



WERRIS CREEK COAL Blasting Monitoring Program



Whitehaven Coal Limited – Werris Creek

PO Box 125

Werris Creek NSW 2341

Telephone: (02) 67687071

ISSUE AND AMENDMENT CONTROL HISTORY

Version	Date	Description	Author
1	2005	BMP (Original)	WCC
2	August 2009	BMP (revised to reflect current operations)	WCC (Lyndon Cini)
3	August 2010	Revised monitoring locations and frequency	WCC (Andrew Wright)

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1.0 INTRODUCTION

Werris Creek No 2 Coal Mine (WCC) is operated by Werris Creek Coal Pty. Ltd, a wholly owned subsidiary of Whitehaven Coal Mining Pty Ltd. The WCC mine is located approximately 4 km south of Werris Creek and 11 km north-northwest of Quirindi in North West Slopes and Plains region of New South Wales.

The WCC Blasting Monitoring Program (BMP) has been prepared in accordance with relevant conditions of DA 172-7-2004 (MOD 5), Environmental Protection Licence (EPL) 12290 and Mining Lease (ML) 1563.

-

WCC has subcontracted all blasting activities including environmental monitoring to Orica Mining Services (OMS), who have been consulted over the development of the BMP.

This BMP identifies the blast monitoring locations and the nature of the monitoring equipment to be used; equipment set up, post-blasting procedures, blast information analysis and reporting procedures. To ensure that this document represents an effective on-site management tool, blast complaint management procedures are also identified.

Government agency correspondence with Department of Environment, Climate Change and Water (DECCW) and Department of Planning (DoP) approving this BMP is included in **Appendix 1**.

1.1 Statutory Conditions

Condition 22 (Schedule 4) of DA 172-7-2004 MOD5 is outlined below:

22. Prior to carrying out any blasting, the Applicant shall prepare and implement a detailed Blasting Monitoring Program for the development in consultation with the DECCW and to the satisfaction of the Director-General. The Application shall monitor the airblast overpressure and ground vibration impacts of blasting operation of the development at privately-owned residences or noise sensitive locations as defined in the DECCW's Industrial Noise Policy (INP), using the units of measurement, frequency, sampling method and locations specified in Table 12 (below).

Parameter	Units of Measure	Frequency	Sampling Method	Measurement Location
Airblast overpressure	dB(Lin Peak)	During every blast	AS2187.2 – 1993 ¹	Not less than 3.5m from a building or structure
Peak particle velocity	mm/s	During every blast	AS2187.2 – 1993	Not more than 30m from a building or structure

Table 12: Airblast Overpressure and Ground Vibration Monitoring

¹ Standards Australia, 1993, AS2187.2 – 1993: Explosives – Storage, Transport and use – Use of Explosives.

Note: The text above including Table 12 is direct from the development consent. Australian and New Zealand Environment Council 1990 “Technical Basis for Guidelines to minimise annoyance due to Blasting Overpressure” is the more appropriate reference than the INP. AS 2187.2 -2006 has superceded the previous Australian Standard for the use of explosives.

The WCC EPL 12290 Condition L8 requires that:

L8.1The overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L8.2The overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L8.3Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L8.4Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment

used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L8.5 Blasting operations at the premises may only take place between 9:00am-5:00pm Monday to Friday. (Where compelling safety reasons exist, the Authority may permit a blast to occur outside the abovementioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority).

L8.6 The hours of operation for blasting operations specified in condition L7.2 may be varied by the EPA, having regard to the effect that the proposed variation would have on the amenity of the residents in the locality, gives written consent to the variation.

L8.7 Blasting at the premises is limited to 1 blast on each day on which blasting is permitted. Note: Additional blasts are permitted where it is demonstrated to be necessary for safety reasons and the EPA and neighbours have been notified of the intended blast prior to the additional blast being fired.

L8.8 To determine compliance with condition(s) L8.1, L8.2, L8.3 and L8.4:

- a) Airblast overpressure and ground vibration levels must be measured and electronically recorded at any point within 30 metres of any non-project related residential building or other sensitive locations such as a school or hospital - for all blasts carried out in or on the premises; and
- b) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006.

2.0 MONITORING LOCATIONS

WCC recognises that the exposure of our operations has increased as mining moves closer to Werris Creek township and with the lengthening of pit strike length. With the increased exposure, the local community will be sensitive to the perceived blasting impacts of higher overpressure and vibration levels. WCC maintains a monitoring network with flexible locations to assist in managing and monitoring blasting impacts as particular issues arise from community enquiries and complaints; property acquisitions or due to variations in mining/blasting positions and meteorological conditions.

Figure 1 and **Table 1** outlines both the permanent and mobile blast monitoring locations. The mobile monitoring locations are not exhaustive and can include other locations to be added as required. However for every blast, there will be at least four blast monitors (Section 3.0) located at representative community locations.

