

# MAC-ENC-PRO-055

## BLAST MONITORING PROGRAM

### Document Owner

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Donna McLaughlin, Superintendent Environment

### Document Approver

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Rob Hayes, Environment Manager

### Revision History

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Version No.	Date Published	Details
1.0		Final Draft submitted for approval
1.1	March 2012	Incorporating consultation with DP&I
FINAL	14/11/2012	Approved by the Department of Planning and Infrastructure on 14/11/12
2.1	15/05/2013	Minor changes to monitoring locations
Final	27/05/2013	Approved by the Department of Planning and Infrastructure on 27/05/13

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## 1. Introduction

This monitoring program describes blast monitoring and analysis, required to ensure compliance with procedures described in the *MAC-ENC-MTP-015 Blast Management Plan*.

This document details the following:

- Assessment Criteria;
- Monitoring Methodology;
- Monitoring Locations; and
- Data Analysis and Reporting.

This blast monitoring program covers the monitoring of both airblast overpressure and ground vibration. The monitoring locations are subject to change and will be updated periodically to align with management needs, government requirements and to accommodate the progression of mining.

## 2. Project Setting and Overview

### 2.1 Site Details

Hunter Valley Energy Coal Pty Ltd operates the Mt Arthur Coal Mine Complex which consists of approved open cut and underground mining operations, a rail loop and associated rail loading facilities. The operations are located in the Upper Hunter Valley, NSW approximately five kilometres south west of Muswellbrook.

### 2.2 Current Approvals

Mt Arthur Coal has an approved coal extraction rate of 36 million tonnes per annum (mtpa). The most current Project Approval associated with mining operations is the *Mt Arthur Coal Mine - Open Cut Consolidation Project, Application Number 09\_0062* (approved 24 September 2010).

Reference should be made to Appendix 1 of the *MAC-ENC-MTP-015 Blast Management Plan* for a full list of Project Approval and Environment Protection Licence (EPL) conditions relating to blasting and vibration.

### 3. Assessment Criteria

#### 3.1 Airblast Overpressure

Airblast overpressure is measured in dB (Linear peak) Project Approval Blast Impact Assessment Criteria for airblast overpressure is detailed in Table 1. Mt Arthur Coal will ensure blasts on site do not cause exceedances of the criteria in Table 1.

**Table 1: Air blast Overpressure Assessment Criteria**

<b>Location</b>	<b>Air Blast Overpressure Level dB (linear Peak)</b>	<b>Allowable Exceedance</b>
<i>Residence on privately owned land</i>	115	5% of the total number of blasts over a period of 12 months
	120	0%
<i>Heritage sites including Edinglassie and Rous Lench</i>	133	0%

#### 3.2 Ground Vibration

Ground vibration is measured in peak particle velocity (mm/s), and the relevant Project Approval Blast Impact Assessment Criteria for ground vibration are detailed in Table 2. Mt Arthur Coal will ensure blasts on site do not cause exceedances of the criteria in Table 2. Mt Arthur Coal also has agreements in place with utility providers, in line with meeting conditions outlined under Schedule 3, Condition 16 of the Mt Arthur Coal Consolidation Project Approval.

**Table 2: Ground Vibration Assessment Criteria**

<b>Location</b>	<b>Peak Particle Velocity (mm/s)</b>	<b>Allowable Exceedance</b>
<i>Residence on privately owned land</i>	5	5% of the total number of blasts over a period of 12 months
	10	0%
<i>Heritage sites including Edinglassie and Rous Lench</i>	10	0%

## 4. Monitoring Methodology

This Blast Monitoring Program will measure and monitor airblast overpressure in dB (Linear Peak) and ground vibration in PPV (mm/s). All aspects of blast monitoring will be conducted in accordance with Project Approval (09\_0062) dated 24 September 2010, Environmental Protection Licence (EPL) 11457 and Australian Standard AS 2187.2-2006 'Explosives – Storage and Use – Part 2: Use of Explosives'.

Blast monitoring parameters and the frequency at which they are monitored, along with the monitoring location, limit / guideline and sampling method is summarised in Table 3.

**Table 3: Blast Monitoring Program**

Parameter	Frequency	Monitor	Limit / Guideline	Sampling Method
Airblast Overpressure Residence on privately owned land	All Blasts	BP04 BP07 BP09 BP10 BP11	115 dB (Lin Peak) (allowable exceedance of 5% over 12 months) 120 dB (Lin Peak) (no allowable exceedance at any time)	AS2187.2-2006
Vibration Residence on privately owned land	All Blast	BP04 BP07 BP09 BP10 BP11	5 mm/s (ppv) (allowable exceedance of 5% over 12 months) 10 mm/s (ppv) (no allowable exceedance at any time)	AS2187.2-2006
Airblast Overpressure Mine owned Heritage Sites	All Blasts	BP08	133 dB (Lin Peak) (no allowable exceedance at any time)	AS2187.2-2006
Vibration Mine owned Heritage Sites	All Blast	BP08	10 mm/s (ppv) (no allowable exceedance at any time)	AS2187.2-2006

#### 4.1 Unattended Method

Mt Arthur Coal has in place an approved comprehensive blast monitoring system. The system includes six permanently positioned blast monitoring units installed at monitoring locations identified in Table 4 and presented on Figure 1. The current blast monitoring system is an automated web based system that provides real-time vibration and overpressure data.

