it can be decided to fire the shot earlier, not load all the holes or change the product to a more water resistant material. (Ingress of water into blast holes is an abnormal circumstance for this site).

Notes:

1. Exceptions - There may be circumstances in which blast events need to be fired in less than ideal weather conditions. Failure to initiate blasts may indeed increase the potential for fume generation and or occupational health and safety risks to mine personnel. In these specific and rare circumstances, the final decision making process will be elevated to the General Manager position (or in their absence, to the delegated authority) with relevant input from D&B Engineer, Shot Firer and Blast Supervisor.

3 Pre-Blast Checklist

Immediately prior to firing, a reassessment of the risks posed by the blast will be undertaken with due consideration given to the relevant factors applying at the time e.g. rain events, wind direction and speed, inversions, operational factors on site. Following the reassessment, it may be necessary to apply additional risk control measures, or defer the blast, to ensure appropriate safety levels are achieved.

Fume considerations for firing the shot include the following:

- Blast clearance zones;
- Weather conditions – wind speed and direction;
- Early firing;
- Blast Controller Checklist;
- Blast Fume TARP & Sensitive Receivers Map (see **Section 3.1**); and
- Operational factors.

3.1 Blast Fume TARP and Sensitive Receivers

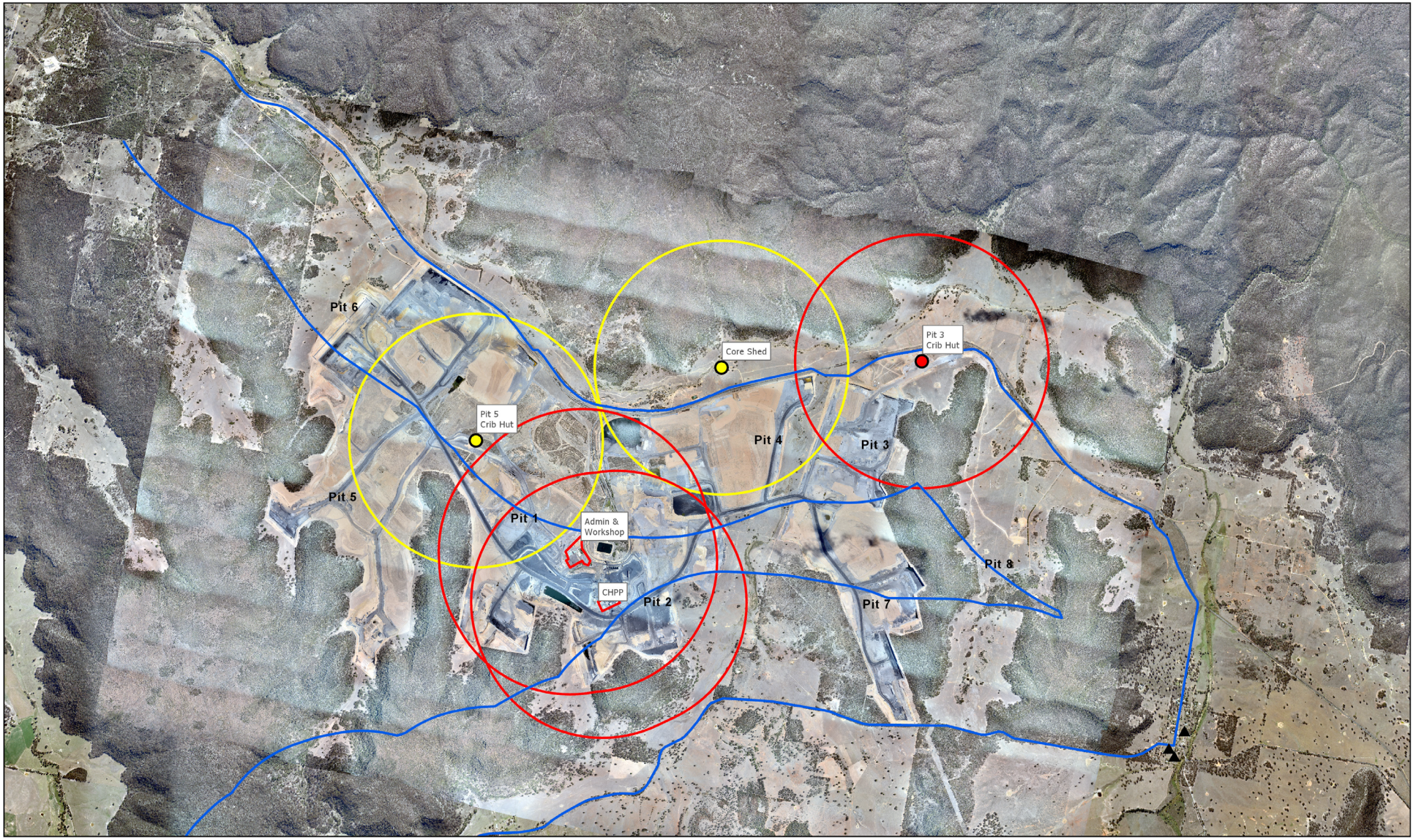
The Blast Controller Checklist includes an assessment of whether there is a risk of blast fume from the blast. A Blast Fume Trigger Action Response Plan (TARP) has been developed (**Table 2**) which documents the process to be followed, depending on the level of risk to sensitive receivers, as indicated on **Figure 1**.

