# Werris Creek Coal Community Consultative Committee

# <u>Thirthieth Meeting of the Committee</u> <u>Training Room, Werris Creek Coal</u> <u>9:30am Thursday 27<sup>th</sup> February 2014</u> <u>MINUTES</u>

Werris Creek Coal (WCC) Community Consultative Committee (CCC) met at 9:30am and had a pit tour of the mine site after the meeting. The CCC inspected the mine from the eastern lookout in pit and the eastern visual amenity bund.

#### 1. Record of Attendance:

Present: Gae Swain (Independent Chairperson); Noel Taylor (Community Representative); Geoff Dunn (Community Representative); Lindsay Bridge (Community Representative); Col Stewart (Liverpool Plains Shire Council - Councilor); Jill Coleman (Community Representative); Ron Van Katwyk (Liverpool Plains Shire Council – Director Environmental Services); Peter Easey (WCC Operations Manager) and Andrew Wright (WCC Environmental Officer and Minute Taker).

Apologies: None.

#### 2. Declaration of Pecuniary or Other Interests

Noel Taylor and Gae Swain declared that their respective son's work for Whitehaven Coal.

#### 3. New Matters for Discussion under General Business

Water Evaporator.

#### 4. Minutes of Previous Meeting

Minutes of the previous meeting on the 21<sup>st</sup> November 2013 were accepted as true and accurate representation of business conducted on that day.

Moved: Jill Coleman. Seconded: Noel Taylor. Motion carried.

#### 5. Matters Arising

#### a) Actions from Previous Meeting

None.

#### b) Other Matters Arising

None.

### 6. Environmental Monitoring Report: November and December 2013, January 2014

**Meteorology** – The three month period was very hot and dry except for good rain in November 2013. The prevailing wind direction was from the south-south east typical of the summer period

**Air Quality** – The continuing below average rainfall is reflected in the elevated dust monitoring results during the period, although the Particulate Matter less than 10 microns (PM10) annual average and daily maximum levels have been below the air quality criteria. Twice during the period the Particulate Matter less than 2.5 microns (PM2.5) measured elevated dust levels above the criteria at the Werris Creek Mid monitoring site unrelated to WCC mining operations. The PM2.5 dust level reached 27.6µg/m<sup>3</sup> on 7<sup>th</sup> and 8<sup>th</sup> November 2013 due to a regional dust event transported by a north northwesterly wind. The PM2.5 dust level reached 28.0µg/m<sup>3</sup> on the 22<sup>nd</sup> and 23<sup>rd</sup> January 2013 due to the Carinya Road bushfire approximately 10km south east of Werris Creek. There were no dust complaints during the period.

**Noise** – There were no noise exceedances during November and December 2013; and January 2014. The last recorded noise exceedance was in September 2013. There were two noise complaints during the period from a Werris Creek resident that alleged noise impacts from the WCC Train Load Out facility but were found to be due to rail traffic in the Werris Creek rail yard.

**Blasting** – During the period a total of nineteen blasts were fired by WCC. All blasts over the period complied with maximum license limits (120dBL and 10mm/s) with no blast overpressure levels above 115dBL or vibration levels over 5mm/s for the three month period. There were seventeen blast complaints during the period from nine separate blast events. The continuation of blasting complaints is believed to be due the sensitization of the Werris Creek community due the elevated overpressure from the blast on 8<sup>th</sup> July 2013. WCC are continuing to balance blasting to minimise community impact while also producing enough blasted inventory to achieve the budgeted 2.5Mt coal production rate for 2013-2014.

**Groundwater** – The extended dry conditions has resulted in no rainfall recharge to aquifers with all monitoring bore groundwater levels declining over the period (except MW10). MW12 measurement in November 2013 was found to be a typo with follow up dip levels not showing any significant groundwater decline. Even the good rainfall in November 2013 was not sufficient to increase aquifer levels. Of the groundwater bores routinely monitored, 12 bores are now at record low levels and 13 bores are within 1m of the lowest groundwater level measured. WCC is undertaking additional work to improve the resolution of the groundwater model for periods of extended low rainfall.

**Surface Water** – Quarterly surface water monitoring was undertaken on 14th November 2013 with all onsite and offsite water quality within longer term averages and the Site Water Management Plan trigger values except for SB2 and SB10 (dam at very low levels) and while at SB9, a different flocculant is now used to improve the rate of treatment of TSS.

**Surface Water Discharges** – The two dirty water discharges were in compliance with WCC's Environmental Protection Licence 12290 and there were no impacts on water quality monitored in Quipolly and Werris Creeks' catchments as a result of the dirty water discharge events.

**Complaints** – There were twenty three complaints received during the period with the details summarised below. There were seventeen complaints related to blasting; two complaints related to lights, two complaints relating to noise and two complaints relating to odour. There were twelve different complainants during the period with twenty one complaints from Werris Creek residents and two complaints from Quipolly residents.

Motion moved to accept the Environmental Monitoring Report for November and December 2013, January 2014.

Moved: Geoff Dunn. Seconded: Lindsay Bridge. Motion Carried.

## 7. General Business

## a. Community Enhancement Fund (CEF) Update

This meeting of the CCC also doubled as the annual review of the CEF. During the previous period the CCC had received written and verbal requests for funding. The CCC asked the Chairperson to write to Liverpool Plains Shire Council requesting their endorsement of the updated CEF Project Schedule as outlined below:

YEAR	CEF Project Schedule	COST
2010	CEF established by Werris Creek Coal	\$300,000
2010	Grand Piano for Royal Theatre, Quirindi	-\$20,000
2012	2012 CPI 2.2% Increase	\$6,160
2013	2013 CPI 2.7% Increase	\$7,726.32
2013	Skate Park, Werris Creek	-\$70,000*
2014	Disabled Lift at Australian Railway Museum, Werris Creek	-\$60,000*
2014	Early Warning Evacuation Alarm, Australian Railway Museum, Werris Creek	-\$30,000*
	Sub Total (Funds Remaining)	\$133,886.32
2014	Additional Public Seating in Single Street outside CBD, Werris Creek	-\$7,000
2014	Werris Creek Preschool Garden Items for Upgraded Sandpit, Werris Creek	-\$755
2014	Finalise various items upstairs at Australian Railway Museum for Occupation Certificate, Werris Creek	-\$6,000
2015	Werris Creek Pool water feature/playground, Werris Creek	-\$70,000
2016	Various playground improvements in Villages, Liverpool Plains Shire	-\$50,000
2017	Nil	-\$0
	Unallocated Funds	\$131.32

In addition, the CCC has requested:

- Council to investigate and install additional public seating suggested for the two existing bus shelters in Single Street;
- Support for the Werris Creek Preschool;
- Australian Railway Museum committee to provide a written request for funds to undertake additional minor carpentry works to obtain an Occupation Certificate; and
- Council to provide further information and planning on playground related projects in Werris Creek.

Motion moved for Chairperson to write a letter to Council requesting their endorsement of the CEF Schedule of Projects and further information, support for the preschool plus a letter to the Australian Railway Museum committee.

Moved: Geoff Dunn. Seconded: Jill Coleman. Motion Carried.

## b. CCC Community Representative Vacancy

Andrew Wright advised that the CCC needed to have between three and five community representatives, even with the vacancy there is currently four community representatives. The committee requested WCC to continue to advertise for nominations for the vacant Community Representative position.

## c. Community Meeting on 11<sup>th</sup> March 2014

The CCC were advised that WCC was holding an open public meeting for the Werris Creek Community on the 11<sup>th</sup> March 2014 at 5:30pm for 6pm at the Werris Creek Bowling and Tennis Club. A copy of the latest WCC Community Newsletter was provided to the CCC.

## d. Annual Environmental Management Inspection

Annual environmental management inspection by the Environment Protection Authority (EPA), Department of Planning (DoP) and Division of Resources and Energy (DRE) was undertaken on the 19<sup>th</sup> February 2014 with no significant issues identified.

#### e. Water Evaporation on Large Dam

Lindsay Bridge tabled feedback that he had received from the community that perceived the water spray on a large dam was a waste of water. Andrew Wright explained that the evaporator was the only option available to WCC that was generally in accordance with its environmental approvals not causing additional environmental impacts. As void water is from the pit, it is slightly salty and therefore is not allowed to be discharged or transferred offsite either to a creek or for use in irrigation.

#### Meeting Closed 11:00am.

#### Next Meeting scheduled for Thursday 29<sup>th</sup> May 2014.

#### Copy to:

Gae Swain Jill Coleman Noel Taylor Lindsay Bridge Roslyn Marr	Independent Chairperson Community Representative Community Representative Community Representative
Roslyn Marr	Community Representative
Geoff Dunn	Community Representative

LPSC

DoPI

DRE

EPA

Ron Van Katwyk Cr Col Stewart Stephen O'Donoghue Simon Lund Lindsay Fulloon

LPSC

Peter Easey Danny Young Andrew Wright Werris Creek Coal Whitehaven Coal Werris Creek Coal



## WERRIS CREEK COAL PTY LTD

## **QUARTERLY ENVIRONMENTAL MONITORING**

# REPORT

# November, December 2013 and January 2014

This Environmental Monitoring Report covers the period 1<sup>st</sup> November 2013 to 31<sup>st</sup> January 2014 for the Werris Creek No.2 Coal Mine Community Consultative Committee.

The report includes environmental monitoring results from the on-site Weather Station, Air Quality, Noise, Blasting, Surface Water, Groundwater and Discharge Water Quality together with any community complaints received and general details on site environmental matters.

**Note:** Monitoring results with any non compliance of monitoring criteria are highlighted in yellow.

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## 1.0 METEOROLOGY

## 1.1 WEATHER STATION

Werris Creek Coal (WCC) collects meteorological data from the onsite weather station located on the top level of the overburden emplacement and from the continuous noise monitoring units located at Quipolly and Werris Creek. The following table summarises temperature, inversion and rainfall data for the last three months and wind data is presented below in windroses. Good rain fell during November but December and January were dry and very hot. The prevailing wind direction was from the south-south east typical of the summer period.

Month	Quipolly Temp (°C)		Wei Te	Werris Creek Temp (°C)		WCC Temp (°C) 10m		Lapse (°C/1	e Rate 00m)	Rainfall (mm)		m)			
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Avg	90%	Onsite	Quip	WC	Annual*
November 2013	3.6	19.4	34.2	7.7	20.5	33.7	9.0	20.4	32.9	+0.5	+7.5	136.8	93.0	103.4	346.5
December 2013	3.8	23.1	39.3	7.7	24.2	39.0	9.8	24.2	37.9	+0.7	+7.9	27.2	23.4	35.0	373.7
January 2014	11.1	26.0	43.5	15.2	26.3	43.2	14.7	26.0	42.8	-0.6	+3.9	4.2	7.6	21.6	377.9

\* Annual cumulative total since July 2012 to June 2013 from a composite data set based on the onsite Weather Station at WCC.



## 2.0 AIR QUALITY

## 2.1 HVAS (PM10) and TEOM (PM10 & PM2.5)

WCC operates five High Volume Air Sampler (HVAS) measuring particulate matter less than 10 micron (PM10) and total suspended particulate (TSP) matter at four sites. HVAS sampling is scheduled for 24 hours every 6 days in accordance with Environment Protection Authority (EPA) guidelines and results are reported as micro grams per cubic metre ( $\mu$ g/m<sup>3</sup>) of air sampled. In addition, WCC operates a Tapered Element Oscillating Microbalance (TEOM) monitor in Werris Creek measuring real time PM10 and PM2.5 (particulate matter less than 2.5 micron) dust levels. Dust monitoring locations are identified in **Figure 1**.

PM2.5 – TEOM92 "Werris Creek" PM10 – TEOM92 "Werris Creek" PM10 – HVP20 "Tonsley Park" PM10 – HVP1 "Escott" PM10 – HVP20 "Glenara" PM10 – HVP98 "Kyooma" TSP – HVT98 "Kyooma"

## 2.1.1 Monitoring Data Results

The average results for the last three months are provided in the table below; however see HVAS/TEOM monitoring data under **Appendix 1** for individual results.



Figure 1 – WCC Dust Monitoring Locations

	Daily	November	December	Ionuonu	2013-	Criteria	$(\mu g/m^3)$
Monitor Location	Maximum (µg/m <sup>3</sup> )	2013 (µg/m <sup>3</sup> )	2013 (μg/m <sup>3</sup> )	2014 (μg/m <sup>3</sup> )	2014 Average (µg/m <sup>3</sup> )	Annual	Daily
PM2.5 – TEOM92 "Werris Creek"	28.0	8.7	8.7	11.0	7.6	8	25
PM10 – TEOM92 "Werris Creek"	40.5	15.0	14.9	17.7	13.2	30	50
PM10 – HVP20 "Tonsley Park"	27.8	12.5	17.1	21.4	16.4	30	50
PM10 - HVP4/HVP1 "Eurunderee"/"Escott"	23.5	8.5	12.1	17.0	10.5	30	50
PM10 – HVP20 "Glenara"	37.1	14.8	16.9	24.0	17.6	30	50
PM10 – HVP98 "Kyooma"	22.1	6.8	12.1	12.8	9.8	30	50
TSP – HVT98 "Kyooma"	38.3	15.7	22.8	26.7	20.2	90	-

The continuing below average rainfall is reflected in the elevated dust monitoring results during the period, although the PM10 annual average and daily maximum levels have been below the Air Quality criteria. Twice during the period the PM2.5 measured elevated dust levels above the criteria at the Werris Creek Mid monitoring site unrelated to WCC mining operations. The PM2.5 dust level reached 27.6 $\mu$ g/m<sup>3</sup> on 7<sup>th</sup> and 8<sup>th</sup> November 2013 due to a regional dust event transported by a north northwesterly wind. The PM2.5 dust level reached 28.0 $\mu$ g/m<sup>3</sup> on the 22<sup>nd</sup> and 23<sup>rd</sup> January 2013 due to the Carinya Road bushfire approximately 10km south east of Werris Creek.

## 2.2 WERRIS CREEK MINE DEPOSITED DUST

Deposited dust monitoring measures particulate matter greater than 30 micron in size that readily settles out of the air related to visual impact. Dust deposition is monitored at 20 locations around WCC. Sampling is scheduled monthly in accordance with EPA guidelines and results are reported as grams per metre squared per month (g/m<sup>2</sup>/month). Dust monitoring locations are identified in **Figure 1**.

## 2.2.1 Monitoring Data Results

The results for the last three months are provided in the table below; however **Appendix 2** has more information on Deposited Dust Monitoring Results.

Monitor	November	December	January	2013-2014	Annual Critoria
Location	$(g/m^2/month)$	(g/m <sup>2</sup> /month)	$(g/m^2/month)$	(g/m <sup>2</sup> /month)	(g/m <sup>2</sup> /month)
DG2 "Cintra"	1.3	2.7	1.8	1.7	4.0
DG5 "Railway View"	1.8	1.1	0.1	0.9	4.0
DG20 "Tonsley Park"	1.2	7.8*	0.7*	1.5	4.0
DG15 "Plain View"	1.3	0.3	< 0.1	1.1	4.0
DG9 "Marengo"	1.2	0.6	0.1	0.6	4.0
DG22 "Mountain View"	c6.9	0.7	< 0.1	1.7	4.0
DG11 "Glenara"	1.6	1.2	0.7	0.7	4.0
DG24 "Hazeldene"	2.4	1.0	< 0.1	0.8	4.0
DG17 "Woodlands"	1.8	0.7	0.7	0.8	4.0
DG96 "Talavera"	1.1	0.7	0.6	0.5	4.0
DG98 "Kyooma"	0.6	0.3	< 0.1	0.3	4.0
DG14 "Greenslopes"	1.1	0.8	0.1	0.5	4.0
DG62 Werris Creek South	1.4	0.9	< 0.1	0.5	4.0
DG92 Werris Creek Centre	1.1	0.6	3.9	0.8	4.0
DG101 "Westfall"	1.3	3.0	0.6	0.9	4.0
DG103 West Street	1.5	1.8	0.1	0.7	4.0
DG1 "Escott"	1.4	0.7	0.5*	1.3	4.0
DG3 "Eurunderee"	1.0	1.2	< 0.1	0.8	4.0
DG34 8 Kurrara St	0.9	c19.6	c31.8*	12.8	4.0
DG106 "Villamagna"	2.6	1.3	0.2	1.1	4.0

\* - sample contaminated with excessive organic matter (>50%) from non-mining source (i.e. bird droppings and insects); c - indicates sample is contaminated from a Non-Werris Creek Coal dust source.

All monthly dust deposition gauge averages are below the annual criteria of 4.0g/m<sup>2</sup>/month except for the DG34 dust gauge. Elevated monthly results not contaminated by excessive organic matter occurred at DG22 in November and DG34 in December. DG22 ("Mountain View") was substantially higher than the other Quipolly dust gauges for November meaning that the elevated levels must have been due to a local dust source and unrelated to WCC. DG34 has consistently resulted in excessively high readings including November and December that are much higher than the other dust gauges in Werris Creek and north of WCC. Given the low readings measured during the winter period at DG34, it is assumed that the elevated dust levels recorded are due to deliberate contamination. The prevailing dry conditions have affected regional air quality with the results being generally above the annual average. A couple of results were contaminated with organic matter (>50%) which is not representative of mining dust emissions.