Blast monitors are calibrated in accordance with Australian Standard AS 2187.2-2006 by a NATA accredited laboratory. Copies of calibration certificates are filed and the date of last calibration is recorded on each monitor.

## 4.2 Attended Method

In accordance with Mt Arthur Coal *MAC-ENC-MTP-015 Blast Management Plan*, portable attended monitoring units may be deployed to assist in measuring airblast overpressure and ground vibration at relevant locations surrounding the operation.

## 5. Monitoring Locations

Monitoring locations are as detailed in Table 4 and shown on Figure 1.

**Table 4: Monitoring Locations**

Site No.	Location	Frequency	Coordinates (MGA)	Parameters	Purpose
BP04	South Muswellbrook	All Blasts	E 301609 N 6426025	Airblast Overpressure (dB(Lin Peak)) Ground vibration (mm/s)	To measure blasting impacts to the north east of the operation
BP07	Muswellbrook Racecourse, Sheppard Ave	All Blasts	E 299170 N 6426437	Airblast Overpressure (dB(Lin Peak)) Ground vibration (mm/s)	To measure blasting impacts to the north of the operation
BP08	Edinglassie	All Blasts	E 296025 N 6424203	Airblast Overpressure (dB(Lin Peak)) Ground vibration (mm/s)	To measure blasting impacts at heritage site located on Mt Arthur Coal property
BP09	Denman Road, West	All Blasts	E 293350 N 6422498	Airblast Overpressure (dB(Lin Peak)) Ground vibration (mm/s)	To measure blasting impacts to the west of the operation
BP10*	Yammanie North	All Blasts	E 299148 N 6425394	Airblast Overpressure (dB(Lin Peak)) Ground vibration (mm/s)	To measure blasting impacts to the north east of the operation
BP11*	Balmoral Road	All Blasts	E. 304233 N. 6422344	Airblast Overpressure (dB(Lin Peak)) Ground vibration (mm/s)	To measure blasting impacts to the east of the operation



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\* New monitoring locations to be installed and operational by 30 September 2013



**Figure 1: Blast Monitoring Location Plan**

## 6. Data Analysis and Reporting

### 6.1 Data Analysis - Review of Monitoring Data

Following the completion of blasting, the blast results for each monitoring location (refer to Table 4) are reviewed for compliance with performance criteria for ground vibration and air overpressure (refer to Table 1, 2 and 3). The reporting and notification of blast results that exceed the blast impact assessment criteria, detailed in Schedule 3, condition 10 of the Project Approval and EPL conditions L7.2 and L7.3, will be undertaken in accordance with *MAC-ENC-PRO-042 Community and Environmental Incident Response and Reporting*.

The percentage of blasts exceeding impact assessment criteria will be calculated at each monitoring location against the total number of blasts on a rolling twelve month basis.

In the event that the monitoring results from a blast identify an exceedance of the ground vibration or airblast overpressure criteria at any blast monitoring locations, Mt Arthur Coal will contact the Department of Planning and Infrastructure (DoPI), Office of Environment and Heritage (OEH) and any other relevant agencies as soon as practicable after the exceedance becomes known in accordance with Condition R4.1 of the EPL and Schedule 5, Condition 7 of the Project Approval. Mt Arthur Coal will conduct investigations to ascertain the cause of the exceedance.

Mt Arthur Coal will prepare a detailed report outlining the results of the investigation and provide the OEH and any other relevant agencies, with the report within 7 days of the incident in accordance with Schedule 5, Condition 7 of the Project Approval.

The detailed report will:

- identifying the date, time and scale of the exceedance;
- identifying the cause or likely cause of the exceedance;
- describing the actions taken in relation to the exceedance; and
- identifying any measures being undertaken to minimise the risk of future exceedance of blasting criteria.

Mt Arthur Coal will implement any recommendations as a result of the investigation, in order to minimise or prevent any future blast exceedances.

Specific reference to any exceedance in blasting criteria, and actions taken to minimise the risk of future exceedance of blasting criteria, will be reported, in both the Annual Environmental Management Report and the EPL Annual Return.

## 6.2 Annual Reporting

Annual reporting will be undertaken in accordance with Schedule 5, Condition 3 of the Project Approval and *MAC-ENC-PRO-008 Communication and Reporting*. The Annual Return for EPL 11457 requires annual environmental reporting in accordance with R1 Annual return document conditions.