Table 2 Blast Fume TARP

Normal **Triggers – Blasting not deemed as high risk for fume**	**Level 1** **Triggers – Is the wind direction heading towards this zone?** • **Potential for Fume Drift over Yellow Zones** *(Low population areas – Refer to Fume Zoning Map – Figure 1)*	**Level 2** **Triggers – Is the wind direction heading towards this zone?** • **Potential for Fume Drift over Red Zones** *(High population areas – Refer to Fume Zoning Map – Figure 1)*	**Level 3** **Triggers – Is the wind direction heading towards this zone?** • **Potential for Fume Drift over Public Road and Railway line** *(Refer to Fume Zoning Map – Figure 1)*

PRIOR TO BLAST:
 	
• Blast Controller shall assess personnel working in areas downwind from blast & determine whether removal from this area is required.
	PRIOR TO BLAST:
	
	• Blast Controller to take into consideration:
	  ○ Shot sleep time (i.e. whether it exceeds explosive manufacturers recommended timeframes, e.g. 12 days) &
	  ○ Ground water conditions at Blast Location
	• Blast exclusion zone may need to be increased to 1500m (refer to attached diagrams)
	• If people are in crib huts or Cumbo shed, in direction of oncoming wind, they shall be evacuated to another crib hut area prior to blast
	
	IMMEDIATELY AFTER BLAST:
	
	• Blast Guards to monitor blast fumes to ensure fumes do not travel towards populated areas
	
	• If blast fumes continue to travel towards personnel a radio call will be given to vacate the area or if in a vehicle put on the recycle aircon and wind windows up.
		PRIOR TO BLAST:
		
		• Blast Controller to take into consideration:
		  ○ Shot sleep time (i.e. whether it exceeds explosive manufacturers recommended timeframes, e.g. 12 days) &
		  ○ Ground water conditions at Blast Location
		• Blast exclusion zones shall be increased to no less than 1500m (refer to blast map)
		• Blast fume drift "Safe Haven" areas shall be marked on Blast Sentry Map and communicated to all personnel on site on the day of Blasting at the morning pre-start.
		• Blast Controller shall instruct all personnel within red zone to assemble within a central accessible "Safe Haven area" specified by their area supervisor (e.g. pre-start rooms)
		• During this time all Personnel shall remain on standby in preparation for potential blast fume drift over the assembly area
		• Blast controller to position themselves outside of exclusion zones in a safe area where the fume drift path will be clearly visible
		
		IMMEDIATELY AFTER BLAST:
		