## 2.3 QUIRINDI TRAIN DUST DEPOSITION

## 2.3.1 Monitoring Data Results

The results for the last three months are provided in the table below; however **Appendix 3** has more information on the Train Dust Monitoring Results.

Monitor	Novembe	r 2013	December	r 2013	January	Annual		
Location	g/m <sup>2</sup> /month	% Coal	g/m <sup>2</sup> /month	% Coal	g/m <sup>2</sup> /month	% Coal	(g/m <sup>2</sup> /month)	
DDW30	2.0	15%	1.5	10%	0.6	40%	1.1	
DDW20	2.6	15%	1.6	10%	2.3	40%	1.3	
DDW13	2.8	75%	c5.7	10%	1.9	55%	1.4	
			Trai	n Line				
DDE13	c18.1	<1%	0.9	10%	0.6	40%	1.3	
DDE20	1.3	35%	2.5	20%	2.3	40%	1.3	
DDE30	1.5	10%	2.1	5%	1.9	55%	1.4	

## 2.3.2 Discussion - Compliance / Non Compliance

Overall the dust fall out levels adjacent to the train line are low (well below the impact assessment criteria nominated by the EPA of 4.0 g/m<sup>2</sup>/month) and comparable to the levels monitored around WCC.

## 2.4 AIR QUALITY COMPLAINTS

There were no dust complaints during the period.

## 3.0 NOISE

## 3.1 OPERATIONAL NOISE

Monthly attended noise monitoring is undertaken representative of the following 16 properties from 13 monitoring points below. Attended noise monitoring was undertaken twice for either 60 minutes at privately owned properties or 15 minutes at properties with private agreements; representative of the day period and the evening/night period.

- A "Rosehill" R5;
- o B1 "Almawille" (private agreement) R8;
- o B1 83 Wadwells Lane R7;
- o B2 "Mountain View" R22;
- o B2 "Gedhurst" R9;
- o C "Meadholme" (private agreement) R10;
- o C "Glenara" (private agreement) R11;
- o D "Hazeldene" R24;
- o E "Railway Cottage" R12;
- o F "Talavera" R96;
- o **G R97**;
- o H "Kyooma" (private agreement) R98;
- I Kurrara St, Werris Creek;
- J Coronation Ave, Werris Creek;

- o K "Alco Park" (private agreement) R21; and
- o L R103.

## 3.1.1 Monitoring Data Results

The WCC operations only noise level (not ambient noise) results for the last three months are outlined below; however see Monthly Noise Monitoring Reports under **Appendix 4** for more detail. Noise monitoring locations are identified in **Figure 2**.

#### Thursday 21st November 2013

Location		Day dB(A)	Criteria dB(A)	<b>Evening/Night</b>	Criteria dB(A)
	Location	L <sub>eq 15min</sub>	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
Α	"Rosehill" R5	Inaudible	35	32#	35
B1	West Quipolly R7, R8*	22	37	31#	37
B2	West Quipolly R9 & R22	23	37/36 <sup>1</sup>	27#	37/36 <sup>1</sup>
С	Central Quipolly R10*, R11*	Inaudible	39	26	39
D	"Hazeldene" R24	Inaudible	37	25#	37
Е	"Railway Cottage" R12	Inaudible	38	20#	38
F	"Talavera" R96	Inaudible	38	Inaudible#	37
G	R97	Inaudible	35	Inaudible#	35
Н	" <b>Kyooma"</b> R98*	19	36	Inaudible#	36
Ι	Kurrara St, WC	Inaudible	35	Inaudible#	35
J	Coronation Ave, WC	Inaudible	35	Inaudible#	35
K	South St, WC R21*	Inaudible	39	Inaudible#	37
L	West St, WC R103	Inaudible	35	Inaudible	35

WC – Werris Creek; \* - Private agreement in place with resident; Yellow Bold – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>

#### Monday 16th & Tuesday 17th December 2013

	Location	Day dB(A)	Criteria dB(A)	<b>Evening/Night</b>	Criteria dB(A)
	Location	L <sub>eq 15min</sub>	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
Α	"Rosehill" R5	21	35	Inaudible#	35
B1	West Quipolly R7, R8*	Inaudible#	37	31#	37
B2	West Quipolly R9 & R22	26	37/36 <sup>1</sup>	Inaudible#	37/36 <sup>1</sup>
С	Central Quipolly R10*, R11*	Inaudible	39	Faintly audible#	39
D	"Hazeldene" R24	Inaudible	37 25		37
Е	"Railway Cottage" R12	Inaudible	38	Inaudible	38
F	"Talavera" R96	20	38	Inaudible#	37
G	R97	20	35	Inaudible#	35
Н	"Kyooma" R98*	<20	36	Inaudible#	36
Ι	Kurrara St, WC	Inaudible	35	Inaudible#	35
J	<b>Coronation Ave, WC</b>	Inaudible	35	Inaudible#	35
K	South St, WC R21*	Inaudible	39	Inaudible#	37
L	West St, WC R103	Inaudible#	35	Inaudible#	35

WC – Werris Creek; \* - Private agreement in place with resident; Yellow Bold – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>

#### Tuesday 28<sup>th</sup> January 2014

Location		Day dB(A)	Criteria dB(A)	<b>Evening/Night</b>	Criteria dB(A)
	Location	L <sub>eq 15min</sub>	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
Α	"Rosehill" R5	Inaudible#	35	Faintly audible#	35
B1	West Quipolly (R7, R8*)	Inaudible#	37	29#	37
B2	West Quipolly (R9 & R22)	22#	37/36 <sup>1</sup>	26#	37/36 <sup>1</sup>
С	<b>Central Quipolly</b> (R10*,R11*)	Inaudible#	39	Faintly audible#	39
D	"Hazeldene" R24	Inaudible#	37	<20#	37
Е	"Railway Cottage" R12	Inaudible#	38	Inaudible#	38
F	"Talavera" R96	Inaudible#	38	Faintly audible#	37
G	R97	Faintly audible#	35	Inaudible#	35
Н	"Kyooma" R98*	Inaudible#	36	Inaudible#	36
Ι	Kurrara St, WC	Inaudible#	35	Inaudible#	35
J	Coronation Ave, WC	Inaudible#	35	Inaudible#	35
K	South St, WC (R20*, R21*)	Inaudible#	39	Inaudible#	37
L	West St, WC (R103)	Inaudible#	35	Inaudible#	35

WC – Werris Creek; \* - Private agreement in place with resident; Yellow Bold – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>



Figure 2 – WCC Noise Monitoring Locations

There were no noise exceedances during November and December 2013; and January 2014. The last recorded noise exceedance was in September 2013.

## 3.2 NOISE COMPLAINTS

There were two noise complaints during the period from a Werris Creek resident that alleged noise impacts from the WCC Train Load Out facility but were found to be due to rail traffic in the Werris Creek rail yard. Specific actions taken in relation to this complaint is outlined in **Section 6**.

## 4.0 BLAST

Blast monitoring was undertaken at "Glenara", "Talavera", "Werris Creek (South)" and "Tonsley Park" for November and December 2013 while "Glenara", "Kyooma", "Werris Creek South" and "Werris Creek Mid" commenced being monitored following Whitehaven Coal taking over the majority of the blasting services previously managed by a contractor. Compliance limits for blasting overpressure is 115dBL (and up to 120dBL for only 5% of blasts) and vibration is 5mm/s (and up to 10mm/s for only 5% of blasts). During the period a total of nineteen blasts were fired by WCC. Blast monitoring locations are identified in **Figure 3**.

### 4.1 BLAST MONITORING

### 4.1.1 Monitoring Data Results

The summary tables of blasting results over the last three months are provided below; however see the blasting results database under **Appendix 5** for more detail.

November 2013	"Glenara"		"Tonsley Park"		Werris Creek		"Talavera"	
November 2013	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.20	102.0	1.18	104.7	0.40	101.8	0.21	103.0
Monthly Maximum	0.20	102.0	1.71	107.0	0.58	105.0	0.27	107.0
Annual Average	0.30	98.5	0.86	101.9	0.44	100.9	0.23	103.9
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	1.5%	0%	1.5%	0%	1.5%
# Triggered this Month	1	/9		5/9	5	/9	2	/9

NM – Site not monitored;\* Indicates project related properties not subject to blasting criteria.

December 2012	"Gle	nara"	"Tonsl	ey Park"	Werris	s Creek	"Tala	ivera"	
December 2015	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	
Monthly Average	0.20	102.2	1.69	103.8	0.59	100.6	0.40	106.4	
Monthly Maximum	0.26	107.0	3.39	108.0	<mark>1.05</mark>	104.0	0.53	112.0	
Annual Average	0.28	99.1	0.95	102.1	0.45	100.9	0.25	104.2	
Criteria	5	115	5	115	5	115	5	115	
% >115dB(L) or 5mm/s	0%	0%	0%	1.4%	0%	1.4%	0%	1.4%	
# Triggered this Month	5	5/6		6/6	5.	/6	5/6		

NM - Site not monitored;\* Indicates project related properties not subject to blasting criteria.

January 2014	"Gle R	nara" 11	"Kyoo	ma" R98	Werris Soutl	s Creek 1 R62	Werris Mid	s Creek R92	
v	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	
Monthly Average	0.14	99.8	0.96	97.1	0.34	98.2	0.23	99.3	
Monthly Maximum	0.26	109.4	2.42	106.9	0.63	104.8	0.45	103.7	
Annual Average	0.26	99.2	0.96	97.1	0.44	100.6	0.23	99.3	
Criteria	5	115	5	115	5	115	5	115	
% >115dB(L) or 5mm/s	0%	0%	0%	0%	0%	1.3%	0%	0%	
# Triggered this Month	4	./4	4/4 (1	Offline)	4	/4	4/4		

NM – Site not monitored;\* Indicates project related properties not subject to blasting criteria; Yellow – overpressure >115dB(L) or Werris Creek vibration >1mm/s.



Figure 3 – WCC Blast Monitoring Locations

All blasts over the period complied with maximum license limits (120d(B)L and 10mm/s) with no blast overpressure levels above 115dB(L) or vibration levels over 5mm/s for the three month period.

## 4.2 BLAST COMPLAINTS

There were seventeen blast complaints during the period from nine separate blast events. The continuation of blasting complaints is believed to be due the sensitization of the Werris Creek community due the elevated overpressure from the blast on 8<sup>th</sup> July 2013. WCC are continuing to balance blasting to minimise community impact while also producing enough blasted inventory to achieve the budgeted 2.5Mt coal production rate for 2013-2014. Specific actions taken in relation to these complaints are outlined in **Section 6**.

## 5.0 WATER

The groundwater monitoring program monitors groundwater levels bi-monthly and groundwater quality six monthly. Surface water monitoring is undertaken quarterly. There were two dirty water discharge events during the period.

## 5.1 GROUND WATER

Groundwater monitoring is undertaken to monitor if there are any impacts on groundwater quality and levels as a result of the mining operations. WCC monitors 30 groundwater bores and piezometers in the key aquifers surrounding the mine including Werrie Basalt (near to WCC and further afield) and Quipolly Creek Alluvium. Bi-monthly groundwater level monitoring was completed on 8<sup>th</sup>/11<sup>th</sup> November 2013 and 20<sup>th</sup>/21<sup>st</sup> January 2014 Six monthly groundwater quality monitoring was not undertaken during the period, last sampled on 24<sup>th</sup> and 25<sup>th</sup> September 2013. Groundwater and Surface Water monitoring locations are identified in **Figure 4**.

## 5.1.1 Monitoring Data Results

A summary of groundwater monitoring results is provided below with the field sheets provided in Appendix 6.

	Site	Nov	2013	Jan 2	2014	014 Comments							
<u>د</u>	MW1	55.34	-1%	55.94	-1%         No rainfall recharge, Level down           -2%         No rainfall recharge, Level down								
ea	MW2	26.73	-2%	27.27	-2%	No rainfall recharge, Level down							
t N	MW3	15.61	-2%	16.01	-2%	No rainfall recharge, Level down							
Sal	MW4B	11.10	-4%	11.62	-4%	No rainfall recharge, Level down							
Ва WC	MW5	8.93	-4%	9.40	)       -5%       No rainfall recharge, Level down         3       -1%       No rainfall recharge, Level down         7       -1%       No rainfall recharge, Level down         6       -5%       No rainfall recharge, Level down         8       -3%       No rainfall recharge, Level down								
rie	MW6	12.64	-2%	12.83	-1%	No rainfall recharge, Level down							
/er	P1	36.07	-2%	36.37	7       -1%       No rainfall recharge, Level down         5       -5%       No rainfall recharge, Level down         -3%       No rainfall recharge, Level down								
М	MW27	43.41	0%	45.76	5         -5%         No rainfall recharge, Level down           -3%         No rainfall recharge, Level down           -         No rainfall recharge, Level down								
	MW8	16.31	-3%	16.8	-3% No rainfall recharge, Level down - No rainfall recharge, Level down								
alt	MW9	-	-	-	- No rainfall recharge, Level down 5 0% No rainfall recharge								
Bas	MW10	16.92	0%	16.95	-     No rainfall recharge, Level down       0%     No rainfall recharge       0%     No rainfall recharge       0%     No rainfall recharge								
le F	MW14	17.74	-1%	17.78	0%     No rainfall recharge       0%     No rainfall recharge       -4%     No rainfall recharge, Level down       -2%     No rainfall recharge, Level down								
erri	<b>MW17B</b>	10.26	-3%	10.74	8         0%         No rainfall recharge           4         -4%         No rainfall recharge, Level down           4         -2%         No rainfall recharge, Level down           9         -1%         No rainfall recharge, Level down								
We	MW19A	5.93	-2%	6.04	4     -4%     No rainfall recharge, Level down       4     -2%     No rainfall recharge, Level down       9     -1%     No rainfall recharge, Level down								
	MW20	19.83	-1%	19.99	+								
	MW12	10.56	-16%	9.62	4     -2%     No rainfall recharge, Level down       19     -1%     No rainfall recharge, Level down       2     10%     Nov 2013 typo, redipped and lowering not excessiv								
	MW13	5.97	-	5.34	99-1%No rainfall recharge, Level down5210%Nov 2013 typo, redipped and lowering not excessiv34-13%No rainfall recharge, Level down								
	MW13B	3.35	-3%	3.85	-13%	No rainfall recharge, Level down							
	MW13D	4.82	-3%	5.00	-4%	No rainfall recharge, Level down							
m	MW15	4.64	-5%	4.82	-4%	No rainfall recharge, Level down							
viu	MW16	5.49	-10%	5.51	0%	No rainfall recharge, Level down							
nIL	MW17A	4.29	-6%	4.72	-9%	No rainfall recharge, Level down							
y A	<b>MW18A</b>	4.16	-7%	4.54	-8%	No rainfall recharge, Level down							
oll	MW21A	7.45	-5%	7.96	-6%	8%         No rainfall recharge, Level down           6%         No rainfall recharge, Level down							
uip	MW22A	5.35	-5%	5.74	-7%	7%         No rainfall recharge, Level down           7%         No rainfall recharge, Level down							
Ō	MW22B	5.57	-4%	5.96	-7%	No rainfall recharge, Level down           1%         No rainfall recharge							
	MW23A	3.93	1%	3.96	-1%	-1% No rainfall recharge							
	MW23B	4.18	12%	4.24	-1%	-1% No rainfall recharge							
	MW28A	12.22	-4%	12.62	-3%	Image         No rainfall recharge           3%         No rainfall recharge, Level down							
1	MW32	413	-3%	4 1 4	0%	No rainfall recharge Level down							

pH – measure of acidity/alkalinity; EC – Electrical Conductivity measures salinity; Dip – is distance in meters from top of bore to groundwater surface; Red – Greater than 15% change/potential compliance issue; Orange – Change decrease; Green – change increase or no change.



Figure 4 – WCC Groundwater and Surface Water Monitoring Locations

The extended dry conditions has resulted in no rainfall recharge to aquifers with all monitoring bore groundwater levels declining over the period (except MW10). MW12 measurement in November 2013 was found to be a typo with follow up dip levels not showing any significant groundwater decline. Even the good rainfall in November 2013 was not sufficient to increase aquifer levels. Of the groundwater bores routinely monitored, 12 bores are now at record low levels and 13 bores are within 1m of the lowest groundwater level measured. WCC is undertaking additional work to improve the resolution of the groundwater model for periods of extended low rainfall.

## 5.2 SURFACE WATER

Surface water monitoring is undertaken from local creeks offsite as well as from discharge point dirty water dams to monitor for potential water quality issues. Quarterly surface water monitoring was undertaken on 14<sup>th</sup> November 2013.

## 5.2.1 Monitoring Data Results

Summary of surface water quality monitoring results is provided below with the laboratory reports provided in **Appendix 7**.