TABLE 1 Blast Monitoring Locations

Monitoring Location Type	Site ID (see Figure 1)	Purpose	Property/Location Description	Frequency	Direction from WCC	Distance (km)
Permanent	WCB - 3	Community	"Tonsley Park"	Every Blast	North	2.9
Mobile*	WCB - 1	Community	"Glenara"	Three selected locations every Blast	South	3.8
Mobile*	WCB - 4	Contractual	"Cintra"		North	1.6
Mobile*	WCB - 5	Community	"Greenslopes" & "Banool"		North East	2.7
Mobile*	WCB - 6	Community	Laneway off Kurrara Street, Werris Creek		North East	3.7
Mobile*	WCB - 7	Community	"Millbank"		South East	2.7
Mobile*	WCB - 20	Infrastructure	Railway Culvert	Every Blast with 500m of Rail Line	East	0.3

Note: Grey shading indicates a "permanent" location for monitoring every blast

* "Mobile" locations are not exhaustive and can include other locations to be added as required. A minimum of three mobile locations will be monitored for every blast

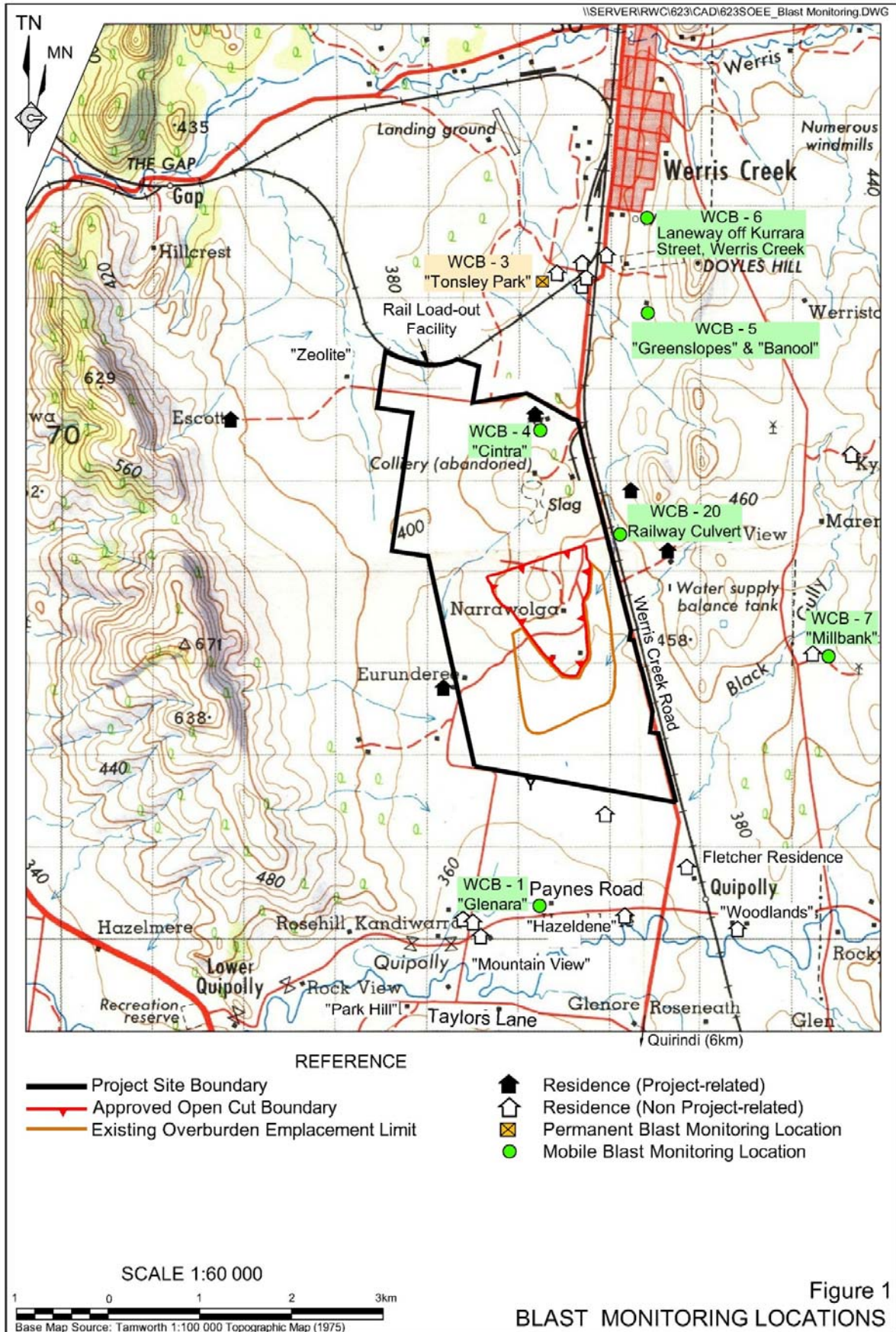
WCC's flexible blast monitoring network methodology aims to achieve overpressure and vibration monitoring that is measured at the most affected community residence or noise sensitive location that is not owned by WCC or subject of a private agreement with the property owner.