		• Blast Sentry's, Shotfirer, & Blast Controller to monitor blast fumes
		• If fume is present AND continuing to drift towards red zone assembly areas, the OCE / Blast controller shall direct Area supervisors to ensure that:
		  ○ all personnel are contained within the designated buildings
		  ○ all doors are closed & all air conditioners switched off until such time as the Blast Controller gives the all clear for personnel to be released from the designated buildings
		
		NOTE: If the location of the blast means that there is potential for blast fume to drift over the public road refer to Level 3 TARP response.
			PRIOR TO BLAST:
			
			• Blast Controller to take into consideration:
			  ○ Shot sleep time (i.e. whether it exceeds explosive manufacturers recommended timeframes, e.g. 12 days) &
			  ○ Ground water conditions at Blast Location
			• Blast exclusion zones shall be increased to no less than 1500m (refer to attached diagrams)
			• At least 24hrs prior to Blast:
			  ○ ARTC shall be called and train time table received for the Wilpinjong line so blasting can be conducted during a vacancy
			  ○ Neighbouring residences shall be notified of potential for blast fume drift over the residential area
			• Blast Controller to monitor & record wind direction & speed
			• If highway / residential areas are at risk of being engulfed by blast fume Blast Controller shall make arrangements for
			  ○ Traffic Road Sentry's to block the Wollar road outside the 1500m radius from the shot and place a gas monitor outside to record air quality
			  ○ nearby residences to be placed on standby for potential blast fume drift over the residential area
			
			IMMEDIATELY AFTER BLAST:
			
			• Blast Guards, Shotfirer, & Blast controller to monitor blast fumes
			• If fume is not going to cross the Wollar road, then reopen road at earliest convenience & notify nearby residences that fumes are all clear
			• If fume is present AND continuing to drift the over the Wollar road towards the public
			  ○ Communicate to all personnel in vehicles to put on the recycle aircon and wind windows up.
			  ○ Roads remain closed until the Blast Controller gives the all clear for them to be re-opened

Figure 1: Blast Fume Sensitive Receivers



Legend

- TARP Level 3 Public Roads & 1500m Zone
- TARP Level 2 High Population Areas On Site & 1500m Zone
- TARP Level 1 - Low Population Areas On Site & 1500m Zone
- ▲ Sensitive Receivers

N W E S

0 0.47 0.95 1.9 2.85 3.8

Kilometers

Wilpinjong Coal
Blast Fume Sensitive Receivers

Spatial Reference	Review ID:	Date Exported:	Drawn:	Drawing No.
Name: GDA 1994 MGA Zone 55	1	20/02/2020 4:04 PM	JF	WILP-20022020

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Folder: W:\Environment and Community\15. GIS & mapping\ARCGIS Pro\Project Workspace\Spon Comb\Spon Comb Management\

4 Post Blast Fume Management

Post blast fume is categorised using the Australian Explosives Industry and Safety Group Inc (AESIG) Visual NOx Gases Rating Scale (AESIG, 2011) (**Figure 2**). Assessing the amount of NOx gases produced from a blast will depend on the distance the observer is from the blast and the prevailing weather conditions. The intensity of the NOx gases produced in a blast should be measured on a simple scale from 0 to 5 based on the table below. The extent of the NOx gases also needs to be assessed and this should be done on a simple scale from A to C where:

- A = Localised (i.e. NOx Gases localised across only a few blast holes)
- B = Medium (i.e. NOx Gases from up to 50% of blast holes in the shot)
- C = Extensive (i.e. Extensive generation of NOx Gases across the whole blast)

The Shotfirer's Blast Report will include details of whether a fume was present and what the fume rating was, based on the guideline in **Figure 2** Video footage of the plume and the direction travelled are recorded by the Blast Team during the blast. Details of every blast including post fume rating are also recorded in the Wilpinjong blast track spread sheet.