Site	pН	EC	TSS	<b>0&amp;G</b>	Change from Previous Quarter
					ONSITE
SB2	8.37	1300	44	<5	pH no change, EC increased 290, TSS increased 47, O&G no change.
SB9	8.33	297	134	<5	pH increased 0.23, EC increased 89, TSS increased 126, O&G no change.
SB10	7.73	168	1030	<5	First water runoff since reconstruction due to Rail Loop Project.
					OFFSITE
QCU	7.59	490	30	<5	pH decreased 0.31, EC increase 20, TSS increased 5, O&G no change.
QCD	7.98	1010	16	<5	pH decreased 0.08, EC decreased 184, TSS increased 5, O&G no change.
WCU	7.97	427	<5	<5	First water runoff since dry previously.
WCD	8.32	1390	19	<5	pH decreased 0.21, EC increased 120, TSS increased 4, O&G no change.

pH – measure of acidity/alkalinity; EC – Electrical Conductivity measures salinity; TSS – Total Suspended Solids is a measure of suspended sediment in water (i.e. similar to turbidity); O&G – Oil and Grease measures amount of hydrocarbons (oils and fuels) in water; Orange – Issue with water quality; Green – water quality OK.

## 5.2.2 Discussion - Compliance / Non Compliance

Quarterly surface water monitoring was undertaken on 14th November 2013 with all onsite and offsite water quality within longer term averages and the Site Water Management Plan trigger values except for SB2 and SB10 (dam at very low levels) and while at SB9, a different flocculant is now used to improve the rate of treatment of TSS.

## 5.3 SURFACE WATER DISCHARGES

## 5.3.1 Monitoring Data Results

There were two controlled discharge events during the period. A summary of discharge monitoring results is provided below with the laboratory reports provided in **Appendix 8**.

Date	Dam	pН	EC	TSS	<b>0&amp;</b> G	Compliance	Туре	5 Day Rain
21/11/2013	SB9	7.70	396	14	<5	Compliant – Water quality in criteria	Controlled	Not Applicable
17/12/2013	SB9	7.98	356	11	<5	Compliant – Water quality in criteria	Controlled	Not Applicable
Crite	ria	8.5	N/A	50	10			

pH – measure of acidity/alkalinity; EC – Electrical Conductivity measures salinity; TSS – Total Suspended Solids is a measure of suspended sediment in water (i.e. similar to turbidity); O&G – Oil and Grease measures amount of hydrocarbons (oils and fuels) in water; Yellow – indicates results outside criteria due to 5 day rain >39.2mm.

## 5.3.2 Discussion - Compliance / Non Compliance

The two dirty water discharges were in compliance with WCC's Environmental Protection Licence 12290 and there were no impacts on water quality monitored in Quipolly and Werris Creeks' catchments as a result of the dirty water discharge events.

## 5.3 WATER COMPLAINTS

There were no water complaints during the period.

## 6.0 COMPLAINTS SUMMARY

There were twenty three complaints received during the period with the details summarised below. There were seventeen complaints related to blasting; two complaints related to lights, two complaints relating to noise and two complaints relating to odour. There were twelve different complainants during the period with twenty one complaints from Werris Creek residents and two complaints from Quipolly residents.

#	Date	Complainant	Complaint	Investigation	Action Taken
340	11/11/2013 1:25pm	A/EPA Werris Creek	Lights from Coal Load Out Facility still on at 3am on 5th November 2013.	Review of lighting camera shows no visual impact from lighting at Train Load Out facility.	Written response provided to EPA.
341	11/11/2013 1:25pm	A/EPA Werris Creek	Loud noise from Coal Load Out Facility at 10:08pm on 10th November 2013.	Source of loud noise due to train in Werris Creek rail yards and unrelated to WCC activities.	Written response provided to EPA.
342	12/11/2013 4:26pm	A Werris Creek	Lights from the pit are directed at complainant's residence only after 11:30pm.	Monday night 11th November 2013 lighting video did not identify any lighting impacts beyond normal operation of the Train Load Out facility lighting and lights from dozers. No lights from the Open Cut were directly visible. An inspection of lighting plants at the Train Load Out Facility confirm that the lights were set up correctly in accordance with PA10_0059 and AS4282.	Verbal response provided to complainant.
343	20/11/2013 12:09pm	AL Werris Creek	Complainant said that they had just felt the blast and caused his house to shake and he does not appreciate the intrusive nature of blasting.	WCC blast #88-2013 (S13_4-9_TSB41 Pt1) at 12:08pm 20th November 2013 was in compliance with PA10_0059 and EPL12290. Blast #88 was designed to minimise potential for community complaints and performed as expected.	Written response provided to complainant.
344	20/11/2013 1:30pm	AT Werris Creek	Complainant indicated that he had felt the blast last Wednesday 13th November which rattled the shutters on the southern side of his house.	WCC blast #87-2013 (S13_4-9_TSB43_Presplit and Rock Pops) at 13:27 13th November 2013 was in compliance with PA10_0059 and EPL12290. Blast #87 was designed to minimise potential for community complaints and performed as expected.	Written response provided to complainant.
345	4/12/2013 1:50pm	AZ Werris Creek	Complainant indicated that could see dust cloud and smell odour from blast when driving past mine on 4 <sup>th</sup> December 2013.	WCC blast #92-2013 (S16_12-15_370) at 13:09 4 <sup>th</sup> December 2013 was in compliance with PA10_0059 and EPL12290. Blast #92 performed as expected. Blast video shows dust generated blowing to the east but video ends and no fume generated.	Written response provided to complainant.
346 & 347	9/12/2013 9:30am 13/12/2013 8:20am	AD Quipolly	Complainant alleged strong sulphur smell that causes breathing difficulties. Odour similar to previous event.	Possible source of odour on 9 <sup>th</sup> December 2013 from ROM Stockpile spontaneous combustion event which had been addressed by time of complaint. Possible source of odour on 13 <sup>th</sup> December 2013 due to uncovering former underground workings close to previously active fire.	WCC to review and monitor for spontaneous combustion events to minimise off-site impacts. No written follow up required.
348	13/12/2013 3:45pm	U Werris Creek	Complainant indicated that the 13 <sup>th</sup> December 2013 blast caused vibration in his house.	WCC blast #95-2013 (S12_12-16_Gcoal) at 15:12 13 <sup>th</sup> December 2013 was in compliance with PA10_0059 and EPL12290. Blast #95 was designed to minimise potential for community complaints and performed as expected.	No written follow up required.
349 to 354	19/12/2013 Various	Various	Complainants indicated that the 19 <sup>th</sup> December 2013 blast shook their houses.	WCC blast #96-2013 (S17_Trim_Pt2) at 12:17 19 <sup>th</sup> December 2013 was in compliance with PA10_0059 and EPL12290 although Werris Creek vibration was >1mm/s design limit due deeper than normal >20m holes to create flat bench horizon in pit.	Blast contract with Orica finishes at end of month. Engineering Manager to review initiation sequence. Written response provided to complainants.
355	24/12/2013 1:50pm	A Werris Creek	Complainant indicated that the mine cracked four new tiles for Christmas.	The nearest WCC blast to the complaint #97/#98-2013 (S13_Wedge and S17_Trim_Pt3) at 13:05 24 <sup>th</sup> December 2013 was in compliance with PA10_0059 and EPL12290. Blast #97/#98 was designed to minimise potential for community complaints and performed as expected with levels well below damage threshold.	No written response required. Previous allegations of blast damage by this complainant have been referred to Department of Planning and are currently being independently assessed.
356	13/01/2014 8:50am	BA Werris Creek	Complainant indicated concern that recent cracking in their home was due to mine blasting having felt the blast on Christmas Eve.	WCC blast #97/#98-2013 (S13_Wedge and S17_Trim_Pt3) at 13:05 24th December 2013 was in compliance with PA10_0059 and EPL12290. Blast #97/#98 was designed to minimise potential for community complaints and performed as expected with levels well below damage threshold.	EO met with complainant on 13th January 2014 and a Property Inspection by a Structural Engineer undertaken on 21st January 2014. Written response provided to complainants

357 to 359	23/01/2014 Various	Various/EPA Werris Creek	Complainants indicated that the 23rd January 2014 blast was intrusive and shook their houses.	WCC blast #02-2014 (S15_13-16_370-350) at 1:02pm 23rd January 2014 was in compliance with PA10_0059 and EPL12290. Blast #02 was designed to minimise potential for community complaints and performed as expected except for minor fume generated by the blast.	WCC to analyse blast frequencies and undertake frequency testing of Werris Creek houses. Investigate cause of minor fume. Written response provided to complainants and EPA.
360	28/01/2014 10:15am	A/EPA Werris Creek	Noise from Coal Loader on both nights Saturday 11/12th January 2014 and the following night Sunday 12/13th January 2014	Noise levels found to be below 35dB(A) and no mining noise audible. Source of complaint unknown. Wind direction would not propagate noise from TLO towards Werris Creek.	Written response provided to EPA.
361 & 362	31/01/2014 Various	U and AI Werris Creek	Complainants indicated that the 31st January 2014 blast had two strong shocks about 5 seconds apart and whole blast lasted 10 seconds.	WCC blast #04-2014 (S15_17-18_370-350) at 2:08pm 31st January 2014 was in compliance with PA10_0059 and EPL12290. Blast #04 was designed to minimise potential for community complaints and performed as expected.	WCC to analyse blast frequencies and undertake frequency testing of Werris Creek houses. Written response provided to complainants.

## 7.0 GENERAL

Please feel free to ask any questions in relation to the information contained within this document during Item 7 of the meeting agenda.

Regards Andrew Wright Environmental Officer

# Appendix 1 – Dust Monitoring Results – PM10

#### Werris Creek Coal HVAS TEOM Dust Monitoring 2013-2014

Site	2.5TEOM92 Werris	Monthly	Annual	10TEOM92 Werris	EPL#30 Monthly	Annual	HVP20 Tonsley	EPL#1 Monthly	Rolling Annual	HVP98	EPL#28 Monthly	Rolling Annual	HVP1	Monthly	Rolling Annual	HVP11	EPL#29 Monthly	Rolling Annual	HVT98	Monthly	Rolling Annual	PM10 24hr	PM10 Annual	TSP Annual
Date	Creek	Summary	Average	Creek	Summary	Average	Park	Summary	Average	Kyooma	Summary	Average	Escott	Summary	Average	Glenara	Summary	Average	Kyooma	Summary	Average	Limit	Average	Average
03-Apr-13		1.8 6.2	62		4.0 12 3	12.3	18 16	8.8	17.9	8 35	3.5 7 2	7.9	11	4.8 87	11.4 8.1	12 123	12.3	12.4	14	7.1 12 5	14.4	50 50	30 20	90
15-Apr-13		5.9	0.2		11.3	12.0	16	15.9	16.5	13	6.1	8.2	14	8.2	9.9	31	14.3	18.4	20	11.4	13.8	50	30	90
21-Apr-13		12.7			25.7		9	17.9	14.6	4	13.1	7.2	5	13.5	8.7	16	30.5	17.8	8	20.0	12.5	50	30	90
27-Apr-13							19		15.4	17		9.1	16		10.2	27		19.7	50		19.9	50	30	90
03-May-13		2.3	64		5.0	12.1	15 18	5.5	15.4	8 20	5.2	8.9	11	3.2	10.3	15 20	6.7	19.0	18.9	17.4	19.8 27.7	50	30	90
15-May-13		6.5	0.4		11.4	12.1	6	18.3	14.5	5	9.6	9.8	3	9.9	9.0	7	19.1	17.6	17.4	18.9	26.4	50	30	90 90
21-May-13		14.0			26.8		19	19.0	15.0	10	19.6	9.8	10	16.2	9.1	19	27.4	17.7	18	75.5	25.4	50	30	90
27-May-13							17		15.2	6		9.4	7		8.9	11		17.0	13		24.2	50	30	90
02-Jun-13		2.9	64		4.0	11.1	3	1.3 77	14.1	1	1.1	8.7	2	1.7	8.3	3	1.3	15.8	3	3.2	22.3	50	30	90
14-Jun-13		6.3	0.4		8.5		1	6.4	12.5	3	3.2	7.8	2	3.5	7.4	1	3.3	13.7	3	4.6	19.6	50	30	90 90
20-Jun-13		12.2			16.7		11	16.5	12.4	4	6.2	7.5	6	7.2	7.3	9	10.8	13.4	<0.1	13.1	19.6	50	30	90
26-Jun-13							9		12.2	3		7.2	4		7.1	2		12.7			19.6	50	30	90
02-Jul-13		2.5	64		3.5	10.6	12	5.6	12.2	3	2.7	6.9	6	4.2	7.0	5	1.9	12.2	4	3.9	18.5	50	30	90
14-Jul-13		5.9	0.4		9.2	10.0	19	12.1	12.6	5	3.3	6.7	6	5.6	7.0	9	4.8	11.8	8	6.9	17.2	50	30	90
20-Jul-13		15.2			17.7		6	18.6	12.3	3	5.6	6.5	4	8.6	6.9	2	9.3	11.3	6	9.2	16.5	50	30	90
26-Jul-13							15		12.4	10		6.7	9		7.0	14		11.4	12		16.3	50	30	90
01-Aug-13		0.1			1.5	40.5	10	9.8	12.3	6	6.4	6.7	7	6.6	7.0	10	7.5	11.3	8	8.3	15.9	50	30	90
13-Aug-13		<b>5.5</b> 4.8	0.2		9.9 8.3	10.5	20 12	13.5	12.6	9	8.5	6.7	0 7	7.5	7.0	19	12.0	11.7	10	14.1	15.9	50	30	90
19-Aug-13		20.0			30.3		11	19.8	12.5	11	11.0	7.0	7	9.4	7.0	8	18.6	11.6	22	22.1	16.0	50	30	90
25-Aug-13							10		12.4	7		7.0	7		7.0	12		11.6	13		15.9	50	30	90
31-Aug-13							19		12.7	12		7.2	13		7.2	16		11.8	19		16.0	50	30	90
06-Sep-13		1.8 8 1	65		5.0 15 3	11.3	30	5.2 21 /	13.3	18 10	3.7	7.6	17	4.6	7.6	39	/./ 25.2	12.8	27	6.4 26.5	16.4	50	30	90
12-Sep-13 18-Sep-13		7.4	0.0		14.8	11.5	5	23.6	13.6	4	11.3	7.5	5	14.9	7.8	8	22.8	13.2	6	20.3	16.3	50	30	90
24-Sep-13		17.8			33.7		35	35.2	14.3	32	32.4	8.4	28	27.6	8.5	46	46.3	14.3	72	71.7	18.2	50	30	90
30-Sep-13							23		14.6	12		8.5	12		8.6	56		15.7	16		18.1	50	30	90
06-Oct-13		4.0	69		8.8	12.1	13	12.8	14.5	8	7.7	8.4	8	6.8	8.6	22	22.1	15.9	14	14.3	18.0	50	30	90
12-0ct-13 18-0ct-13		<b>0.2</b> 7 1	0.0		14.4	12.1	38	22.6	16.0	31	11.5	9.4	36	12.0	9.8	42	31.6	17.1	46	21.3	19.5	50	30 30	90 90
24-Oct-13		24.5			43.7		22	41.1	16.1	10	31.2	9.4	7	36.2	9.7	23	56.4	17.3	21	45.6	19.5	50	30	90
30-Oct-13							16		16.1	9		9.4	10		9.7	16		17.2	16		19.4	50	30	90
05-Nov-13		1.5	7.0		1.5	12.4	21	5.8	16.3	11	3.2	9.5	12	5.4	9.8	31	4.2	17.6	23	5.6	19.5	50	30	90
17-Nov-13		<b>0.7</b> 7.4	7.0		12.4	12.4	7	13.1	15.9	5	6.1	9.3	7	7.6	9.6	8	14.0	17.3	21	16.1	19.3	50	30 30	90 90
23-Nov-13		27.6			40.5		6	21.2	15.7	3	10.5	9.1	5	12.2	9.5	4	30.7	16.9	6	22.5	19.0	50	30	90
29-Nov-13							16		15.7	13		9.2	13		9.6	16		16.9	22		19.1	50	30	90
05-Dec-13		3.9 9 7	72		6.2	12.7	12 21	10.1	15.6	12	5.9	9.3	12	7.8	9.7	12	9.3	16.8 16.7	23	9.5	19.2	50	30	90
17-Dec-13		8.1	1.2		14.3	12.7	10	16.0	15.6	6	12.0	9.2	8	11.7	9.7	9	13.4	16.6	10	22.2	19.0	50	30	90
23-Dec-13		15.5			28.4		27	27.4	15.8	18	18.4	9.4	16	16.0	9.8	34	33.9	16.9	38	38.3	19.5	50	30	90
29-Dec-13							25		16.0	20		9.7	20		10.0	26	10.5	17.1	31		19.7	50	30	90
04-Jan-14		3.5	7.6		7.1 17 7	12.2	28	15.0 21 4	16.3	22	2.0	9.9	24	9.0	10.3	37	12.5	17.5	38	14.0 26 7	20.1	50	30	90
16-Jan-14		9.6	7.0		16.5	13.2	20	20.2	16.3	4	15.9	9.6	16	16.6	10.3	20	25.1	17.4	22	28.6	20.0	50	30	90
22-Jan-14		28.0			37.9		19	27.8	16.4	16	22.1	9.8	17	23.5	10.5	25	37.1	17.6	29	37.9	20.2	50	30	90
28-Jan-14									16.4			9.8			10.5			17.6			20.2	50	30	90
03-Feb-14									16.4			9.8			10.5			17.6			20.2	50	30	90
15-Feb-14									16.4			9.8			10.5			17.6			20.2	50	30	90 90
21-Feb-14									16.4			9.8			10.5			17.6			20.2	50	30	90
27-Feb-14									16.4			9.8			10.5			17.6			20.2	50	30	90
05-Mar-14									16.4			9.8			10.5			17.6			20.2	50	30	90
17-Mar-14									16.4			9.8			10.5			17.6			20.2	50	30	90
23-Mar-14									16.4			9.8			10.5			17.6			20.2	50	30	90
29-Mar-14									16.4			9.8			10.5			17.6			20.2	50	30	90
Min Median							1.3			1.1 8 1			1.7 8 3			1.3 14 7			3.2 16.8					
Max							41.1			32.4			36.2	2		56.4			75.5					
Capture							82%			82%			82%			82%			79%					