"Tonsley Park" is currently the closest privately owned and occupied residence to WCC and is therefore the representative permanent location for community blast monitoring of every blast.

"Cintra" was acquired by WCC on 31st March 2010 and is now considered as a project related property and is not subject to the relevant compliance criteria in Section 7.0, however due to a clause within the sale contract limited blast monitoring is required at the site.

"Greenslopes" & "Banool" is the closest privately owned property but contains no residence, however when the property owner constructs a permanent dwelling onsite, it will become a permanent monitoring location.

Due to similar distances to the next nearest privately owned and occupied residence to the north and south, both "Glenara" and the Laneway off Kurrara Street (most southern street in Werris Creek township) are proposed as mobile blast monitoring locations due to infrequent detection of blasting impacts currently.



WCC is contractually obligated by Australian Rail Track Corporation to monitor blast vibration levels at key railway infrastructure locations for every blast within 500m of the railway line.

Table 2 summarises the WCC blasting criteria for each monitoring location.

TABLE 2 Blasting Criteria

Purpose	Property/Location Description	Overpressure (dBL)	Vibration (mm/s)
Community	WCB - 3 "Tonsley Park"	115*	5*
	WCB - 1 "Glenara"		
	WCB - 5 "Greenslopes" & "Banool"		
	WCB – 6 Laneway off Kurrara Street, Werris Creek		
	WCB – 7 "Millbank"		
Contractual	WCB - 4 "Cintra"	Not Applicable	Not Applicable
Infrastructure	WCB – 20 Railway Culvert	Not Applicable	50 [#]

* DECCW and DoP are the regulatory authorities for administering community blasting criteria

[#] Contractual agreement with the Rail Line Manager Australian Rail Track Corporation

In addition to the nominated sites, WCC will also:

- Monitor flyrock / blast rock distribution for each blast; and
- Video all major blasts to assist in the interpretation of results.

3.0 BLAST MONITORS

Instrumentation used to measure the airblast overpressure and ground vibration levels will meet the requirements of Australian Standard 2187.2 of 1993. A combination of Texcel μ Mx and Texcel Compact Monitors will be used at all monitoring sites to analyse airblast overpressure (dBL) and peak particle velocity in a radial, vertical and transverse direction (mm/s), i.e. ground vibration. All equipment for the measurement of airblast overpressure will have a lower cut-off frequency of 2Hz, and a frequency bandwidth of 2 Hz to 500 Hz.

Only calibrated monitors will be used for blast monitoring at the Werris Creek Coal Mine, with copies of calibration certificates or other means of verification available on site. The date of last calibration is automatically printed on each monitor print-out and each report provided by the blast contractor.

4.0 PROCEDURES

4.1 Standards

All aspects of blasting operations will be undertaken by the blast contractor and in accordance with AS 2187.2-2006 – Explosives - Storage and Use, a copy of which will be retained on site in the blasting contractor's office.

4.2 Pre-check

Prior to monitors being placed in the field, the following aspects will be verified for each instrument.

- (i) Battery is charged. Note: batteries will be placed on charge immediately following data downloading from each blast.
- (ii) Date and time are correct.
- (iii) Location (Site) for each monitor is marked on the carry case.
- (iv) Instrument "fields" are correctly set to reflect the distance from the blast site to identified monitor location. The instrument fields, i.e. near, medium and far, determine the period of recording for airblast once the monitor is triggered on either ground vibration or airblast itself.

Table 3 identifies the distance range between the blast site and the monitor, the appropriate "field" setting and the duration of airblast (air pressure wave) recording.

TABLE 3 Monitor Settings and Airblast Recording Times

Setting	Near Field	Mid Field	Far Field
Distance (Monitor to Blast) (m)	<300	300 - 1000	>1000
Recording Time (sec)	4	10	20

Ground vibration is recorded for a period of 4 seconds following triggering.

- (v) Instrument trigger levels are set to minimize the potential for false initiation of the recording sequence by, for example, wind, but would record airblast or ground vibration events approaching or greater than the standard vibration criteria of 115 dBL and 5 mm/s respectively. For the far field setting, triggers would typically be set at about 0.37 mm/s and 111.9 dBL.
- (vi) Setting adjustment as necessary.
- (vii) Print-off a confirmation of settings from the logger.

To ensure consistency, a sheet identifying the monitor settings for each blast monitoring site will be retained at the site office and adjusted as necessary to reflect, for example, increasing or decreasing distances to the blast site and monitoring results, e.g. false trigger frequency.

4.3 Field Set-up

The instrument will be set up at the pre-selected location at each monitoring point, between 3.5 m and 30 m from the residence or building to be monitored.

The instrument set-up procedure involves the following steps.