In the event of blast fume rated 3 or higher on the scale that leaves the site boundary, WCPL will notify the DPIE compliance office in Singleton (**ph: 65753402**) and if any blasts exceed a rating of 4 or 5. In the event of an emergency where the fume moves towards sensitive receivers the Wilpinjong Emergency Management Plan will be enacted.

Figure 2: AEISG Post-blast Fume Rating Guideline

Level	Typical Appearance
Level 0 No NOx gas	
Level 1 Slight NOx gas 1A Localised 1B Medium 1C Extensive	
Level 2 Minor yellow/orange gas 2A Localised 2B Medium 2C Extensive	
Level 3 Orange gas 3A Localised 3B Medium 3C Extensive	
Level 4 Orange/red gas 4A Localised 4B Medium 4C Extensive	
Level 5 Red/purple gas 5A Localised 5B Medium 5C Extensive	

5 References

AESIG (2011) Code of Practice Prevention and Management of Blast Generated NOx Gases in Surface Blasting, Edition 2, August 2011 Appendices

6 Appendix

6.1 Appendix 1 – DPIE Correspondence

Peabody

NSW GOVERNMENT | Planning, Industry & Environment

Mr Ian Flood
Manager – Project Development and Approvals
Peabody Australia
1434 Ulan-Wollar Road
WILPINJONG NSW 2850

Via email: iflood@peabodyenergy.com

Dear Mr Flood

Wilpinjong Coal Mine (SSD-6764)
Management Plan Review

I refer to your emails dated 27 September 2019 and 17 April 2020 submitting revised management plans for the Wilpinjong Coal Mine (SSD-6764), including the:

- Aboriginal and Cultural Heritage Management Plan (condition 47 of Schedule 3, version 6 dated September 2019);
- Air Quality Management Plan (condition 20 of Schedule 3, version 5 dated September 2019);
- Biodiversity Management Plan (condition 42 of Schedule 3, version 6 dated September 2019);
- Blast Management Plan (condition 14 of Schedule 3, version 6 dated September 2019);
- Environmental Management Strategy (condition 1 of Schedule 5, version 6 dated September 2019);
- Historical Heritage Management Plan (condition 49 of Schedule 3, version 3 dated September 2019); and
- Noise Management Plan (condition 5 of Schedule 3, version 4 dated September 2019).

The Department has reviewed the above plans and is satisfied that they meet the requirements of the relevant conditions of consent. Accordingly, the Secretary has approved these plans.

I also refer to the revised Water Management Plan which was submitted on 17 April 2020. The Department notes that substantial changes have been made to the site water balance component of this plan.

As such, the Department requests that this plan be submitted through the Major Projects portal for review by the Department and relevant agencies.

If you have any questions, please contact Jack Turner on 02 9995 5387 or Jack.Turner@planning.nsw.gov.au

Yours sincerely

19/6/20

Stephen O'Donoghue
Director
Resource Assessments
as nominee of the Secretary

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NSW GOVERNMENT Planning & Environment

Planning Services
Resource Assessments
Contact: Matthew Riley
Phone: 9274 6339
Email: matthew.riley@planning.nsw.gov.au

Mr Kieren Bennetts
Environment and Community Manager
Wilpinjong Coal
Locked Bag 2005
Mudgee NSW 2850

Dear Mr Bennetts

Wilpinjong Coal Mine (05_0021)
Management Plans

I refer to the revised management plans submitted to the Department following approval of the recent modification application for the Wilpinjong Coal Project (05_0021).

The Department has reviewed the management plans and is satisfied that the following plans are adequate:

- Noise Management Plan;
- Blast Management Plan;
- Air Quality Management Plan;
- Site Water Management Plan;
- Biodiversity Management Plan;
- Aboriginal Cultural Heritage Management Plan;
- Waste Management Plan;
- Spontaneous Combustion Management Plan; and
- Environmental Management Strategy.

Consequently, the Secretary approves the above mentioned plans.

If you wish to discuss the matter further, please contact Matthew Riley on 9274 6339.