<u>Appendix 2 – Dust Monitoring Results – Deposited Dust</u>

							Depos	ited D	ust - Wer	ris Cre	ek Coal	Mine 20	13-2014	4						
	N (a/m	IONTH 2/month)		April 2013	May 2013	June 2013	July 2013	August 2013	September 2013	October 2013	November 2013	December 2013	January 2014	February 2014	March 2014	ANNUAL	AVERAGE -	MINIMUM	MAXIMUM	AQGHGMP Criteria
			Total Matter	4.1	1.5	1.3	1.2	0.4	2.2	0.5	1.3	2.7	1.5							
-	DG2	Cintra	Ash Content	3.0	0.8	0.9	0.8	0.3	1.2	0.4	0.7	1.7	0.6			1.7	1.4	0.4	4.1	4.0
			Total Matter	0.7	1.0	0.9	0.8	0.5	1.2	1.0	1.8	1.1	0.1							
-	DG5	Railway View	Ash Content	0.5	0.6	0.9	0.6	0.5	0.8	0.7	1.2	0.7	<0.1			0.9	0.9	0.1	1.8	4.0
			Total Matter	1.2	0.6	0.4	0.6	0.4	1.4	0.5	1.2	7.8	0.7							
EPL #1	DG20	Tonsley Park	Ash Content	0.7	0.3	0.4	0.4	0.3	0.6	0.4	0.8	1.7	0.3			1.5	0.7	0.4	7.8	4.0
	5045	Dista Maria	Total Matter	2.6	1.0	1.2	0.8	1.1	0.8	0.7	1.3	0.3	<0.1							4.0
-	DG15	Plain view	Ash Content	1.3	0.6	1.0	0.5	0.7	0.5	0.6	0.9	0.2	<0.1			1.1	1.1	0.3	2.0	4.0
	DC0	Morongo	Total Matter	1.4	0.8	0.3	0.4	0.5	0.6	0.5	1.2	0.6	0.1			0.6	0.5	0.1	14	4.0
-	DG9	warengo	Ash Content	0.6	0.3	0.2	0.2	0.4	0.3	0.4	0.6	0.6	<0.1			0.8	0.5	0.1	1.4	4.0
	DG22	Mountain	Total Matter	0.7	0.8	1.5	0.5	0.5	2.8	1.3	6.9	0.7	<0.1			17	12	0.5	69	4.0
	0022	View	Ash Content	0.5	0.7	1.2	0.4	0.5	2.0	0.8	3.3	0.6	<0.1				1.2	0.5	0.5	4.0
FPI #29	DG11	Glenara	Total Matter	0.2	0.2	0.2	0.1	0.8	1.1	0.9	1.6	1.2	0.7			07	0.7	0.1	16	4.0
	2011	Clenara	Ash Content	0.1	0.1	0.1	0.1	0.6	0.8	0.6	1.1	0.7	0.6			0.1	0.1	0.1	1.0	4.0
	DG24	Hazeldene	Total Matter	0.8	0.5	0.4	0.3	0.4	0.6	0.7	2.4	1.0	<0.1			0.8	0.8	0.3	2.4	4.0
			Ash Content	0.4	0.4	0.4	0.2	0.3	0.6	0.6	1.3	0.7	<0.1			0.0	0.0	0.0		
	DG17	Woodlands	Total Matter	0.8	0.7	0.4	0.4	0.5	0.5	1.3	1.8	0.7	0.7			0.8	0.8	0.4	1.8	4.0
	_		Ash Content	0.5	0.4	0.4	0.3	0.5	0.5	1.1	1.1	0.6	0.5					-		
-	DG96	Talavera	Total Matter	0.7	0.4	0.2	0.2	0.4	0.6	0.5	1.1	0.7	0.6			0.5	0.5	0.2	1.1	4.0
			Ash Content	0.4	0.2	0.2	0.2	0.2	0.3	0.4	0.9	0.6	0.4							
EPL#28	DG98	Kyooma	Matter	0.2	0.2	0.1	0.2	0.2	0.3	0.4	0.6	0.3	<0.1			0.3	0.3	0.1	0.6	4.0
			Content	0.2	0.2	0.1	0.2	0.2	0.3	0.4	0.5	0.3	<0.1							
-	DG14	Greenslopes	Matter	0.4	0.3	0.3	0.3	0.3	0.6	0.3	1.1	0.8	0.1			0.5	0.5	0.1	1.1	4.0
			Content	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.8	0.6	<0.1							
-	DG62	Werris Creek	Matter	0.3	0.3	0.2	0.9	0.2	0.3	0.3	1.4	0.9	<0.1			0.5	0.5	0.2	1.4	4.0
		oouiii	Content	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.8	0.6	<0.1							
EPL#30	DG92	Werris Creek Centre	Matter	0.5	0.8	0.3	0.3	0.1	0.3	0.2	1.1	0.6	3.9			0.8	0.8	0.1	3.9	4.0
			Content Total	0.3	0.6	0.2	0.2	0.1	0.2	0.2	0.7	0.5	1.6							
-	DG101	Westfall	Matter Ash	1.2	0.5	0.4	0.5	0.4	0.6	0.7	1.3	3.0	0.6			0.9	0.9	0.4	3.0	4.0
			Content Total	0.8	0.5	0.2	0.3	0.2	0.5	0.4	0.9	2.5	0.4							
-	DG103	West Street	Matter Ash	0.8	0.5	0.3	0.7	0.5	0.6	0.5	1.5	1.8	0.1			0.7	0.7	0.1	1.8	4.0
			Content Total	0.6	0.5	1.6	0.4	0.3	0.5	0.5	1.0	0.7	0.1							
-	DG1	Escott	Matter Ash	2.4	0.2	0.6	0.7	0.2	0.5	5.0	0.0	0.7	0.5			1.3	0.8	0.2	5.0	4.0
			Content Total	1.0	0.2	0.0	0.0	0.1	1.6	0.2	1.0	1.2	<0.1							
-	DG3	Eurunderee	Matter Ash	0.8	0.0	0.7	0.4	0.0	1.0	0.2	0.6	0.9	<0.1			0.8	0.8	0.2	1.6	4.0
			Content Total	13.7	6.2	54.4	0.4	0.4	0.6	0.2	0.0	19.6	31.9							
-	DG34	8 Kurrara Street	Matter Ash	9.8	4.6	43.6	0.4	0.2	0.0	0.3	0.6	13.0	10.4			12.8	0.5	0.2	54.1	4.0
<u> </u>			Content Total	0.8	0.4	0.4	0.3	0.4	0.4	3.0	2.6	13	0.2							
· ·	DG106	Villamagna	Matter Ash	0.5	0.3	0.7	0.1	0.4	0.4	1.3	1.6	1.0	0.2			1.0	0.8	0.2	3.0	4.0
1	1		Content	5.5	0.0	5.2	<b>.</b>	0.0	0.0				0.2							

Note: All results are in the form of Insoluble Matter (g/m2/month); NS - Not sampled BROWN - indicates sample is contaminated from a Non-Werris Creek Coal dust source YELLOW - sample contaminated with excessive organic matter (>50%) from non-mining source (i.e bird droppings and insects)

# Appendix 3 – Train Dust Deposition Monitoring

						Dep	oosi	ted	Dus	st - C	Quir	indi	Tra	ins :	2013	3-20	14								
		DD	W30			DD	N20			DD	W13			DD	E13			DD	E20			DD	E30		line
	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Guidel
April 2013	0.8	15%	45%	40%	0.5	15%	50%	35%	-	-	-	-	1.0	15%	45%	15%	0.9	15%	60%	25%	0.7	5%	55%	40%	4.0
May 2013	1.4	<1%	50%	30%	0.7	<1%	90%	10%	0.5	10%	85%	5%	0.6	<1%	70%	20%	0.9	<1%	30%	60%	0.5	<1%	90%	10%	4.0
June 2013	1.0	30%	30%	35%	0.5	40%	35%	20%	-	-	-	-	-	-	-	-	0.4	30%	40%	20%	0.8	15%	50%	15%	4.0
July 2013	1.0	30%	40%	20%	1.2	25%	40%	10%	0.9	30%	20%	10%	0.8	20%	40%	20%	1.7	20%	30%	40%	1.6	10%	25%	30%	4.0
August 2013	0.8	5%	30%	60%	0.5	10%	30%	50%	0.5	35%	20%	45%	0.7	30%	40%	25%	0.6	30%	40%	20%	0.9	5%	30%	35%	4.0
September 2013	1.2	-	-	-	1.1	-	-	-	1.7	-	-	-	1.8	-	-	-	1.2	-	-	-	1.0	-	-	-	4.0
October 2013	-	-	-	-	1.9	20%	40%	30%	1.4	40%	20%	40%	2.9	70%	10%	20%	2.4	60%	20%	20%	3.1	20%	20%	30%	4.0
November 2013	2.0	15%	45%	35%	2.6	15%	30%	50%	2.8	75%	10%	15%	c18.1	<1%	10%	90%	1.3	35%	20%	40%	1.5	10%	35%	40%	4.0
December 2013	1.5	10%	40%	20%	1.6	10%	30%	20%	c5.7	10%	20%	10%	0.9	10%	40%	40%	2.5	20%	10%	10%	2.1	5%	35%	10%	4.0
January 2014	0.6	40%	30%	20%	2.3	40%	10%	<1%	1.9	55%	15%	20%	1.4	80%	15%	5%	0.8	50%	20%	20%	1.6	20%	10%	10%	4.0
February 2014																									4.0
March 2014																									4.0
ANNUAL AVERAGE		1	.1			1	.3			1	.4			1	.3			1	.3			1	.4		4.0
Average Coal %		20	.7%			21.9%			36	.4%			37.	.5%			32.	.5%			11	.3%		-	
Average Coal g/m2		0.	24			0.28		0.50			0.47			0.41				0.16				-			
MINIMUM		0	.6			0.5			0.5			0.6			0.4				0.5				-		
MAXIMUM		2	.0			2.6			2.8			2.9					2	.5		3.1				4.0	

Note: All results are in the form of Insoluble Matter (g/m2/month)

# Appendix 4 – Noise Monitoring Results



25 November 2013

Ref: 04035/4999

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

## RE: NOVEMBER 2013 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Thursday 21<sup>st</sup> November, 2013 as required by the draft Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

## Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

			Table 1	. <b>D</b>
		WCC /	Attended Noise Monitoring	J Program
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements
A	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ
B1	$60 \text{ minutes}^2$	R7	83 Wadwells Lane	60 minutes as per EPL 12290
	00 minutes	R8*	Almawillee	Private Agreement
B2	$60 \text{ minutes}^2$	R9	Gedhurst	60 minutes as per EPL 12290
DZ	00 111110165	R22	Mountain View	60 minutes as per EPL 12290
C	15 minutos <sup>1</sup>	R10*	Meadholme	Private Agreement
U U	10 minutes	R11*	Glenara	r IIvate Agreement
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement
I	60 minutes <sup>2</sup>	R57	Kurrara Street <sup>®</sup>	60 minutes as per EPL 12290
J	15 minutes <sup>1</sup>		Coronation Avenue <sup>@</sup>	PA10_0059 Private Property outside NMZ
K	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

Monitoring points B1, B2, C and K are considered representative of multiple receivers because they are sufficiently close together that therefore noise monitoring at the monitoring points are acoustically representative of individual receivers in accordance with EPL 12290 Condition L4.6.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



## **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Thursday 21<sup>st</sup> November 2013 had the 5600 excavator in Strip 14 centre at RL330m, 3600 excavator in Strip 14 west at RL350m; a 1900 excavator in Strip 15 centre at RL370m and a 1900 excavator in Strip 15 west at RL370m. Day and night shift had the overburden truck fleets running to the western RL410m (out of pit) dump. There were no production delays due to noise impacts. The crushing plant and train load out operated to 3:30am with two trains loaded during night shift.

#### Noise Compliance Assessment

The results of the noise measurements are shown below in **Tables 2** and **3**.



				Table 2		
		W	CC Noise Mon	itoring Results -	21 November	2013 (Day)
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Inversion <sup>o</sup> C/100m	Wind speed (m/s),dir <sup>o</sup>	Identified Noise Sources
A R5 Rosehill	2:33 pm	39	35	n/a	1.0,337	Birds & insects (39), traffic (22), WCC inaudible
B1 R7 83 Wadwells Lane/R8 Almawillee	2:53 pm	49	37	n/a	2.2,199	Birds & insects (49), tractor (24), WCC (22)
B2 R9Gedhurst/ R22 Mountain View	1:30 pm	47	37/36*	n/a	2.0,320	Birds & insects (47), traffic (25), WCC (23)
C R10 Meadholme/ R11 Glenara	2:58 pm	46	39	n/a	1.2,213	Birds & insects (46), traffic (20), WCC inaudible
D R24 Hazeldene	3:17 pm	41	37	n/a	1.1,115	Birds & insects (41), traffic (30), WCC inaudible
E R12 Railway Cottage	1:27 pm	50	38	n/a	2.0,320	Traffic (49), birds & insects (43), WCC inaudible
F R96 Talavera	2:33 pm	32	38	n/a	1.9,239	Birds & insects (31), traffic (24), WCC barely audible
<b>G</b> R97	3:40 pm	37	35	n/a	2.1,191	Birds & insects (37), WCC inaudible
H R98 Kyooma	4:05 pm	37	36	n/a	1.2,213	Birds & insects (37), WCC (19)
I R57 Kurrara St	4:48 pm	54	35	n/a	1.9,60	Traffic (54), birds & insects (43), WCC inaudible
J R57 Coronation Ave	4:29 pm	43	35	n/a	0.5,90	Birds & insects (43), trains (32), traffic (30), WCC
						inaudible
K R21 Alco Park	4:43 pm	39	39	n/a	2.6,7	Birds & insects (37), trains (34), WCC inaudible
L R103	4:23 pm	34	35	n/a	2.4,10	Train (34), insects (22), WCC inaudible

Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.

Table 3									
WCC Noise Monitoring Results – 21 November 2013 (Evening/Night)									
		dB(A),	dB(A),	Criterion	Inversion <sup>o</sup> C/100m,				
Location	Time	L1	Leq	dB(A) Leq	Wind speed	Identified Noise Sources			
		(1min) <sup>1</sup>			(m/s),dir <sup>o</sup>				
A R5 Rosehill	8:21 pm	40	37	35	+3.6,6.1,66	Birds & insects (35), WCC (32), traffic (25)			
B1 R7 83 Wadwells	8:41 pm	40	40	37	+1.6,6.6,47	Birds & insects (37), WCC (31), traffic (30)			
Lane/R8 Almawillee									
B2 R9Gedhurst/ R22	7:08 pm	30	43	37/36*	Lapse, 3.8, 38	Birds & insects (43), traffic (32), WCC (27)			
Mountain View									
C R10 Meadholme/ R11	9:45 pm	34	38	39	Lapse, 2.6, 284	Birds & insects (36), dog (32), traffic (30), WCC (26)			
Glenara									
D R24 Hazeldene	10:12 pm	35	36	37	Lapse, 3.9, 88	Birds & insects (35), WCC (25), traffic (24)			
E R12 Railway Cottage	10:32 pm	<25	32	38	Lapse, 3.7, 84	Traffic (30), insects (26), WCC (20)			
F R96 Talavera	7:12 pm	n/a	33	37	+3.4,4.4,47	Birds & insects (33), WCC inaudible			
<b>G</b> R97	8:17 pm	n/a	42	35	+0.3,6.3,71	Birds & insects (39), wind (39), WCC inaudible			
H R98 Kyooma	8:42 pm	n/a	36	36	Lapse, 5.4, 54	Birds & insects (33), wind (33) WCC inaudible			
I R57 Kurrara St	9:26 pm	n/a	48	35	Lapse, 3.2, 128	Traffic (45), insects (43), trains (40), WCC inaudible			
J R57 Coronation Ave	9:05 pm	n/a	42	35	Lapse,7.7,50	Traffic (40), birds & insects (38), WCC inaudible			
K R21 Alco Park	11:42 pm	n/a	47	37	Lapse, 3.8, 128	Insects (46), traffic (37), trains (37), WCC inaudible			
L R103	11:20 pm	n/a	41	35	Lapse, 2.7, 98	Insects (40), trains (35), WCC inaudible			

1. L1 (1 min) from mine noise only. \* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.

The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.





Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.







We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

an ,

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Review:

Neil Perit

Neil Pennington Acoustical Consultant



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## Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Location		Day	Evening/Night	Night	Long Term	Acquisition
		L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R7	83 Wadwells Lane	37	37	45	35	40
R9	"Gedhurst"	37	37	45	35	40
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R22	"Mountain View"	36	36	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All other privately-owned land		35	35	45	35	40

## LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq		
R8	"Almawillee"	40	45		
R10	"Meadholme"	40	45		
R11	"Glenara"	40	45		
R20	"Tonsley Park"	40	45		
R21	"Alco Park"	40	45		
R98	"Kyooma"	40	45		

#### Table 21: Properties with Private Agreements Noise Criteria



## Appendix III

Plant Sound Power Levels

Plant Item			SWLs	dP(A) Log	dB(A)	Data Maagurad
Туре	No.	Leq	Lmax	dB(A) Leq	Lmax	Date measured
Haul truck CAT 785C (unattenuated)	608	108	116	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	108	116	115	118	8/8/13
Haul truck CAT 785C (unattenuated)	614	108	116		120	17/7/12
Haul truck CAT 785C (unattenuated)	609	108	116	120		11/9/12
Haul truck CAT 785C (unattenuated)	610	108	116	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	108	116	120		11/9/12
Haul truck CAT 785C (unattenuated)	600	108	116	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	108	116	122		8/8/13
Haul truck CAT 785C (unattenuated)	624	108	116	121		8/8/13
Water Cart	WA897	111	118	113		11/9/12
Scraper	SC882	118	121	113		11/9/12
Excavator (PC 3600)	EX551	116	120	115		11/9/12
Dozer	829	107	114	114		11/9/12
Crushing Plant	n/a	114	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	108	116		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	108	116		124	11/9/12
Haul truck CAT 793XQ	662	n/a	n/a	115	118	18/12/12
Excavator (PC4000)	EX837	116	n/a	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	107 (1 <sup>st</sup> )	114 (1 <sup>st</sup> )	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	107 (1 <sup>st</sup> )	114 (1 <sup>st</sup> )	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	107 (1 <sup>st</sup> )	114 (1 <sup>st</sup> )	119 113	122 118	6/2/13
Excavator (EX 5600)	570	121	n/a	116	119	8/8/13
Haul truck CAT 793XQ	660	115	n/a	116	119	8/8/13
Haul truck CAT 793XQ	661	115	n/a	116	118	8/8/13
Haul truck CAT 793XQ	662	115	n/a	115	118	8/8/13
Haul truck CAT 793XQ	663	115	n/a	116	119	8/8/13
Haul truck CAT 793XQ	664	115	n/a	114	117	8/8/13
Haul truck CAT 793XQ	665	115	n/a	115	117	8/8/13
Haul truck CAT 793XQ	666	115	n/a	115	117	8/8/13

 $\square$ 

Haul truck CAT 793XQ	667	115	n/a	116	119	8/8/13
Hitachi Excavator	543	116	n/a	115	119	8/8/13
Grader	849	n/a	n/a	110	112	8/8/13
Warrior 2400 crusher	n/a	n/a	n/a	117	117	8/8/13
Kleeman screen	MCR401	n/a	n/a	111	112	8/8/13

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.




6 January 2014

Ref: 04035/5025

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

### RE: DECEMBER 2013 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Monday 16<sup>th</sup> and Tuesday 17<sup>th</sup> December, 2013 as required by the draft Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

## Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

	Table 1												
	WCC Attended Noise Monitoring Program												
Monitoring Point	Duration	Relevant Monitoring Requirements											
A	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ									
R1	$60 \text{ minutes}^2$	R7	83 Wadwells Lane	60 minutes as per EPL 12290									
	00 minutes	R8*	Almawillee	Private Agreement									
B2	$60 \text{ minutes}^2$	R9	Gedhurst	60 minutes as per EPL 12290									
DZ	00 minutes	R22	Mountain View	60 minutes as per EPL 12290									
C	15 minutes <sup>1</sup>	R10*	Meadholme	Private Agreement									
Ŭ	10 minutes	R11*	Glenara	r IIvale Agreement									
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290									
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290									
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290									
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ									
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement									
I	60 minutes <sup>2</sup>	R57	Kurrara Street <sup>®</sup>	60 minutes as per EPL 12290									
J	15 minutes <sup>1</sup>		Coronation Avenue <sup>@</sup>	PA10_0059 Private Property outside NMZ									
K	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement									
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ									

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

Monitoring points B1, B2, and C are considered representative of multiple receivers because they are sufficiently close together that therefore noise monitoring at the monitoring points are acoustically representative of individual receivers in accordance with EPL 12290 Condition L4.6.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



#### **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

The noise monitoring commenced with the daytime survey on Monday 16<sup>th</sup> December. Rain in the early evening caused disruptions to mining throughout the evening and night. The nighttime survey was, therefore, undertaken on Tuesday 17<sup>th</sup> December.

WCC operations on Monday dayshift 16<sup>th</sup> December and Tuesday night shift 17<sup>th</sup> December 2013 had the 5600 excavator in Strip 13 centre at RL300m, a 1900 excavator in Strip 13 centre at RL300m and a 1900 excavator in Strip 14 centre at RL340m. The 3600 excavator was not operating due to unplanned maintenance. Day and night shift had the two Strip 13 overburden truck fleets running to the in pit dump at RL330m and the Strip 14 truck fleet were dumping on the western (out of pit) dump at RL430m. There were no production delays due to noise impacts. The crushing plant and train load out operated to 3:30am with no trains loaded.

#### Noise Compliance Assessment

The results of the noise measurements are shown below in Tables 2 and 3.



Table 2												
	WCC Noise Monitoring Results – 16 December 2013 (Day)											
l ti	<b>T</b> !	dB(A),	Criterion	Inversion	Wind	Identified Nation Courses						
Location	Time	Leq	dB(A) Leq	°C/100m	(m/s),dir <sup>o</sup>	identified Noise Sources						
A R5 Rosehill	11:30 am	38	35	n/a	1.8,78	Birds & insects (38), traffic (25), WCC (21)						
<b>B1</b> R7 83 Wadwells Lane/R8 Almawillee	1:22 pm	47	37	n/a	3.7,177	Birds & insects (47), domestic noise (30), WCC inaudible						
B2 R9Gedhurst/ R22 Mountain View	10:25 am	45	37/36*	n/a	2.3,55	Birds & insects (45), tractor (30), WCC (26)						
C R10 Meadholme/ R11 Glenara	11:51 am	38	39	n/a	1.4,134	Birds & insects (37), traffic (30), WCC inaudible						
D R24 Hazeldene	12:12 pm	36	37	n/a	2.0,194	Birds & insects (33), traffic (33), WCC inaudible						
E R12 Railway Cottage	9:15 am	37	38	n/a	2.6,11	Birds & insects (36), traffic (30), WCC inaudible						
F R96 Talavera	10:28 am	33	38	n/a	2.3,55	Birds & insects (32), traffic (25), WCC (20)						
<b>G</b> R97	11:40 am	34	35	n/a	0.6,67	Birds & insects (34), WCC (20)						
H R98 Kyooma	12:08 pm	33	36	n/a	2.2,205	Birds & insects (33), WCC (<20)						
I R57 Kurrara St	12:53 pm	45	35	n/a	2.9,181	Birds & insects (43), traffic (40), WCC inaudible						
J R57 Coronation Ave	12:32 pm	48	35	n/a	1.7,204	Birds & insects (45), traffic (45), WCC inaudible						
K R21 Alco Park	9:58 pm	37	39	n/a	2.2,22	Traffic (37), birds & insects (28), WCC inaudible						
L R103	9:30 am	36	35	n/a	3.2,348	Traffic (34), birds & insects (31), WCC inaudible						

Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.

Table 3									
WCC Noise Monitoring Results – 17 December 2013 (Evening/Night)									
		dB(A),	dB(A),	Criterion	Inversion <sup>o</sup> C/100m,				
Location	Time	L1	Leq	dB(A) Leq	Wind speed	Identified Noise Sources			
		(1min) <sup>1</sup>			(m/s),dir <sup>o</sup>				
A R5 Rosehill	9:08 pm	n/a	37	35	+2.1,2.5,126	Traffic (36), birds & insects (30), WCC inaudible			
B1 R7 83 Wadwells	9:28 pm	37	40	37	+1.0,2.8,113	Insects (39), WCC (31), traffic (30)			
Lane/R8 Almawillee									
B2 R9Gedhurst/ R22	8:03 pm	n/a	34	37/36*	+1.7,3.6,120	Birds & insects (34), traffic (25), WCC inaudible			
Mountain View									
C R10 Meadholme/ R11	10:32 pm	n/a	32	39	+0.6,3.4,106	Birds & insects (32), traffic (23), WCC faintly audible			
Glenara									
D R24 Hazeldene	10:56 pm	30	40	37	+5.4,0.6,267	Birds & insects (38), traffic (35), WCC (25)			
E R12 Railway Cottage	10:45 pm	n/a	36	38	+4.2,1.1,223	Traffic (35), insects (29), WCC inaudible			
F R96 Talavera	7:06 pm	n/a	32	37	Lapse, 5.6, 143	Birds & insects (32), WCC inaudible			
<b>G</b> R97	8:18 pm	n/a	36	35	+1.4,3.6,120	Insects (36), traffic (24), WCC inaudible			
H R98 Kyooma	8:44 pm	n/a	29	36	+2.0,3.4,120	Birds & insects (29), WCC inaudible			
I R57 Kurrara St	9:30 pm	n/a	40	35	+2.7,2.8,113	Frogs & insects (38), trains (35), traffic (30), WCC			
						inaudible			
J R57 Coronation Ave	9:11 pm	n/a	33	35	+2.1,2.2,138	Insects (31), traffic (29), WCC inaudible			
K R21 Alco Park	7:37 pm	n/a	44	37	+0.4,5.0,140	Birds & insects (42), traffic (40), WCC inaudible			
L R103	7:17 pm	n/a	42	35	Lapse, 5.9, 144	Birds & insects (39), trains (38), traffic (32), WCC			
						inaudible			

1. L1 (1 min) from mine noise only. \* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.



The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.

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In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-





minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Cass

Ross Hodge Acoustical Consultant

Review:

Neil Port

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## Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Legation		Day	Evening/Night	Night	Long Term	Acquisition
	Location	L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R7	83 Wadwells Lane	37	37	45	35	40
R9	"Gedhurst"	37	37	45	35	40
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R22	"Mountain View"	36	36	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

## LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
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R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R98	"Kyooma"	40	45

#### Table 21: Properties with Private Agreements Noise Criteria



## Appendix III

Plant Sound Power Levels

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Туре	No.	Leq	Lmax	dB(A) Leq	Lmax	Date measured
Haul truck CAT 785C (unattenuated)	608	108	116	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	108	116	115	118	8/8/13
Haul truck CAT 785C (unattenuated)	614	108	116		120	17/7/12
Haul truck CAT 785C (unattenuated)	609	108	116	120		11/9/12
Haul truck CAT 785C (unattenuated)	610	108	116	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	108	116	120		11/9/12
Haul truck CAT 785C (unattenuated)	600	108	116	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	108	116	122		8/8/13
Haul truck CAT 785C (unattenuated)	624	108	116	121		8/8/13
Water Cart	WA897	111	118	113		11/9/12
Scraper	SC882	118	121	113		11/9/12
Excavator (PC 3600)	EX551	116	120	115		11/9/12
Dozer	829	107	114	114		11/9/12
Crushing Plant	n/a	114	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	108	116		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	108	116		124	11/9/12
Haul truck CAT 793XQ	662	n/a	n/a	115	118	18/12/12
Excavator (PC4000)	EX837	116	n/a	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	107 (1 <sup>st</sup> )	114 (1 <sup>st</sup> )	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	107 (1 <sup>st</sup> )	114 (1 <sup>st</sup> )	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	107 (1 <sup>st</sup> )	114 (1 <sup>st</sup> )	119 113	122 118	6/2/13
Excavator (EX 5600)	570	121	n/a	116	119	8/8/13
Haul truck CAT 793XQ	660	115	n/a	116	119	8/8/13
Haul truck CAT 793XQ	661	115	n/a	116	118	8/8/13
Haul truck CAT 793XQ	662	115	n/a	115	118	8/8/13
Haul truck CAT 793XQ	663	115	n/a	116	119	8/8/13
Haul truck CAT 793XQ	664	115	n/a	114	117	8/8/13
Haul truck CAT 793XQ	665	115	n/a	115	117	8/8/13
Haul truck CAT 793XQ	666	115	n/a	115	117	8/8/13



Haul truck CAT 793XQ	667	115	n/a	116	119	8/8/13
Hitachi Excavator	543	116	n/a	115	119	8/8/13
Grader	849	n/a	n/a	110	112	8/8/13
Warrior 2400 crusher	n/a	n/a	n/a	117	117	8/8/13
Kleeman screen	MCR401	n/a	n/a	111	112	8/8/13

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.





4 February 2014

Ref: 04035/5049

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

### RE: JANUARY 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Tuesday 28<sup>th</sup> January, 2014 as required by the draft Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

### Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

	Table 1											
	WCC Attended Noise Monitoring Program											
Monitoring Point	Duration	ID	Relevant Monitoring Requirements									
A	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ								
B1	$60 \text{ minutes}^2$	R7	83 Wadwells Lane	60 minutes as per EPL 12290								
	00 111110165	R8*	Almawillee	Private Agreement								
B2	$60 \text{ minutes}^2$	R9	Gedhurst	60 minutes as per EPL 12290								
DZ	00 minutes	R22	Mountain View	60 minutes as per EPL 12290								
C	15 minutos <sup>1</sup>	R10*	Meadholme	Private Agreement								
C		R11*	Glenara	r Iwale Agreement								
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290								
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290								
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290								
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ								
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement								
I	60 minutes <sup>2</sup>	R57	Kurrara Street <sup>®</sup>	60 minutes as per EPL 12290								
J	15 minutes <sup>1</sup>		Coronation Avenue <sup>@</sup>	PA10_0059 Private Property outside NMZ								
К	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement								
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ								

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

Monitoring points B1, B2, and C are considered representative of multiple receivers because they are sufficiently close together that therefore noise monitoring at the monitoring points are acoustically representative of individual receivers in accordance with EPL 12290 Condition L4.6.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



#### **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Tuesday 28<sup>th</sup> January 2014 had the 5600 excavator in Strip 15 west at RL370m, a 1900 excavator in Strip 15 east at RL370m, a 1900 excavator in Strip 17 west at RL390m and a 1900 excavator in Strip 13 centre at RL310m. The 3600 excavator was not operating due to unplanned maintenance. The Strip 13 overburden truck fleet were running to the in pit dump at RL330m and the other truck fleets were running to the Western Out of Pit Dump at RL420m. There were no production delays due to noise impacts. The crushing plant and train load out operated to 3:30am with three trains loaded between 10:06pm and 12:49pm; 6:58pm and 8:54pm and 21:19 and 11:06pm.

#### Noise Compliance Assessment

The results of the noise measurements are shown below in Tables 2 and 3.



Table 2												
	WCC Noise Monitoring Results – 28 January 2014 (Day)											
		dB(A),	Criterion	Inversion	Wind							
Location	Time	Leq	dB(A) Leq	<sup>o</sup> C/100m	speed	Identified Noise Sources						
					(m/s),dir <sup>o</sup>							
A R5 Rosehill	2:15 pm	38	35	n/a	3.5,119	Traffic (37), birds & insects (30), WCC inaudible						
B1 R7 83 Wadwells	2:35 pm	43	37	n/a	4.1,106	Birds & insects (41), domestic noise (39), WCC inaudible						
Lane/R8 Almawillee												
B2 R9Gedhurst/ R22	1:10 pm	45	37/36*	n/a	3.7,122	Birds & insects (45), WCC (22)						
Mountain View												
C R10 Meadholme/	3:39 pm	37	39	n/a	2.9,103	Birds & insects (36), wind in trees (30), WCC inaudible						
R11 Glenara												
D R24 Hazeldene	3:58 pm	37	37	n/a	3.8,45	Traffic (36), birds & insects (32), WCC inaudible						
E R12 Railway Cottage	4:40 pm	37	38	n/a	3.7,56	Birds & insects (36), traffic (30), WCC inaudible						
F R96 Talavera	1:06 pm	33	38	n/a	3.7,122	Birds & insects (33), WCC inaudible						
<b>G</b> R97	2:15 pm	32	35	n/a	3.5,119	Birds & insects (32), cattle (20), WCC faintly audible						
H R98 Kyooma	4:15 pm	36	36	n/a	5.4,27	Birds & insects (34), wind (32), WCC inaudible						
I R57 Kurrara St	3:05 pm	35	35	n/a	3.6,93	Birds & insects (34), traffic (28), WCC inaudible						
J R57 Coronation Ave	2:47 pm	44	35	n/a	4.0,116	Birds & insects (44), traffic (35), WCC inaudible						
K R21 Alco Park	5:26 pm	36	39	n/a	4.8,82	Traffic (36), birds & insects (25), WCC inaudible						
L R103	5:07 pm	35	35	n/a	3.3,36	Traffic (32), birds & insects (32), WCC inaudible						

Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.