- (i) Insert the soil spike into the ground and level the geophone.
- (ii) Set up microphone.
- (iii) Connect microphone and geophone to the monitor.
- (iv) Turn power on. Powering up the monitor initiates a self check culminating in a VDU advice that the instrument is functioning properly.
- (v) Press "start". Following a countdown sequence, the monitor moves into a "standby mode" awaiting triggering.

Prior to initiation, a Werris Creek Mine Site Blast Check List form which includes verification that the monitors are in place and records salient weather data, e.g. wind direction and cloud cover, will be complete and signed by the shotfirer.

4.4 Post-blast (in the Field)

Following the completion of the blast, the following activities will be undertaken prior to the monitor being returned to the office for data downloading.

- (i) Press “stop” button.
- (ii) Turn power off.
- (iii) Disconnect microphone and geophone
- (iv) Remove soil spike.
- (v) Pack instrument up.

4.5 Post-blast (at the Office)

On the return of each monitor to the site office, staff will:

- (i) retrieve / download the data to the office computer;
- (ii) review the data and delete any data pertaining to false triggers, i.e. triggers before the blast initiation time;
- (iii) generate a results print-out sheet (in Microsoft Word) and insert relevant data relating to the blast, e.g. blast pattern, hole spacing, number of rows, number of holes, blasthole diameter, stemming, MIC, explosives type and weight, delay type (interval and duration (ms)) and any relevant comments or observations. An example of a typical results sheet from the Whitehaven Coal Mine is attached as **Appendix 2**;
- (iv) print-off and distribute the results to the nominated recipients. Prior to the commencement of blasting activities, the owner of each building where monitoring is undertaken, will be asked if they would like to receive copies of the relevant blast results. Result distribution may be by email, fax or in hardcopy as appropriate or requested.

Copies of the printouts, the Mine Site blast checklist and details such as blast design, charging and tie in pattern are retained on the mine site files;

- (v) transfer the data for the blast to an Excel spreadsheet; and
- (vi) place monitor battery on charge to await the next blast.

5.0 POST BLASTING FUME MONITORING

Following each blast, all personnel involved in the firing of the shot will monitor the movement of any post blast fume. Blast sentries will wait in position and monitor any post blast fume until it has safely dissipated. Once the risk of post blast fume is removed, sentries will communicate the all clear back to the shot firer via radio communications.

The incidence of post blasting fume is considered to be infrequent and of low occurrence at the WCC site, although it is considered a risk which requires careful management and monitoring. WCC has developed a *Post Blast Fume Alert Procedure* which allows for the proper management and notification of neighbouring residence if post blasting fume has not dissipated. The procedure is initiated in the unlikely event that post blast fume may become a risk for a neighbouring residence.

6.0 FLYROCK DISTRIBUTION MONITORING

6.1 Flyrock Distribution

Following each blast, the area surrounding the blast site will be inspected and flyrock distribution to the front, rear and both sides of the blast site recorded.

Given that the information gathered may form the basis for discussions regarding the future closure of the Werris Creek – Quirindi Road during blasting, the data recorded will, as a minimum, comprise the maximum flyrock projection distance in each direction from the blast.

7.0 BLAST CRITERIA EXCEEDANCE MANAGEMENT AND REPORTING

In the event that the results of a blast identify an exceedance of:

- peak vector sum velocity (ground vibration) at or above – 5 mm/s (ppv); and/or
- peak overpressure at or above – 115 dBL,

Werris Creek Coal Pty Ltd (WCC), as Licencee under the Protection of the Environment Operations Act 1997 and holder of Development Consent DA-172-7-2004, will report the incident to DECCW and DoP. WCC will also undertake investigations into any possible exceedances and forward this information onto the departments as required.

8.0 BLAST COMPLAINT MANAGEMENT PROCEDURES

Any formal complaints received relating to any blast will be managed in accordance with the complaints receipt and response procedure presented in the Werris Creek Coal Mine Environmental Management Strategy (Section 6.2) and summarized below.

- (i) Details of the complainant and complaint will be recorded in the complaints log.
- (ii) WCC representatives will liaise with the complainant to ascertain all details, to identify the nature and source of the complaint and provide supplementary information for the log.
- (iii) Investigations will be initiated to verify or otherwise the basis for the complaint.
- (iv) Results of the investigation will be provided to the complainant together with advice as to any changed blast management practices to be implemented as a consequence of the investigation.

Complaints pertaining to blast-related damage will be managed in accordance with Condition 27 of DA 172-7-2004, viz:

If any landowner within a 2 km of the development, or any other landowner nominated by the Director-General (DoP), claims that his/her property, including vibration-sensitive infrastructure such as water supply or underground irrigation mains, has been damaged as a result of blasting, Werris Creek Coal Pty Ltd will, within 3 months of receiving this request:

- commission a suitably qualified person whose appointment has been approved by the Director-General to investigate the claim; and
- give the landowner a copy of the property investigation report.