Yours sincerely

Mike Young
Director
Resource Assessments
As nominee of the Secretary

20/3/17.

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NSW GOVERNMENT Planning & Environment

Contact: Chris Schultz
Phone: 02 4224 9478
Fax: 02 4224 9470
Email: Christopher.Schultz@planning.nsw.gov.au

Mr Kieren Bennetts
Environment and Community Manager
Wilpinjong Coal Mine
Locked Bag 2005
MUDGEE NSW 2850

Dear Mr Bennetts,

Wilpinjong Coal Mine (PA 05_0021)
Approval of Management Plans

I refer to the following Management Plans required under Project Approval 05_0021 (the approval), submitted to the Department for consideration:

- Noise Management Plan – Document No. WI-ENV-MNP-0001 dated May 2014;
- Blast Management Plan - Document No. WI-ENV-MNP-0003 dated May 2014, including the Blast Fume Management Strategy dated May 2014;
- Water Management Plan - Document No. WI-ENV-MNP-0006 dated November 2014, including the Site Water Balance, Erosion and Sediment Control Plan, Surface Water Management and Monitoring Plan, Groundwater Monitoring Program and Surface and Groundwater Response Plan; and
- Spontaneous Combustion Management Plan – Document No. WI-ENV-MNP-0010 dated May 2015.

The Department has reviewed the plans and is satisfied that they generally address the requirements set out in the relevant conditions of the approval. Accordingly the Secretary has approved the management plans.

It is requested that the issues identified in Attachment 1 are addressed either prior to the publishing of the management plans on the website or in the next revision of the document.

A copy of these management plans is to be placed on the website in accordance with Schedule 5, Condition 11 of the approval within one month of the date of this letter.

Should you wish to discuss the above matter, please contact Chris Schultz, Senior Compliance Officer, on 02 4224 9478 or Christopher.Schultz@planning.nsw.gov.au.

Yours sincerely

K O'Reilly 9/5/16

Katrina O'Reilly
Team Leader Compliance Southern Region
as nominee of the Secretary

Peabody

NSW GOVERNMENT Planning & Infrastructure

Contact: Ben Harrison
Phone: 02 6575 3402
Fax: 02 6575 3515
Email: benjamin.harrison@planning.nsw.gov.au
Our ref: MP 05_0021

Blair Jackson
General Manager
Wilpinjong Coal
Locked Bag 2005
Mudgee NSW 2850

Dear Blair

Rating and Recording of Blast Fume

In 2012, NSW Planning and Infrastructure, concerned about a number of blast fume events at coal mines in the Upper Hunter, sought the co-operation of all mines in the Upper Hunter to reduce amenity impacts by implementing measures to minimise the emission of blast fume. As part of this process the agency, in conjunction with NSW Minerals Council conducted a fume workshop to discuss the management of blast fume.

The outcome of this process in the Upper Hunter Valley included a two-stage implementation strategy:

- The requirement for mines to rate and record blast fume from all blasts; and
- The preparation of a blast fume management strategy

It is now intended to apply this process to the Gloucester and Mudgee regions.

The first stage will cover the rating, recording and reporting of blast fume events and the second stage will require the development of a fume management strategy and emergency response procedures.

The intention of this letter is to request the commencement of the first stage – rating, recording and reporting of blast fume events - **from 1 April 2014.** The methodology for this stage is described in Attachment 1.

The second stage of the proposed minimisation measures requires the submission of a Blast Fume Management Strategy for approval by **1 July 2014**. The suggested minimum requirements for the Strategy are, listed in Attachment 2.

It is intended that each mine's Blast Fume Management Strategy, once approved, would be annexed to the mine's Blast Management Plan or, in the absence of a Blast Management Plan, to an appropriate operational management plan.

I appreciate your co-operation in developing and implementing a strategy to minimise amenity impacts from blast fume.

For further information, please contact me on 6575 3402 or by email to benjamin.harrison@planning.nsw.gov.au .