Table 3											
	WCC Noise Monitoring Results – 28 January 2014 (Evening/Night)										
		dB(A),	dB(A),	Criterion	Inversion <sup>o</sup> C/100m,						
Location	Time	L1	Leq	dB(A) Leq	Wind speed	Identified Noise Sources					
		(1min) <sup>1</sup>			(m/s),dir <sup>o</sup>						
A R5 Rosehill	9:04 pm	n/a	33	35	Lapse,8.1,48	Birds & insects (30), traffic (29), pump (24), WCC faintly					
						audible					
B1 R7 83 Wadwells	9:24 pm	40	37	37	Lapse, 7.0, 46	Insects (36), WCC (29), traffic (23)					
Lane/R8 Almawillee											
B2 R9Gedhurst/ R22	8:00 pm	30	34	37/36*	Lapse,5.7,44	Birds & insects (30), traffic (30), WCC (26)					
Mountain View											
C R10 Meadholme/ R11	10:28 pm	n/a	37	39	Lapse,6.5,44	Traffic (37), insects (27), WCC faintly audible					
Glenara											
D R24 Hazeldene	10:50 pm	25	38	37	Lapse, 3.7, 43	Traffic (35), insects (34), WCC (<20)					
E R12 Railway Cottage	10:51 pm	n/a	36	38	Lapse, 3.7, 43	Traffic (35), insects (28), WCC inaudible					
F R96 Talavera	7:10 pm	n/a	34	37	Lapse, 5.1, 43	Birds & insects (34), WCC faintly audible					
<b>G</b> R97	8:21 pm	n/a	40	35	Lapse, 5.4, 46	Wind (40), WCC inaudible					
H R98 Kyooma	8:55 pm	n/a	42	36	Lapse,8.1,48	Wind (42), insects (30), WCC inaudible					
I R57 Kurrara St	9:40 pm	n/a	38	35	Lapse,6.8,45	Wind (37), frogs & insects (31), traffic (25), WCC					
						inaudible					
J R57 Coronation Ave	9:23 pm	n/a	40	35	Lapse,7.5,49	Wind (40), insects (30), WCC inaudible					
K R21 Alco Park	7:35 pm	n/a	47	37	Lapse, 5.6, 43	Insects (46), traffic (40), WCC inaudible					
L R103	7:15 pm	n/a	39	35	Lapse, 5.9, 144	Trains (37), traffic (34), insects (25), WCC inaudible					

1. L1 (1 min) from mine noise only. \* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.



The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.

Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-





minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Cass

Ross Hodge Acoustical Consultant

Review:

Neil Port

Neil Pennington Acoustical Consultant

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## Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Legation		Day	Evening/Night	Night	Long Term	Acquisition
	Location	L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R7	83 Wadwells Lane	37	37	45	35	40
R9	"Gedhurst"	37	37	45	35	40
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R22	"Mountain View"	36	36	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

## LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R8	"Almawillee"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R98	"Kyooma"	40	45

#### Table 21: Properties with Private Agreements Noise Criteria



## Appendix III

Plant Sound Power Levels

Plant Item		NMP SWL	Actual	Actual	Data Maggurad
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116	118	28/1/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	114		11/9/12
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13



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Haul truck CAT 793XQ	664	115	114	117	8/8/13
Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.



# Appendix 5 – Blasting Monitoring Results

													WERRIS	CREEK CO	DAL BLASTING RESU	LTS							
Shot number	Date fired	Time Fired	Location	Туре	Glenar	a R11	Tonslev	Park R20	Werris C	reek R62	Talave	ra R96	COMPL	IANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	WIN	D	FUME	c	MPLAINT	3
					Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	0 to 5	OP/Vib	Dust/Fume	Other
2013-82	1/11/2013	13:13	S15_17-19_370RL	OB	<0.25	<109.8	0.64	101.7	0.29	100.4	<0.25	<109.8	10.00	120.0	Not Monitored	50.00	-2.0	205	2.0	0	0	0	0
2013-83	4/11/2013	12:11	S13_S14_DE Wedge	IB	<0.25	<109.8	<0.25	<109.8	< 0.25	<109.8	<0.25	<109.8	10.00	120.0	Not Monitored	50.00	-4.5	163	7.4	0	0	0	0
2013-84	5/11/2013	13:13	S13_10 & S13_9_DE Coal UG Collapse	TSB	<0.25	<109.8	<0.25	<109.8	< 0.25	<109.8	<0.25	<109.8	10.00	120.0	Not Monitored	50.00	-4.3	122	2.7	0	0	0	0
2013-85	7/11/2013	16:10	S13 DE UG Collapse	IB	<0.25	<109.8	<0.25	<109.8	< 0.25	<109.8	< 0.25	<109.8	10.00	120.0	Not Monitored	50.00	-2.6	147	1.7	0	0	0	0
2013-86	12/11/2013	10:42	S15_10-12_370	OB	<0.25	<109.8	<0.25	<109.8	<0.25	<109.8	<0.25	<109.8	10.00	120.0	Not Monitored	50.00	-1.4	0	5.6	0	0	0	0
2013-87	13/11/2013	13:27	S13_4-9_TSB43_Presplit and Rock Pops	PS	<0.25	<109.8	1.71	105.0	0.42	97.4	<0.25	<109.8	10.00	120.0	6.47 125.6	50.00	-3.3	281	1.9	0	1	0	0
2013-88	20/11/2013	12:07	S13_4-9_310 TSB43 Pt1	TSB	<0.25	<109.8	1.36	105.0	0.58	103.0	<0.25	<109.8	10.00	120.0	8.97 97.1	50.00	-3.3	175	4.8	0	1	0	0
2013-89&90	27/11/2013	13:06	S16_19-23_370	OB	0.20	102.0	1.37	105.0	0.50	103.0	0.27	99.0	10.00	120.0	Not Monitored	50.00	-2.7	175	3.3	0	0	0	0
2013-91	29/11/2013	13:25	S16_17-20_385	OB	<0.25	<109.8	0.84	107.0	0.21	105.0	0.14	107.0	10.00	120.0	Not Monitored	50.00	-1.6	312	5.4	0	0	0	0
TOTALS	NOVEMBER 2013	# BLAST	9	AVERAGE	0.20	102.0	1.18	104.7	0.40	101.8	0.21	103.0	5.00	115.0									
TOTALS	NOVEMBER 2013	2	1	HIGHEST	0.20	102.0	1.71	107.0	0.58	105.0	0.27	107.0	10.00	120.0									
TOTALS	ANNUAL	# BLAST	66	AVERAGE	0.30	98.5	0.86	101.9	0.44	100.9	0.23	103.9	5.00	115.0	-								
TOTALS	ANNUAL	%	>115dB(L) or 5mm/s or MAX # Blasts Per Month	15	0%	0%	0%	1.5%	0%	1.5%	0%	1.5%	5%	5%									
													WERRIS	CREEK CO	DAL BLASTING RESU	LTS							
Shot number	Date fired	Time Fired	Location	Type										DECE	MBER 2013								
					Glenar	a K11	Ionsley	Park R20	Werris C	reek R62	Talave	ra R96	COMPL	IANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	WIN	D (	FUME	00040		
0040.00	4/40/2042	40.00	D40 40 45 070	00	VID (mm/s)	OP (dB)	VID (mm/s)	OP (dB)	VID (mm/s)	OP (dB)	VID (mm/s)	OP (dB)	VID (mm/s)	OP (dB)	VID (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	0 to 5	OP/VID	Dust/Fume	Other
2013-92	4/12/2013 E/12/2012	13:09	S16_12=15_370	UB	0.17	107.0	1.69	105.0	0.48	104.0	-0.25	112.0	10.00	120.0	Not Monitored	50.00	-2.7	290	0.9	0	0	1	0
2013-93	11/12/2013	13:13	S15_Wedge	IB OP	<0.25	103.0	1.70	105.0	<0.20	<109.0	<0.20	105.0	10.00	120.0	Not Monitored	50.00	-3.5	271	0.9	0	0	0	0
2013-94	13/12/2013	15:12	S12_12.16_Gcoal	IB	0.20	102.0	1.79	101.0	0.51	101.0	0.30	103.0	10.00	120.0	Not Monitored	50.00	-1.5	200	3.5	0	1	0	0
2013-96	10/12/2013	12:17	\$17 Trim Pt2	OB	0.20	07.0	3.30	103.0	1.05	102.0	0.53	104.0	10.00	120.0	Not Monitored	50.00	-1.5	133	3.3	0	6	0	0
2013-97&98	24/12/2013	13:05	S17 Trim Pt3 & S13 Wedge	OB/IB	0.13	98.0	1.51	103.0	0.37	102.0	0.33	104.0	10.00	120.0	4 69 119 9	50.00	-2.5	181	4.5	0	0	0	1
TOTALS	DECEMBER 2013	# BLAST	6	AVERAGE	0.20	102.2	1.69	103.8	0.59	100.6	0.40	106.4	5.00	115.0	4.00 110.0	00.00	2.0	101	4.0	•	0	Ŭ	<u>`</u>
TOTALS	DECEMBER 2013	#>0.5mm	3	HIGHEST	0.26	107.0	3.39	108.0	1.05	104.0	0.53	112.0	10.00	120.0									
TOTALS	ANNUAL	# BLAST	72	AVERAGE	0.28	99.1	0.95	102.1	0.45	100.9	0.25	104.2	5.00	115.0									
TOTALS	ANNUAL	%	>115dB(L) or 5mm/s or MAX # Blasts Per Month	15	0%	0%	0%	1.4%	0%	1.4%	0%	1.4%	5%	5%									
								1	1				WERRIS	CREEK CO	OAL BLASTING RESU	LTS							
Shot number	Data fired	Time Fired	Location	Type										JAN	UARY 2014								
Shot number	Date meu	rime rineu	Location	Type	Glenar	a R11	Kyoon	na R98	Werris C	k Sth R62	Werris Cl	Mid R92	COMPL	IANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	WIN	D	FUME	C	OMPLAINTS	j
					Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	0 to 5	OP/Vib	Dust/Fume	Other
2014-01	10/01/2014	13:19	S15_370-330_Presplit	PS	0.07	86.8	0.46	84.7	0.16	88.1	0.18	91.2	10.00	120.0	Not Monitored	50.00	-3.5	132	0.3	1	0	0	0
2014-02	23/01/2014	13:02	S15_13-16_370-350	IB	0.26	104	2.42	106.9	0.63	104.8	0.45	103.7	10.00	120.0	Not Monitored	50.00	-3.1	33	4.4	2	3	0	0
2014-03	24/01/2014	13:14	Rock Pop Shot	ReBlast	0.04	109.4	0.01	99.7	0.00	99.0	0.01	103.0	10.00	120.0	Not Monitored	50.00	-3.5	290	5.3	0	0	0	0
2014-04	31/01/2014	14:08	S15_17-18_370-350	TSB	0.18	99.0	Offline	Offline	0.57	100.8	0.26	99.1	10.00	120.0	Not Monitored	50.00	-2.7	165	3.8	0	2	0	0
TOTALS	JANUARY 2014	# BLAST	4	AVERAGE	0.14	99.8	0.96	97.1	0.34	98.2	0.23	99.3	5.00	115.0	4								
TOTALS	JANUARY 2014	#>0.5mm	1	HIGHEST	0.26	109.4	2.42	106.9	0.63	104.8	0.45	103.7	10.00	120.0	-								
TOTALS	ANNUAL	# BLAST	76	AVERAGE	0.26	99.2	0.96	97.1	0.44	100.6	0.23	99.3	5.00	115.0	-								
TOTALS	ANNUAL	%	>115dB(L) or 5mm/s or MAX # Blasts Per Month	15	0%	0%	0%	0.0%	0%	1.3%	0%	0.0%	5%	5%	1								

# Appendix 6 – Groundwater Monitoring Results

0 # 0 W	835
-	
SWL (Standing Water Level Only)	(ALS)
~	ACIRI
Fleid Observations	Comments
e Odor Colour	
T.	ilview
~	ail view
	urundree
M	une front
2	nine front.
1	108
<i>N</i>	0.02
M	ine - Rail Out lood
E.	scott Lane - near shed
bave.	Syot Legger - Gap
	Mine Reil loop
4 5	undered in - windered.
	a line a
	No - Tenks
6	on more,
	~
	* * *
0	intra - Escott lane,
2	K-looma,
	[q avera VVIndm.]]
, 1	
Image: Switch of the second	

Sheet: of

ROJECT ID: WERRIS CREEK COAL QUARTERLY GROUNDWATERS			Bi-Monthly Ground Waters - SWL (\$	standing Water Level Only)
AMPLER NAME: C. CILANNE				
TE: WERRIS CREEK MINE AND SURROUNDS				
Sample ID Information Bore Da	ata Sampling Data	Field Tests	<b>S</b>	Field Observations
les / Analytes Sample ID ID / Bore Date Date Time Standing Water Level Bore depth	Stick up Purge Type Purge Volume	Pump Set Depth EC - field	Temp - field Appearanc e	Odor
Reportable (24hr) Imbioc Imbi	oc m Pump/	⊆mbgl ⊡mbtoc uS/cm pH units ∟m	đ	
15-31 Q1:01 21/11 11 BMM	1'o			
MW12 11/12 13 20 10.53	S,0	" Mud on Hr	e and of Probe	÷.
MW13 1/ 11/ 13 10:40 5.97	<b>4</b> <b>1</b>	(Interniou p	in arren and	well.
MW13B 11/11/12 10:56 3.35	5.0	С	C	
MW13D 11/1/13 11:05 4:57	Ŷ	•		
MW15 11/11/13 12:10 4.64	ر ب ب	Windmill	humia	
MW16 11/11/13 12:50 5.44	5.0		C	
MW17A 8/11/13 12:40 4.29	2.0	20		
MW18A W 12 12 36 416	1			
MW19A 4 1 1 10- 25 5.93	0-15	(Pup Ru	mine .	
MW21A 8/11/13 12=25 7-45	0.30			
MW22A 11/11/13 13:00 535	0-22	-		3
MW22B 11/13 13:15 5.57	0.45		7	
MW23A 11/11/13 11:46 303	0 ,2	( Pup he	a)	
MW23B 11/11/13 11-55 4.18	0.1	(		
MW28A W W 12, 9:50 12-21	0-25	" Cate P.	addrocked 1"	
MW28B 8/11/13 12:10 -	0, 8	Pump Duer	Bove - No	SWL
* Naranzi II /II /13 11:20 4.B				
		10 <sup>-17</sup> ,		