If this independent investigation confirms the landowner's claim, and the complainant and WCC agree with the findings, then WCC will repair the damage to the satisfaction of the Director-General.

In the event of a disagreement by WCC or the complainant as to the findings of the independent property investigation, the matter may be referred to the Director-General. If the matter still cannot be resolved, the Director-General will initiate the Independent Dispute Resolution Process identified in DA 172-7-2004.

Appendix 1

Government Agency Correspondence



Planning

Contact: Colin Phillips
Phone: (02) 9228 6483
Fax: (02) 9228 6466
Email: colin.phillips@planning.nsw.gov.au

Mr Andrew Wright
Environmental Officer
Werris Creek Coal Pty Limited
PO Box 125
WERRIS CREEK NSW 2341

Our ref: 9040291-9

Dear Mr Wright

Werris Creek Coal Mine – Revised Blast Monitoring Program

I refer to your email, dated 2 August 2010, seeking approval of a revised version of Werris Creek Coal Mine's Blast Monitoring Plan (BMP).

The Department considers that the submitted BMP is satisfactory. Accordingly, the Director-General has approved Werris Creek Coal Mine's BMP.

If you have any enquiries on this matter please contact Colin Phillips at the details above.

Yours sincerely

DKitto 26/8/10

David Kitto
Director
Mining and Industry Projects
as Delegate for the Director-General

Andrew Wright

From: Lindsay Fulloon [Lindsay.Fulloon@environment.nsw.gov.au]
Sent: Thursday, 29 July 2010 4:27 PM
To: Andrew Wright
Cc: Danny Young; Robert O'Hem; Stephen O'Donoghue
Subject: RE: Tracked Changed Blast Monitoring Program

Andrew

After reviewing the proposed Werris Creek Coal Blasting Monitoring Program revisions I am pleased to advise that the Department generally supports the proposed changes on the basis of recent property acquisitions by Whitehaven and the proposal to maintain a minimum of 4 community monitoring locations for all blasts undertaken at the site. The proposal to maintain one fixed monitor at the nearest receptor and circulate a minimum of three mobile monitors to the other proposed community monitoring locations is viewed as positive as it provides the mine with the flexibility to position monitors to most appropriately consider prevailing weather conditions at the time of each blast and address any community complaints associated with blasting activities.

I have confirmed that we can accommodate the proposed monitoring program via a licence variation notice further to the variation application form submitted previously by Danny Young. As agreed with Danny, I will proceed with the variation once I am informed that the BMP has been approved by the Department of Planning.

Kind regards

*Lindsay Fulloon | Regional Operations Officer | Environment Protection and Regulation Group
Department of Environment, Climate Change and Water
PO Box 494 (85 Faulkner Street) | ARMIDALE NSW 2350
Phone: (02) 6773 7000 | Fax: (02) 6772 2336
Mobile: 0419 418 577 | E-mail: Lindsay.fulloon@environment.nsw.gov.au*

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Appendix 2

Typical Blast Results Sheet

Customer Blast Summary Report 05.08.2010

Blast Information

Customer Name: WERRIS CREEK COAL	Firing Date: 04.08.2010
Customer No: 16220	Firing Time: 13:21:51
Bench Location: STRIP 13	ShotFirer: Dave McWilliams
Shot Number: 320	Purchase Order No: SHOT 320
Shot Type: OB - Overburden	Sales Order: 1096457
Blast Status: -Open	WBS Element:

Pattern Design

Ave Burden: 4.50	Ave Spacing: 5.00
No of Holes: 176	Ave Hole Depth: 12.00
BCM: 47,520	Ave Hole Diameter: 165.00
Powder Factor: 0.33	

Bulk Explosives Deliveries:

Product	Description	Quantity (Kg)
BFSCLC	FORTIS COAL CUSTOMER SPECIAL	16,016.000

Initiating & Packaged Explosives Used:

Product	Description	Quantity (ea)
PPP400	*Pentex PowerPlus P Booster 30/Box	342.00
DPU500.09XCA	*Uni tronic Det. 500-09.0M(30FT) 90pcs	171.00
DPU500.15CMCA	*Uni tronic Det. 500-15.0M CU (50FT) 60pc	171.00
XUTHW400	*Uni tronic Harness Wire 400M	2.00

Additional Blast Services Completed:

Blast Service	Description	Quantity	UoM
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Comments

Orica Representative	_____	Signature	_____
Customer Representative	_____	Signature	_____

Customer Blast Summary Report 05.08.2010

Blast Information

Customer Name: WERRIS CREEK COAL	Firing Date: 04.08.2010
Customer No: 16220	Firing Time: 13:21:51
Bench Location: STRIP 13	ShotFirer: Dave McWilliams
Shot Number: 320	Purchase Order No: SHOT 320
Shot Type: OB - Overburden	Sales Order: 1096457
Blast Status: -Open	WBS Element:

Pattern Design

Ave Burden: 4.50	Ave Spacing: 5.00
No of Holes: 176	Ave Hole Depth: 12.00
BCM: 47,520	Ave Hole Diameter: 165.00
Powder Factor: 0.33	

Comments

BLAST Comments:

Environmental Monitoring Results

Glenala Monitor did not trigger

Marengo 0.07 mm/s 112.2 dB

Tonsley Park Monitor did not trigger

Cintra 0.08 mm/s 113.2 dB

Railway colvert Not monitored

Werris creek Monitor did not trigger

weather Temperature @ 2m = 15.0oC and @ 10m = 13.9oC

No Inversion

Wind = NW at 3.1m/s

Partially Cloudy 2/8

MMU Comments:

ISPE Log Comments:

Orica Representative

Signature

Customer Representative

Signature



Orica Mining Services

Customer Blast Summary Report 05.08.2010

Blast Information

Customer Name: WERRIS CREEK COAL	Firing Date: 04.08.2010
Customer No: 16220	Firing Time: 13:21:51
Bench Location: STRIP 13	ShotFirer: Dave McWilliams
Shot Number: 320	Purchase Order No: SHOT 320
Shot Type: OB - Overburden	Sales Order: 1096457
Blast Status: -Open	WBS Element:

Pattern Design

Ave Burden: 4.50	Ave Spacing: 5.00
No of Holes: 176	Ave Hole Depth: 12.00
BCM: 47,520	Ave Hole Diameter: 165.00
Powder Factor: 0.33	

Comments

BLAST Service Comments:

Orica Representative	_____	Signature	_____
Customer Representative	_____	Signature	_____



Orica Australia Pty Ltd
ACN 004 117 828

Orica Mining Services
PO Box 110
Werris Creek NSW 2341
<http://www.orica.com.au>
Ph: 02 6768 7888

Werris Creek Mine Blast Report

Orica Blast Number #320
Blast ID/name S13_6-7_400
Date and Time Fired 04/08/2010 @13.21

Blaster ID	2223
Milli amps at firing time	83ma
Total NCOs	0
Total GLBs	0
Total number of holes	176

Environmental Monitoring Results

	Glenala	Monitor did not trigger		
	Marengo	0.07	mm/s	112.2 dB
	Tonsley Park	Monitor did not trigger		
	Cintra	0.08	mm/s	113.2 dB
	Railway colvert	Not monitored		
	Werris creek	Monitor did not trigger		
weather	Temperature @ 2m = 15.0oC and @ 10m = 13.9oC			
	No Inversion			
	Wind = NW at 3.1m/s			
	Partially Cloudy 2/8			

Attachments

Environmental Monitoring Reports

Anthony Green
Blasting Technician
Orica Mining Services
Ph 0428 847 859
Email anthony.green@orica.com



Orica Australia Pty Ltd
ACN 004 117 828

Orica Mining Services
PO Box 110
Werris Creek NSW 2341
<http://www.orica.com.au>

Werris Creek Mine Blast Notice to DECC

Orica Blast Number #320
Location S13_6-7_400
Date and Time Fired 04/08/2010 @13.21