Yours sincerely

24.3.14

Ben Harrison
Investigations (Lead) Northern Region

cc. Environment Protection Authority
Department of Trade and Investment, Division of Resources and Energy

Singleton Office: P.O. Box 3145, Suite 14, Level 1, 1 Civic Avenue Singleton NSW 2330
Website: www.planning.nsw.gov.au

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Attachment 1

Fume Minimisation Measures (Stage 1): Rating and recording of blast fume events

- Rate and record the fume characteristics of all shots using the rating system in Appendices 2 and 3 of the Australian Explosives Industry and Safety Group Inc Code of Practice titled "Prevention and Management of Blast Generated NOx Gases in Surface Blasting, Edition 2, August 2011" (the "AEISG Code") available at http://aeisg.org.au/index.php/cop.html. This includes all blasts even if there is no visible post blast fume. **The fume is to be rated when it is at its greatest extent.** Further information is also available from the Queensland Dept of Employment, Economic Development and Innovation at: http://mines.industry.qld.gov.au/safety-and-health/631.htm.

- Records of fume ratings are to be kept on the mine site. Planning & Infrastructure may take up the option of reviewing and discussing these results with the mine from time to time. Written records are to be kept for a minimum of 2 years.

- Video record each blast where a risk of post blast fume is identified. The forthcoming blast fume management strategy would define when such a risk is likely to occur.

- All video footage is to be stored for at least 1 year. All videos should be a minimum duration of 1 minute following the blast and should capture any post blast fume until the fume dissipates, leaves the site, or leaves the view of the camera.

- The rating and recording of post blast fume is to be kept from **1 April 2014.**

Additional suggestions:

- When video recording fume events, suggest keeping the camera in one place and use panning and the zoom function to follow the fume, if necessary.

- A camera on the mine boundary could be helpful to confirm whether the fume extends beyond the mine site.

Reporting significant fume events to Planning & Infrastructure

Notify the Planning & Infrastructure compliance office in Singleton (65753402) of any blast producing post blast fume that rates 3 at its highest extent and leaves the site (see definition below), and any blast that rates 4 or 5. It is not the intention that all shots required to be reported will require a formal incident report, as this will depend on a number of factors.

Site - includes any active mine site's project approval boundary and any closed portion of public road.

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Attachment 2

Developing a Blast Fume Management Strategy (Stage 2) to minimise fume emissions by addressing those factors known to contribute to fume generation and fume management.

The following should be considered:

Geology

- Blasting in surface to base of weathering (primarily within 20m of natural surface). The strategy will require a specific section detailing mitigation techniques specific to this strata. It is envisaged mitigation techniques may involve reduced shot size, use of increased water resistant or recommended fume minimising products, and reduced target sleep time;
- A risk matrix for the entire blast area should be established based on geology and past blasting outcomes, then used as a guide for shot size, target sleep time and product selection. The risk matrix will require frequent updating and as such may form an appendix to the Blast Fume Management Strategy;
- Areas known to contain a high incidence of faulted/fractured ground or where past blasting has resulted in fracturing/back break;
- Areas with high clay content (traditionally surface to base of weathering);
- Reducing time between drilling and loading (particularly in areas where past experience or geological knowledge indicate increased risk of hole collapse;
- Ground movement/product desensitization;
- Mud/sediment in the base of holes.

Blast Design

- Explosives desensitization
- Blast layout and delays;
- Priming.
- Consideration of the location and depth of previous underground workings

Meteorological forecasts prior to loading

- How meteorological forecasting for storms, rain events, strong winds, unfavourable wind directions and inversions affect decisions to load and inform product choice;

Product Selection, Quality and Blast Crew Education

- Choice of explosive product;
- Compliance with manufacturer's recommendations and procedure for variations to manufacturer's recommendations. Manufacturers recommendations are currently based on dry blast holes;
- Education and training on product selection and bench practices;

Operations should clearly understand where sensitive receivers (both internal and external) are located and whether they are likely to be impacted in a worst case scenario, and provide for a process of advising these receivers of a declared emergency situation (such as phone calls or SMS messages).