14

RESS/O JECT ID PLER N/ WERRI Sam	FFICE: : WERRIS C AME: IS CREEK M IS CREEK M ID / Bore ID	REEK COAL O		DWATERS		496											
JECT ID PLER N/ WERRI Sam	: WERRIS C AME: IS CREEK M IS CREEK M	REEK COAL O								а ж. ст.	a a *	ACIRL LABORAT	ORY:				
PLER N/ WERRI	AME: B IS CREEK M pie ID / Bore ID	Phile INE AND SUF	5/61	11 .					0 N		11	Bi-Monthly Groun	d Waters - SWL (S	atanding Water Le	vel Only)	9	(ALS)
WERR.	IS CREEK M	INE AND SUF		lbar	×2.		8)	6	4		21	6. 1			0.		ACIDI.
Sam	pie ID / Bore ID		ROUNDS									2					ACIKL
Sam	pie ID / Bore ID	Sample ID Inform	ation		Bore Data		8	Sampling Data	i danari Israegen	-	Field Tests	<u>q.</u>	2	Field Observation:			Comments
		Date	Time	Standing Water Level	Bore dept	Stick up	Purge Ty	Purge Volume	Pump Se Depth	EC - field	pH - fiek	Temp - fie	Appearar	Odd	Coiour		
			(24hr)	:mbgl ⊡mbtoc	⊡mbgl i≃mbtoc i⊂m	m	Pump / Bailer	L	⊡mbgl ⊡mbtoc	uS/cm	pH units	°C					
Į	MW1	20/	10:20	55-94		0.35	5	200	а. 1940 г.	· · · · · · · · · · · · · · · · · · ·	#1					6 Monthly	Hillsewi
1	MW2	104	10:40	71.72		0.15			2	i n	2 1	18			•	6 Monthly	failurey vie
1	MW3	21/1	11:30	16.01	40.2	0.95			°н ж			8			h.,	6 Monthly	Emidere
	MW4	21/1	12:06	-	B	rehar	CHICH.	X.		Blocka	ge app	ex 30	cm Fra	n grou	ø.		Mire Front
N	AW4B	211	12:15	11.62	30.5	0.7		ļ					2 8 85	~	0	6 Monthly	~ #
	MW5	21 1	11.50	9.40	30.	1.15					č,	5.  5				6 Monthly	Mine.
N	AW5B	21/1	11 40	895	422	0.70				· · · · · · · · · · · · · · · · · · ·				Aller -			More.
	MW6	20 1	11:00	12.83	,	1.05		· ·	-01	1				, , ,		6 Monthly	III WC K
	MW9	21/1	13:00	N AF	1	1.20			Dlo	chae i	n pipe	· @	grand	level,		Mine	2- loge
	MW10	201	9:15	6.9		0.7		1					A		0	t sco	t In. Noer
	VIVV 11	201	9:00	-	10	mpou	er bon	e . (f	(una nay)	inc	1.4	Tip	Uner-	NI	Clew	540#	h Cup.
		21	12:36	11-10	26 m	0.95	·		0			8. 1	* <u>*</u>			Mine	Kail dep
	IVV 14.B	2011	12:20	10.7	*)~	0.15	· · · · ·	2 10 0							10 N	H, 1 1	11 11
	MW/20	201	9,00	10.19	* 	0.6)			2							R1 1	Ph Wide
		~	n a	<b>F</b> 1 11	· · · · ·		1.1	1.	,	e.						ender	1.14
	W25				40	N	locha	2.		lun	5 am	pove.				morea	- Inflerre
M	W)4A	21	0.00	5.4)	37.5	0.15				10	Pol.	the	diat	2		Maren	D Canky
- "	P1	<u></u>	-1.00			/				www.	7 3	u u	0.0-10	(-)		2	5
	P2		2 Pur	Juction	h at	Een				•		1.0					
1	PUG		C 1.00									-		9. 12	1		
· N	MW27	2011	10:06	45-76	5	0.45							. F	2		Cintra	- Escott. In
N	MW29	21/1	9:00	12.25	45.	0.75	•	1.1				See .				Known	- Wednill
N	MW31	1			1214		1	Nol	onger	monita	are).	At				Tillom	in fullat - Art

I: WEF	RRIS CREEK	COAL PTY LTE	)									QUOTATION N	0:	x)		ж. Т	A
RESS/O	FFICE:	201 - 40			×	1: 80				*		ACIRL LABORA	ATORY:				
JECT ID:	WERRIS CR		ARTERLY GROUN	DWATERS		2						Bi-Monthly Grou	und Waters - SWL (S	Standing Water Le	evel Only)		(ALS)
PLER NA	AME:	15 m	hps C	klbau	me.												ACIRI
	IS CREEK MI	Sample ID Informa	tion		Bore Data			Samplino Data	Carlos and a		Field Tests			Field Observation			Comments
Sam	ple ID / Bore ID	Date	Time	Standing Water Level	Bore depth	Stick up	Purge Type	Purge Volume	Pump Set Depth	EC - field	pH - field	Temp - field	Appearanc	Odor	Colour		
			(24hr)	⊡mbgl ⊡mbtoc ⊡m	⊡mbgl ⊡mbtoc ⊡m	m	Pump / Bailer	L	⊡mbgl ⊡mbtoc ∷m	uS/cm	pH units	°C					
	MW8	20/1	11.20	16.80	)	0-2				18) - Li		e			8	Rosen	eath.
Ν	MW12	21/1	10:20	9.62	10-6	0.5			-	5-		x 101 17	2 2	¢		Have	Here.
N	<b>/W</b> 13	26 1	11:50	5.34		04		а а С		(Pump	.A.)	-				Wadme	Il In - well
M	IW13B	20/1	12:00	3.85	2	0.3	×							2		Tayles	-s h. /get
M	IW13D	20/1	12:10	5.00	e.	0.2		2						2		Taylors	In (wind mill.
N	MW15	20/1	13:15	4.82		20			-	(Window	II Runn	ing)			i e	Paynes 1	-n. (Windmill
N	/W16	20/1	14:00	5.51		0.3						-	· .			Montai	nview Wittles
M	IW17A	20/1	13:40	4:72		0.5			9		Ч		· · ·			83 Wad	well In (sted
M	IW18A	201	13:50	4.54	•		e									82 ~	~-sde of
M	IW19A	20/1	11:35	6.04		0.15				7.	/			s <sup>i</sup> s		Lintare	- Punp
M	IW21A	21/1	16:40	7.96	10m .	0.}	2 2				(	Windm	<u>s(()</u>			Glena	ra
M	W22A ,	24/1	11:10	5-74	Sm.	0.55									55	308 6	aynes In - Itaxe
M	IW22B	21	11:00	5-96	8 m.	o.ys					2			2 1		v	n - Inico
M	IW23A	2011	12:40	3.46		0.7	-				10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	1	)			Fegg Eug	y - Honseyard.
M		20/1	13:00	424		0.1						We	M ]	2)			- Irrigation
M	W28A	ZIN	9:50	12.62	14 m	0:25				10		~				Woodlown	- LHS Windmill
			10:00			0.8				lump a	ver ber	e.				Wood law	n-KHS
Na	arony	20/1	12:30	4.14		0,5									n Ji w	78 S Joh	- In.
											a						

# Appendix 7 – Surface Water Monitoring Results



	CE	<b>RTIFICATE OF ANALYSIS</b>	
Work Order	ES1324939	Page	: 1 of 7
Client		Laboratory	: Environmental Division Sydney
Contact	: LYNN DUNN	Contact	: Client Services
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	TALBOT RD		
	GUNNEDAH NSW 2380		
E-mail	: lynn.dunn@alsglobal.com	E-mail	: sydney@alsglobal.com
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500
Project	: WCC QUARTERLY SURFACE WATER	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 6863		
C-O-C number	:	Date Samples Received	: 15-NOV-2013
Sampler	:	Issue Date	: 22-NOV-2013
Site	:		
		No. of samples received	: 14
Quote number	: SY/417/13	No. of samples analysed	: 14

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

Accredited for compliance with

ISO/IEC 17025.

- General Comments
- Analytical Results
- Descriptive Results



NATA Accredited Laboratory 825	Signatories
--------------------------------	-------------

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics
Kim Phan	Sample Receipt Clerk	ACIRL Sampling

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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting ^ = This result is computed from individual analyte detections at or above the level of reporting

- AC03: Field tests supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC04: Field observations supplied by ALS ACIRL.



Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	WER-SEDIMENT BASIN2 115209	WER-SEDIMENT BASIN9 115210	WER-SEDIMENT BASIN10 115211	WER-SEDIMENT DETENTION 4 115212	WER-SEDIMENT DETENTION 5 115213
	Cli	ent sampl	ing date / time	14-NOV-2013 12:15	14-NOV-2013 11:00	14-NOV-2013 13:20	14-NOV-2013 13:00	14-NOV-2013 12:45
Compound	CAS Number	LOR	Unit	ES1324939-001	ES1324939-002	ES1324939-003	ES1324939-004	ES1324939-005
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	µS/cm	1120	265	162	305	338
рН		0.01	pH Unit	9.00	9.10	8.70	9.10	9.20
Temperature		0.1	°C	23.4	24.7	26.5	24.5	23.6
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	8.37	8.33	7.73	8.51	8.66
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	1300	297	168	339	381
EA025: Suspended Solids								
Suspended Solids (SS)		5	mg/L	44	134	1030	24	14
EK057G: Nitrite as N by Discrete Analyse	ər							
Nitrite as N		0.01	mg/L	<0.01	<0.01	0.03	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analys	er							
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.05	1.08	<0.01	0.02
EK059G: Nitrite plus Nitrate as N (NOx)	by Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	<0.01	0.05	1.11	<0.01	0.02
EK061G: Total Kjeldahl Nitrogen By Disc	rete Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.6	0.7	4.0	0.9	0.9
EK062G: Total Nitrogen as N (TKN + NOx	) by Discrete An	alyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	0.6	0.8	5.1	0.9	0.9
EK067G: Total Phosphorus as P by Discr	ete Analyser							
Total Phosphorus as P		0.01	mg/L	0.06	0.12	0.74	0.21	0.48
EK071G: Reactive Phosphorus as P by di	iscrete analyser							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.05	0.14	0.44
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5	<5	<5



Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	WER-VOID WATER	WER-VOID WATER	WER-QUIPOLLY	WER-QUIPOLLY	WER-WERRIS CREEK
				DAM1	DAM2	CREEK UPSTREAM	CREEK	UPSTREAM
				115214	115215	115216	115217	115218
	Cli	ent sampl	ing date / time	14-NOV-2013 12:30	14-NOV-2013 11:20	14-NOV-2013 10:00	14-NOV-2013 15:00	14-NOV-2013 15:00
Compound	CAS Number	LOR	Unit	ES1324939-006	ES1324939-007	ES1324939-008	ES1324939-009	ES1324939-010
AC03: Field Tests								
Electrical Conductivity (Non		1	µS/cm	890	960	437	870	376
Compensated)								
pH		0.01	pH Unit	9.40	8.60	7.80	8.10	8.40
Temperature		0.1	°C	21.7	23.7	22.0	20.1	19.3
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	8.73	8.25	7.59	7.98	7.97
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	1030	1110	490	1010	427
EA025: Suspended Solids								
Suspended Solids (SS)		5	mg/L	29	10	30	16	<5
EK057G: Nitrite as N by Discrete Analyser	r							
Nitrite as N		0.01	mg/L	0.04	0.02	0.01	<0.01	0.06
EK058G: Nitrate as N by Discrete Analyse	r							
Nitrate as N	14797-55-8	0.01	mg/L	0.51	1.77	0.07	0.02	0.14
EK059G: Nitrite plus Nitrate as N (NOx) b	v Discrete Anal	vser						
Nitrite + Nitrate as N		0.01	mg/L	0.55	1.79	0.08	0.02	0.20
EK061G: Total Kjeldahl Nitrogen By Discre	ete Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.3	0.5	0.6	0.3	0.8
EK062G: Total Nitrogen as N (TKN + NOx)	by Discrete An	alyser						
^ Total Nitrogen as N		0.1	mg/L	0.8	2.3	0.7	0.3	1.0
EK067G: Total Phosphorus as P by Discre	te Analyser							
Total Phosphorus as P		0.01	mg/L	0.03	<0.01	0.13	0.16	0.35
EK071G: Reactive Phosphorus as P by dis	crete analyser							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.02	0.12	0.27
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5	<5	<5



Sub-Matrix: WATER (Matrix: WATER)		Cli	ient sample ID	WER-WERRIS CREEK	WER-VOID WATER	WER-VOID WATER	SB-11	
				115215	115220	115221	115222	
Client sampling date / time			14-NOV-2013 15:00	14-NOV-2013 15:00	14-NOV-2013 15:00	14-NOV-2013 15:00		
Compound CA	S Number	LOR	Unit	ES1324939-011	ES1324939-012	ES1324939-013	ES1324939-014	
AC03: Field Tests								
Electrical Conductivity (Non		1	μS/cm	1200	1020	973	348	
Compensated)								
pH		0.01	pH Unit	8.40	8.80	8.80	8.70	
Temperature		0.1	°C	21.2	23.7	23.8	27.8	
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	8.32	8.38	8.32	7.96	
EA010P: Conductivity by PC Titrator	EA010P: Conductivity by PC Titrator							
Electrical Conductivity @ 25°C		1	μS/cm	1390	1190	1130	385	
EA025: Suspended Solids								
Suspended Solids (SS)		5	mg/L	19	13	14	77	
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N		0.01	mg/L	<0.01	0.04	0.03		
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N 1	4797-55-8	0.01	mg/L	0.02	2.95	1.42		
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N		0.01	mg/L	0.02	2.99	1.45		
EK061G: Total Kieldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.3	0.9	0.6		
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N		0.1	mg/L	0.3	3.9	2.0		
EK067G: Total Phosphorus as P by Discrete A	nalyser							
Total Phosphorus as P		0.01	mg/L	0.23	0.02	0.02		
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P 1	4265-44-2	0.01	mg/L	0.20	<0.01	<0.01		
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5		



**Descriptive Results** 

Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Field Observations		
AC04: Appearance	WER-SEDIMENT BASIN2115209 - 14-NOV-2013 12:15	Clear
AC04: Appearance	WER-SEDIMENT BASIN9115210 - 14-NOV-2013 11:00	Slight Turbid
AC04: Appearance	WER-SEDIMENT BASIN10115211 - 14-NOV-2013 13:20	Turbid
AC04: Appearance	WER-SEDIMENT DETENTION 4115212 - 14-NOV-2013 13:00	Clear
AC04: Appearance	WER-SEDIMENT DETENTION 5115213 - 14-NOV-2013 12:45	Clear
AC04: Appearance	WER-VOID WATER DAM1115214 - 14-NOV-2013 12:30	Clear
AC04: Appearance	WER-VOID WATER DAM2115215 - 14-NOV-2013 11:20	Clear
AC04: Appearance	WER-QUIPOLLY CREEK UPSTREAM115216 - 14-NOV-2013 10:00	Clear
AC04: Appearance	WER-QUIPOLLY CREEK115217 - 14-NOV-2013 15:00	Clear
AC04: Appearance	WER-WERRIS CREEK UPSTREAM115218 - 14-NOV-2013 15:00	Clear
AC04: Appearance	WER-WERRIS CREEK115219 - 14-NOV-2013 15:00	Clear
AC04: Appearance	WER-VOID WATER DAM3115220 - 14-NOV-2013 15:00	Clear
AC04: Appearance	WER-VOID WATER DAM4115221 - 14-NOV-2013 15:00	Clear
AC04: Appearance	SB-11115222 - 14-NOV-2013 15:00	Clear
AC04: Odour	WER-SEDIMENT BASIN2115209 - 14-NOV-2013 12:15	Nil
AC04: Odour	WER-SEDIMENT BASIN9115210 - 14-NOV-2013 11:00	Nil
AC04: Odour	WER-SEDIMENT BASIN10115211 - 14-NOV-2013 13:20	Nil
AC04: Odour	WER-SEDIMENT DETENTION 4115212 - 14-NOV-2013 13:00	Nil
AC04: Odour	WER-SEDIMENT DETENTION 5115213 - 14-NOV-2013 12:45	Nil
AC04: Odour	WER-VOID WATER DAM1115214 - 14-NOV-2013 12:30	Nil



Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Odour	WER-VOID WATER DAM2115215 - 14-NOV-2013 11:20	Nil
AC04: Odour	WER-QUIPOLLY CREEK UPSTREAM115216 - 14-NOV-2013 10:00	Nil
AC04: Odour	WER-QUIPOLLY CREEK115217 - 14-NOV-2013 15:00	Nil
AC04: Odour	WER-WERRIS CREEK UPSTREAM115218 - 14-NOV-2013 15:00	Nil
AC04: Odour	WER-WERRIS CREEK115219 - 14-NOV-2013 15:00	Nil
AC04: Odour	WER-VOID WATER DAM3115220 - 14-NOV-2013 15:00	Nil
AC04: Odour	WER-VOID WATER DAM4115221 - 14-NOV-2013 15:00	Nil
AC04: Odour	SB-11115222 - 14-NOV-2013 15:00	Nil
AC04: Colour	WER-SEDIMENT BASIN2115209 - 14-NOV-2013 12:15	Clear
AC04: Colour	WER-SEDIMENT BASIN9115210 - 14-NOV-2013 11:00	Brown
AC04: Colour	WER-SEDIMENT BASIN10115211 - 14-NOV-2013 13:20	Dark Grey
AC04: Colour	WER-SEDIMENT DETENTION 4115212 - 14-NOV-2013 13:00	Clear
AC04: Colour	WER-SEDIMENT DETENTION 5115213 - 14-NOV-2013 12:45	Clear
AC04: Colour	WER-VOID WATER DAM1115214 - 14-NOV-2013 12:30	Clear
AC04: Colour	WER-VOID WATER DAM2115215 - 14-NOV-2013 11:20	Clear
AC04: Colour	WER-QUIPOLLY CREEK UPSTREAM115216 - 14-NOV-2013 10:00	Clear
AC04: Colour	WER-QUIPOLLY CREEK115217 - 14-NOV-2013 15:00	Clear
AC04: Colour	WER-WERRIS CREEK UPSTREAM115218 - 14-NOV-2013 15:00	Clear
AC04: Colour	WER-WERRIS CREEK115219 - 14-NOV-2013 15:00	Clear
AC04: Colour	WER-VOID WATER DAM3115220 - 14-NOV-2013 15:00	Clear
AC04: Colour	WER-VOID WATER DAM4115221 - 14-NOV-2013 15:00	Clear
AC04: Colour	SB-11115222 - 14-NOV-2013 15:00	Clear