## 7. References

### 7.1 External Documents

Australian Standard AS 2187.2-2006 'Explosives—Storage and use Part 2: Use of explosives'

Department of Environment, Climate Change and Water (12 November 2009)  
Environmental Protection Licence 11457

Department of Planning, Minister of Planning's Project Approval document (dated 24 September 2010), Application Number 09-0062, Mt Arthur Coal Mine – Open Cut Consolidation Project.

### 7.2 Mt Arthur Coal Internal EMS Documents

*MAC-ENC-PRO-008 Communication and Reporting*

*MAC-ENC-PRO-042 Community and Environmental Incident Response and Reporting*

## Appendix 1: Correspondence Records

### *Telephone correspondence on 16 March 2011, 3.38pm*

Steve Perkins from Mt Arthur Coal contacted Steve Clair from the Department of Environment, Climate Change and Water (now Office of Environment and Heritage) on 16 March 2011 and asked if Mt Arthur Coal could meet with him to review Management Plans. Steve Clair advised that the Department of Environment, Climate Change and Water does not provide comment on Management Plans. Steve Clair informed Steve Perkins that he could send the Management Plans to him for review, but that he would not submit any comments on the Management Plans.

### *Email correspondence on 31 March 2011, 4.12pm*

**From:** Perkins, Steven R (NSWEC)  
**Sent:** Thursday, 31 March 2011 4:12 PM  
**To:** 'steve.clair@environment.nsw.gov.au'  
**Subject:** Blast Management Plan  
**Attachments:** MAC Blast Management Plan Final Draft 110331.doc; MAC Blast Monitoring Program Final Draft 110331.docx

Good afternoon Steve,

Please find attached the Mt Arthur Coal Blast Management Plan and Blast Monitoring Program for your review.

Regards,  
Steve



**Steven Perkins**  
Environmental Superintendent  
Mt Arthur Coal  
NSW Energy Coal

**BHP Billiton**  
Thomas Mitchell Drive, Muswellbrook, 2333, NSW, Australia  
Mail To [Steven.R.Perkins@bhpbilliton.com](mailto:Steven.R.Perkins@bhpbilliton.com)  
Internet <http://www.bhpbilliton.com>  
Phone +61 2 6542 4874  
Mobile +61 408 220 765  
Please consider the environment before printing this email



Michael White  
General Manager Operations  
Mt Arthur Coal  
PMB 8  
MUSWELLBROOK NSW 2333

Contact: Ben Harrison  
Phone: 02 6575 3402  
Fax: 02 6575 3515  
Email: [benjamin.harrison@planning.nsw.gov.au](mailto:benjamin.harrison@planning.nsw.gov.au)  
Our ref: 10/20755

Dear Mr White,

**Mt Arthur Coal Mine – PA 09\_0062  
Environmental Monitoring and Management Plans**

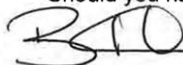
Thank you for forwarding the following management plans required under project approval 09\_0062 for the Department's consideration:

- Blast Management Plan (Condition 17 of Schedule 3);
- Biodiversity and Rehabilitation Management Plan (Condition 40 & 44 of Schedule 3);
- Rehabilitation Strategy (Condition 42 of Schedule 3).

The Department has reviewed these plans (as amended following previous correspondence) and is satisfied that they generally address the requirements set out in the relevant conditions of the project approval. Consequently, I would like to advise you that the Director-General has approved the plans.

Could you please forward finalised copies of the above plans for the Department's records at your earliest convenience.

Should you have any enquiries on this matter please contact me on (02) 6575 3402.



14.11.12

Ben Harrison  
**A/Team Leader Compliance**

As Nominee for the Director-General



Michael White  
General Manager Operations  
Mt Arthur Coal  
PMB 8  
MUSWELLBROOK NSW 2333

Contact: Ben Harrison  
Phone: 02 6575 3402  
Fax: 02 6575 3515  
Email: [benjamin.harrison@planning.nsw.gov.au](mailto:benjamin.harrison@planning.nsw.gov.au)  
Our ref: 10/20755

Dear Mr White,

**Mt Arthur Coal Mine – PA 09\_0062  
Environmental Monitoring and Management Plans**

Thank you for forwarding the following modified management plans required under project approval 09\_0062 for the Department's consideration:

- Blast Management Plan, inclusive of monitoring program (Condition 17, Schedule 3);
- Air Quality Management Plan inclusive of monitoring program (Condition 24, Schedule 3)
- Noise Management Plan, inclusive of monitoring program (Condition 9, Schedule 3)
- Environmental Management Strategy (Condition 1, Schedule 5)

The Department has reviewed these plans and is satisfied that they generally address the requirements set out in the relevant conditions of the project approval. Consequently, I would like to advise you that the Director-General has approved the plans.

Could you please forward finalised copies of the above plans for the Department's records at your earliest convenience.

Should you have any enquiries on this matter please contact Ben Harrison on (02) 6575 3402.



Scott Brooks  
**Team Leader Compliance**

As Nominee for the Director-General

27-5-2013