Monitor #1	
Location:	Glenala
Results:	Monitor did not trigger

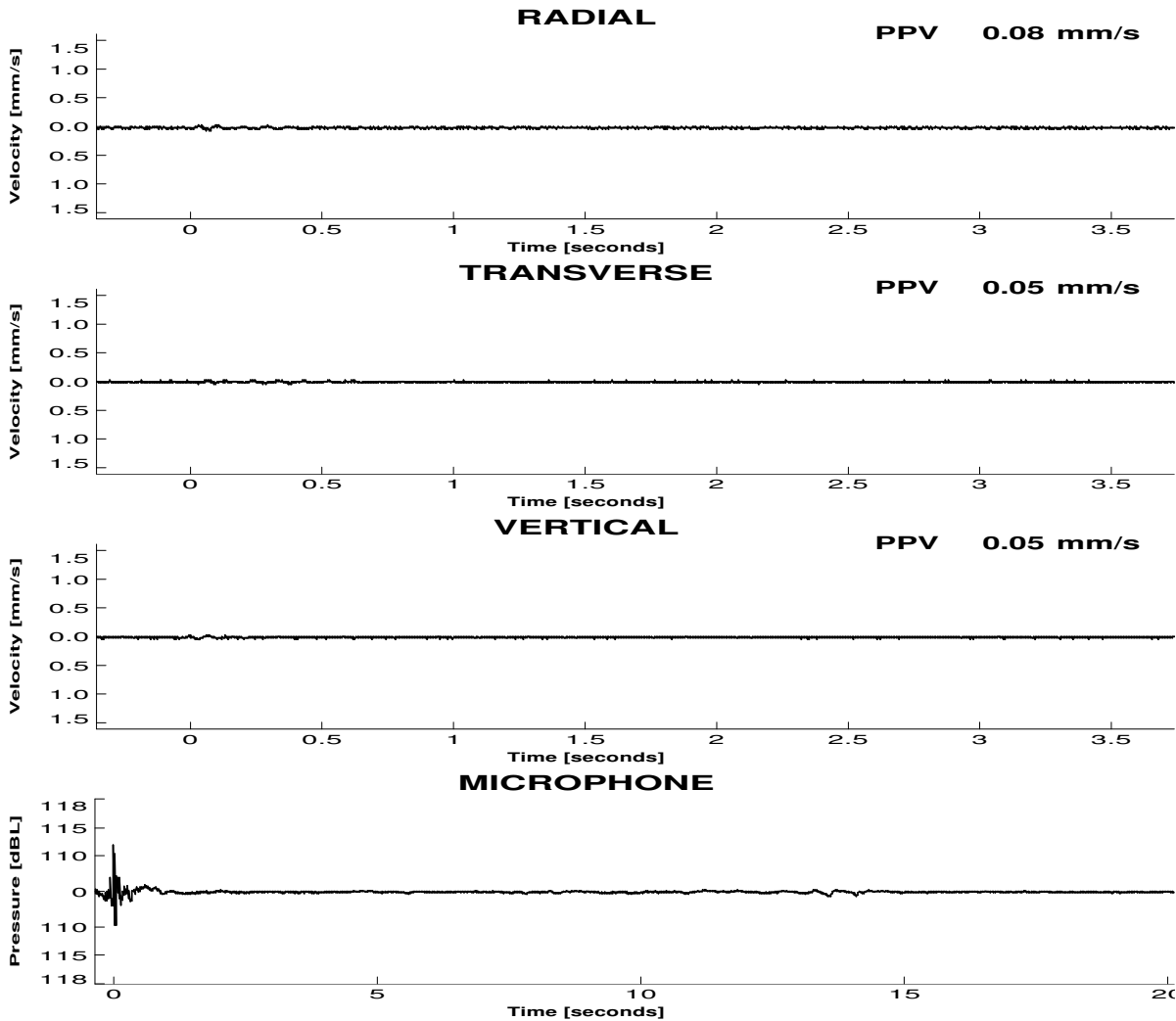
Monitor #2	
Location:	Marengo
Results:	As expected. Within licence limits

Monitor #3	
Location:	Tonsley Park
Results:	Monitor did not trigger

Monitor #4	
Location:	Cintra
Results:	As expected. Within licence limits

werris creek No2

Location: Cintra
Time: 13:21:30
Date: 04 Aug 2010



BLAST RESULTS

Peak Vector Sum Velocity : 0.08 mm/s
Peak Overpressure : 113.2 dBL

Monitoring conducted by:
(Orica Ltd:Orica Ltd)

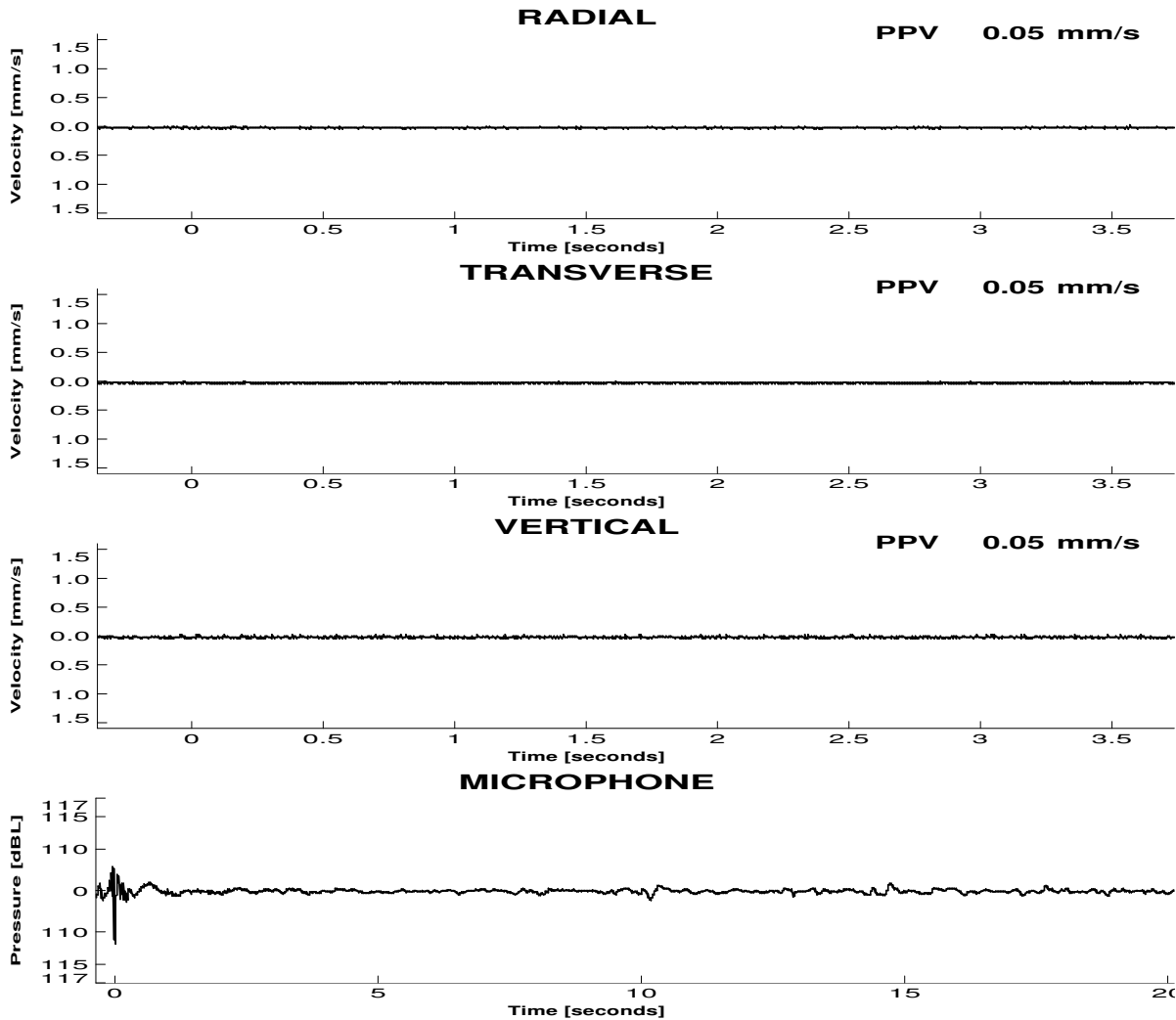
Checked by:

TM Serial Number : 3148 Last Calibration: 24 Mar 2010

werris creek No2

Location: marengo
Time: 13:21:27
Date: 04 Aug 2010

Blast #320
Shot S13_6-7_400



BLAST RESULTS

Peak Vector Sum Velocity : 0.07 mm/s
Peak Overpressure : 112.2 dBL

Monitoring conducted by:
(Orica Ltd:Orica Ltd)

Checked by:

TM Serial Number : 3146 Last Calibration: 25 Nov 2009

Werris Creek

Location: Tonsley Park
Time: 13.21
Date: 04/08/2010
Blast: **Shot #320 S13_6-7_400**

Monitor did not trigger.

Review Settings

Settings Name: A3147 Monitor Settings
Settings File: A3147.stg

Compliance Settings for Monitor A3147

Geophone monitoring duration is 4 s.
Microphone monitoring duration is 20 s.

Triggered by Vibration at 0.25 mm/s or Overpressure at 108.9 dBL.
Auto Trigger Disabled.

Summary files will record:

- * Date
- * Time
- * Peak Vector Sum Vibration
- * Peak Air Overpressure
- * Peak Radial Vibration
- * Peak Transverse Vibration
- * Peak Vertical Vibration

Preset Items:

Monitor Sampling at 1 ms.
With 9% pretrigger.
Waveform Resolution is 12 bits.

Recorded 5/08/2010 9:08 AM

Orica Limited

Werris Creek

Location: Clenala
Time: 13.21
Date: 04-08- 2010
Blast: **#320 S13_6-7_400**

Monitor did not trigger.

Review Settings

Settings Name: A3145 Monitor Settings
Settings File: A3145.stg

Compliance Settings for Monitor A3145

Geophone monitoring duration is 4 s.
Microphone monitoring duration is 20 s.

Triggered by Vibration at 0.25 mm/s or Overpressure at 108.9 dBL.
Auto Trigger Disabled.

Summary files will record:

- * Date
- * Time
- * Peak Vector Sum Vibration
- * Peak Air Overpressure
- * Peak Radial Vibration
- * Peak Transverse Vibration
- * Peak Vertical Vibration

Preset Items:

Monitor Sampling at 1 ms.
With 9% pretrigger.
Waveform Resolution is 12 bits.

Recorded 5/08/2010 9:06 AM

Orica Limited

Werris Creek

Location: Kurrara st werris creek
Time: 13.21
Date: 04-08- 2010
Blast: **#320 S13_6-7_400**

Monitor did not trigger.

Review Settings

Settings Name: A3146 Monitor Settings
Settings File: A3146.stg

Compliance Settings for Monitor A3146

Geophone monitoring duration is 4 s.
Microphone monitoring duration is 20 s.

Triggered by Vibration at 0.25 mm/s or Overpressure at 108.9 dBL.
Auto Trigger Disabled.

Summary files will record:

- * Date
- * Time
- * Peak Vector Sum Vibration
- * Peak Air Overpressure
- * Peak Radial Vibration
- * Peak Transverse Vibration
- * Peak Vertical Vibration

Preset Items:

Monitor Sampling at 1 ms.
With 9% pretrigger.
Waveform Resolution is 12 bits.

Recorded 5/08/2010 9:09 AM

Orica Limited