Information should be provided in advance to sensitive receivers to advise them of potential actions to take in a declared emergency. A procedure for regular updating of sensitive receiver contact details should also be provided.

Mine staff, including sentries should be provided with sufficient training to make decisions on when to enact a declared emergency and the actions to be taken in the event of a declared emergency.

Declared emergency procedures should be able to be enacted at short notice.

6.2 Appendix 2 – Blast Controllers Checklist

Blast Controller Checklist

Location: Pit Strip Block **Shot No:** _____ **Day/ Date:** _____

Scheduled Blast Time: _____ **Actual Blast Date/Time:** _____

Is this a road & rail closure? **Yes/No** If **yes** has PO been confirmed? **Yes/No** If yes proceed with tie up

WIND SPEED, DIRECTION and CLOUD COVER **DO NOT BLAST IF 1. Wind speed > 7m/s in pits 3, 7 or 8 OR 2. Wind speed >10m/s**

Source: http://novecom.net/sentinex/index.php

Time	Results and Comments	OK to Proceed with blast?	Action
Pre Start	_____	YES/NO	YES: Proceed tie up, NO: Reschedule blast
1 hour prior to blast	_____	YES/NO	YES/NO: Proceed blast, check conditions
5 min prior to blast	_____	YES/NO	YES: Proceed blast, NO: 30 minute window to check conditions, if no change proceed with Blast Security Guard process

Blast Security Guard: D/S _____ N/S _____ Guard tied-in shot, delineate area, communicate to OCE

CONFIRM AT LEAST 45 MIN PRIOR TO SCHEDULED BLAST TIME

1) Does this blast comply with the *'maximum 2 blasts per day'* limit?	YES / NO	
2) Does the blast comply with the *'maximum 5 blasts per week'* limit?	YES / NO	
3) Is the rail loop and train load out in the blast exclusion radius?	YES / NO	If YES: go to 4. Otherwise proceed with checklist
4) Has the train schedule been confirmed with the CHPP control room?	YES / NO	
5) Does the confirmed train schedule affect the blast time?	YES / NO	If YES: reschedule blast time, distribute notification, inform OCE

CONFIRM PRIOR TO TIE UP

	YES	NO	N/A		YES	NO	N/A
Blast Notice Boards Active				Equipment Park up Confirmed			
Peabody Office Notified				Blast Area OCE Advised			
Neighbours Notified				Local Council Notified (Road Closure)			
Subcontractors Notified				Blast Signs on Road			
Blast Holes Surveyed				Rail Possession secured if within 500m			
500m Exclusion Zone Mapped				Rail Protection officer secured			
Is there a westerly wind?				*If yes to both then must use nonel surface connection*			
Is the shot in overburden?							

BLAST MONITORING

Monitor Location	**Unit Number**	**Person Responsible**
Main Rail Culvert	_____	_____
Main Railway Line	_____	_____
Magazine	_____	_____

1 km Radius Castle Rock ,P1 or P5 South (153 &152) BMP

Is there a risk of Blast Fume ? YES NO *If Yes please see Blast Fume TARP* TARP Level _____

Sensitive Receivers Identified? YES NO

Comments: _____

Blast Fume Present YES NO Video Footage Captured YES NO

Blast Fume Rating 1 2 3 4 5

Blast Fume Rating Higher than 3 - Report Immediately to Environmental Manager

Comments: _____

MISFIRE EVENT Time:

Advised by Shotfirer:	YES	NO	If YES:	Mine Manager Advised:	☐
Delineated:	YES	NO		Mine Supt. Advised:	☐
Removed:	YES	NO		OCE Advised:	☐
Surveyed:	YES	NO			
Investigation Complete	YES	NO	Learning's Implemented: YES NO	Date Implemented:	

Signed: _____ Blast Controller _____ Drill and Blast Supervisor

Name: _____ _____

Blast Controller Checklist

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