# Appendix 8 – Discharge Monitoring Results


	CERTIFICA	TE OF ANALYSIS	
Work Order	ES1325502	Page	: 1 of 3
Client		Laboratory	: Environmental Division Sydney
Contact	: A WRIGHT	Contact	: Client Services
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	TALBOT RD		
	GUNNEDAH NSW 2380		
E-mail	: awright@whitehavencoal.com.au	E-mail	: sydney@alsglobal.com
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500
Project	: WERRIS CREEK AD HOC CONTROLLED DISCHARGE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 6898		
C-O-C number	:	Date Samples Received	: 22-NOV-2013
Sampler	: AW	Issue Date	: 29-NOV-2013
Site	:		
		No. of samples received	: 3
Quote number	: SY/417/13	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

	NATA Accredited Laboratory 825 Accredited for compliance with	Signatories This document has been electronically signed by the authorized signatories indicated below. Electronic signing has be carried out in compliance with procedures specified in 21 CFR Part 11.							
NAIA	ISO/IEC 17025.	Signatories	Position	Accreditation Category					
WORLD RECOGNISED ACCREDITATION		Ankit Joshi Ashesh Patel	Inorganic Chemist Inorganic Chemist	Sydney Inorganics Sydney Inorganics					

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 PHONE +61-2-8784 8555 Facsimile +61-2-8784 8500 Environmental Division Sydney ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

# Page : 3 of 3 Work Order : ES1325502 Client : ACIRL PTY LTD Project : WERRIS CREEK AD HOC CONTROLLED DISCHARGE



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		WER/QCV 115357	WER/QCD 115358	WER/SB9 115359	 	
	Cl	ient sampli	ng date / time	21-NOV-2013 15:00	21-NOV-2013 15:00	21-NOV-2013 15:00	 
Compound	CAS Number	LOR	Unit	ES1325502-001	ES1325502-002	ES1325502-003	 
EA005P: pH by PC Titrator							
pH Value		0.01	pH Unit	7.65	7.92	7.70	 
EA010P: Conductivity by PC Titrator							
Electrical Conductivity @ 25°C		1	μS/cm	454	884	396	 
EA025: Suspended Solids							
Suspended Solids (SS)		5	mg/L	32	20	14	 
EK055G: Ammonia as N by Discrete Analy	yser						
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.02	0.24	 
EK057G: Nitrite as N by Discrete Analyse	r						
Nitrite as N		0.01	mg/L	<0.01	<0.01	0.11	 
EK058G: Nitrate as N by Discrete Analyse	er						
Nitrate as N	14797-55-8	0.01	mg/L	0.01	0.01	3.45	 
EK059G: Nitrite plus Nitrate as N (NOx) b	by Discrete Ana	lyser					
Nitrite + Nitrate as N		0.01	mg/L	0.01	0.01	3.56	 
EK061G: Total Kjeldahl Nitrogen By Discr	ete Analyser						
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.4	0.2	0.8	 
EK062G: Total Nitrogen as N (TKN + NOx)	by Discrete Ar	nalyser					
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	0.4	0.2	4.4	 
EK067G: Total Phosphorus as P by Discre	ete Analyser						
Total Phosphorus as P		0.01	mg/L	0.04	0.10	<0.01	 
EK071G: Reactive Phosphorus as P by dis	screte analyser						
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.09	<0.01	 
EP020: Oil and Grease (O&G)							
Oil & Grease		5	mg/L	<5	<5	<5	 



	CERTIFICA	<b>TE OF ANALYSIS</b>	
Work Order	ES1327712	Page	: 1 of 3
Client		Laboratory	: Environmental Division Sydney
Contact	: LYNN DUNN	Contact	Client Services
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	TALBOT RD		
	GUNNEDAH NSW 2380		
E-mail	: lynn.dunn@alsglobal.com	E-mail	: sydney@alsglobal.com
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500
Project	: WERRIS CREEK AD HOC CONTROLLED DISCHARGE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 7024		
C-O-C number	:	Date Samples Received	: 18-DEC-2013
Sampler	: AW	Issue Date	: 27-DEC-2013
Site	:		
		No. of samples received	: 3
Quote number	: SY/417/13	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

	NATA Accredited Laboratory 825 Accredited for compliance with	Signatories This document has been electronically carried out in compliance with procedures spe	signed by the authorized signatories in cified in 21 CFR Part 11.	dicated below. Electronic signing has been
NAIA	ISO/IEC 17025.	Signatories	Position	Accreditation Category
WORLD RECOGNISED ACCREDITATION		Ankit Joshi Hoa Nguyen	Inorganic Chemist Senior Inorganic Chemist	Sydney Inorganics Sydney Inorganics

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 PHONE +61-2-8784 8555 Facsimile +61-2-8784 8500 Environmental Division Sydney ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

# Page : 3 of 3 Work Order : ES1327712 Client : ACIRL PTY LTD Project : WERRIS CREEK AD HOC CONTROLLED DISCHARGE



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)	atrix: WATER (Matrix: WATER) Client sample ID		WER-SEDIMENT BASIN9 115593	WER-QUIPOLLY CREEK UPSTREAM 115594	WER-QUIPOLLY CREEK DOWNSTREAM 115595	 	
	Cli	ent sampli	ng date / time	17-DEC-2013 07:00	17-DEC-2013 07:30	17-DEC-2013 07:45	 
Compound	CAS Number	LOR	Unit	ES1327712-001	ES1327712-002	ES1327712-003	 
EA005P: pH by PC Titrator							
pH Value		0.01	pH Unit	7.98	8.08	8.32	 
EA010P: Conductivity by PC Titrator							
Electrical Conductivity @ 25°C		1	µS/cm	356	499	942	 
EA025: Suspended Solids							
Suspended Solids (SS)		5	mg/L	11	58	25	 
EK057G: Nitrite as N by Discrete Analyser							
Nitrite as N		0.01	mg/L	0.10	<0.01	<0.01	 
EK058G: Nitrate as N by Discrete Analyser							
Nitrate as N	14797-55-8	0.01	mg/L	2.00	<0.01	0.02	 
EK059G: Nitrite plus Nitrate as N (NOx) by I	Discrete Ana	lyser					
Nitrite + Nitrate as N		0.01	mg/L	2.10	<0.01	0.02	 
EK061G: Total Kjeldahl Nitrogen By Discrete	Analyser						
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.5	1.4	0.3	 
EK062G: Total Nitrogen as N (TKN + NOx) by	y Discrete An	alyser					
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	2.6	1.4	0.3	 
EK067G: Total Phosphorus as P by Discrete	Analyser						
Total Phosphorus as P		0.01	mg/L	0.05	0.21	0.14	 
EK071G: Reactive Phosphorus as P by discr	rete analyser						
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	0.11	 
EP020: Oil and Grease (O&G)							
Oil & Grease		5	mg/L	<5	<5	<5	 

## Werris Creek Coal Community Consultative Committee

# <u>Thirty First Meeting of the Committee</u> <u>Training Room, Werris Creek Coal</u> <u>9:30am Thursday 29<sup>th</sup> May 2014</u> <u>MINUTES</u>

Werris Creek Coal (WCC) Community Consultative Committee (CCC) met at 9:30am and had a pit tour of the mine site before the meeting inspecting operations from the RL430m lookout.

#### 1. Record of Attendance:

Present: Gae Swain (Independent Chairperson); Noel Taylor (Community Representative); Geoff Dunn (Community Representative); Lindsay Bridge (Community Representative); Col Stewart (Liverpool Plains Shire Council - Councilor); Ron Van Katwyk (Liverpool Plains Shire Council – Director Environmental Services); Eamonn Browne (WCC Operations Manager) and Andrew Wright (WCC Environmental Officer and Minute Taker).

Apologies: Jill Coleman (Community Representative).

#### 2. Declaration of Pecuniary or Other Interests

Noel Taylor declared that his son works for Whitehaven Coal at Werris Creek Coal.

#### 3. New Matters for Discussion under General Business

None.

#### 4. Minutes of Previous Meeting

Minutes of the previous meeting on the 27<sup>th</sup> February 2014 were accepted as true and accurate representation of business conducted on that day.

Moved: Geoff Dunn. Seconded: Noel Taylor. Motion carried.

#### 5. Matters Arising

#### a) Actions from Previous Meeting

None.

#### b) Other Matters Arising

None.

#### 6. Environmental Monitoring Report: February, March and April 2014

**Meteorology** – The rainfall during the period was below average (except March 2014), with the prevailing wind direction from the south-south east typical of the summer to autumn period. **Air Quality** – The Particulate Matter less than 10 microns (PM10) annual average and daily maximum levels were within the air quality criteria for the period; despite the below average rainfall resulting in the elevated ambient dust levels.

The Werris Creek Particulate Matter less than 2.5 microns (PM2.5) dust level was measured above the daily target of  $25\mu g/m^3$  on  $11^{th}$  February 2014 between 4pm and 7:45pm peaking at  $25.5\mu g/m^3$  with the average wind direction from the west south west (2410) at 3.8m/s. That wind direction would not propagate dust emissions from WCC towards Werris Creek town.

The Werris Creek PM2.5 annual average was measured to be  $8.1\mu g/m^3$ , fractionally above the annual criteria based on the interim guideline published in the relevant National Environment Protection Measure but did not exceed any air quality criteria outlined in the Project Approval. The elevated PM2.5 is a function of the prevailing climate of below average rain and strong westerly winds since October 2013 which has increased the ambient dust levels across the entire North West Slopes and Plains region.

All dust deposition gauge averages were below the annual criteria of 4.0g/m<sup>2</sup>/month except for DG34 (8 Kurrara St) which has previously been affected by localized non-mining related dust contamination. Elevated monthly results identified during period occurred in February at DG2 ("Cintra") and DG22 ("Mountain View") and in March at DG15 ("Plain View"). The predominant wind direction in February was a south-south easterly, therefore the elevated monthly result for "Cintra" is likely to have been due to mining operations while "Mountain View" would have been from non-mining sources (paddocks being cultivated for winter crops). Similarly in March, the predominant wind direction was a south-south easterly, therefore the elevated monthly result for "Plain View" would have been from non-mining sources (excessive organic matter greater than 50% of the sample). Both "Cintra" and "Plain View" properties are owned by Werris Creek Coal to mitigate potential mining related impacts.

There were four dust complaints during the period. Two of the dust complaints did not have a specific event but rather expressing concern at the increase in dust levels experienced in Werris Creek. Monitoring results demonstrate that dust levels had increased up to 40% for Summer 2013/2014 than Summer 2012/2013 due to below average rainfall impacting on ambient dust levels rather than specifically as a result of mining operations. Two dust complaints were related to dust haze sitting over the mine on the morning of the 10<sup>th</sup> February 2014 that was trapped by a strong temperature inversion.

**Noise** – There were no noise exceedances during February, March and April 2014. There were two noise complaints during the period from a Werris Creek resident that alleged noise impacts from the WCC Train Load Out facility but were found to be due to rail traffic in the Werris Creek rail yard.

**Blasting** – During the period a total of nineteen blasts were fired by WCC. All blasts over the period complied with maximum license limits (120dBL and 10mm/s) with no blast overpressure levels above 115dBL or vibration levels over 1mm/s for the three month period. There were eleven blast complaints during the period from six separate blast events. The continuation of blasting complaints is believed to be due the sensitization of the Werris Creek community from an elevated blast overpressure on 8<sup>th</sup> July 2013. WCC are continuing to balance blasting to minimise community impact while also producing enough blasted inventory to achieve the budgeted 2.3Mt coal production rate for 2013-2014. Eight blasting complaints were related to vibration impacts with six complaints specifically from G Coal Interburden blasts that have caused community complaints in the past even though each shot was designed and achieved a vibration level less than 1mm/s. Three blasting complaints were in relation to dust clouds generated by the blast relating the very dry and hot conditions experienced in February 2014.

**Groundwater** – The good rainfall in March 2014 was not enough to reverse the prevailing dry conditions resulting in no rainfall recharge to aquifers with the majority of monitoring bores groundwater levels declining over the period. WCC is continuing with additional work to improve the resolution of the groundwater model for periods of extended low rainfall. There was one groundwater complaint during the period due to declining groundwater levels.

**Surface Water** – Quarterly surface water monitoring was undertaken on 25th February 2014 with all onsite and offsite water quality within longer term averages and the Site Water Management Plan trigger values except for some parameters due to the dry conditions evaporating the remaining water into small pools.

**Surface Water Discharges** – There were no discharge events during the period. There were no impacts on water quality monitored in Quipolly and Werris Creeks' catchments as a result of the dirty water discharge events.

**Complaints** – There were nineteen complaints received during the period. There were eleven complaints related to blasting; four complaints related to dust; two complaints relating to noise; one complaint related to road transport and one complaint relating to groundwater. There were ten different complainants during the period with seventeen complaints from Werris Creek residents and one complaint from a Quipolly resident and one complaint from the Liverpool Plains Shire Council.

Motion moved to accept the Environmental Monitoring Report for February, March and April 2014.

Moved: Ron Van Katwyk. Seconded: Lindsay Bridge. Motion Carried.

#### 7. General Business

#### a. Community Enhancement Fund (CEF) Update

Andrew Wright gave an update since the previous Committee meeting on the CEF being endorsed by Liverpool Plains Shire Council; and subsequently the CEF (v4) is now the approved version. Ron Van Katwyk tabled a letter from the Australian Railway Museum itemising the repairs to be funded from the \$6000 committed so that the museum can receive an Occupation Certificate. Also Ron Van Katwyk gave an update on the planning for the 2015 Werris Creek playground project which has been incorporated into a large grant application to upgrade David Taylor Oval, Werris Creek.

#### b. CCC Community Representative Vacancy

Andrew Wright advised that the CCC needed to have between three and five community representatives, even with the vacancy there is currently four community representatives. The committee requested WCC to continue to advertise for nominations for the vacant Community Representative position.

#### Meeting Closed 11:30am.

#### Next Meeting scheduled for Thursday 25<sup>th</sup> September 2014.

<b>Copy to:</b> Gae Swain Jill Coleman Noel Taylor Lindsay Bridge Geoff Dunn	Independent Chairperson Community Representative Community Representative Community Representative Community Representative		
Ron Van Katwyk Cr Col Stewart Stephen O'Donoghue John Trotter Kharl Turnbull	LPSC LPSC DoPI DRE EPA	Eamonn Browne Andrew Wright	Werris Creek Coal Werris Creek Coal



## WERRIS CREEK COAL PTY LTD

## **QUARTERLY ENVIRONMENTAL MONITORING**

## REPORT

## February, March and April 2014

This Environmental Monitoring Report covers the period 1<sup>st</sup> February 2014 to 30<sup>th</sup> April 2014 for the Werris Creek No.2 Coal Mine Community Consultative Committee.

The report includes environmental monitoring results from the on-site Weather Station, Air Quality, Noise, Blasting, Surface Water, Groundwater and Discharge Water Quality together with any community complaints received and general details on site environmental matters.

**Note:** Elevated monitoring results above the relevant monitoring criteria are highlighted in **yellow**.

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## **APPENDICES**

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Appendix 3	.Train Dust Deposition Monitoring
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Appendix 7	Surface Water Monitoring Results
Appendix 8	Discharge Monitoring Results

## 1.0 METEOROLOGY

#### 1.1 WEATHER STATION

Werris Creek Coal (WCC) collects meteorological data from the onsite weather station located on the top level of the overburden emplacement and from the continuous noise monitoring units located at Quipolly and Werris Creek. The following table summarises temperature, inversion and rainfall data for the last three months and the wind data is presented below in windroses. For the last three months the prevailing wind direction was from the south-south east typical of the summer to autumn period.

Month	Q Te	uipol mp ('	ly °C)	Wei Te	rris ( mp (	Creek (°C)	W (°	CC T C) 10	emp )m	Lapse Rate (°C/100m)		Rainfall (mm)		m)	
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Avg	90%	Onsite	Quip	WC	Annual*
February 2014	11.4	24.7	38.4	14.1	25.0	38.6	14.4	24.9	37.2	-0.4	+4.3	29.4	12.4	31.8	407.3
March 2014	7.9	21.1	32.3	11.6	21.7	31.6	12.6	21.7	30.8	-0.1	+4.9	90.6	68.6	103.6	497.9
April 2014	1.3	17.0	29.6	7.2	18.6	29.2	8.3	18.8	28.8	+1.3	+6.4	32.4	30.4	30.0	32.4

\* Annual cumulative total since July 2012 to June 2013 from a composite data set based on the onsite Weather Station at WCC.



## 2.0 AIR QUALITY

#### 2.1 HVAS (PM10) and TEOM (PM10 & PM2.5)

WCC operates five High Volume Air Sampler (HVAS) measuring particulate matter less than 10 micron (PM10) and total suspended particulate (TSP) matter at four sites. HVAS sampling is scheduled for 24 hours every 6 days in accordance with Environment Protection Authority (EPA) guidelines and results are reported as micro grams per cubic metre ( $\mu$ g/m<sup>3</sup>) of air sampled. In addition, WCC operates a Tapered Element Oscillating Microbalance (TEOM) monitor in Werris Creek measuring real time PM10 and PM2.5 (particulate matter less than 2.5 micron) dust levels. Dust monitoring locations are identified in **Figure 1**.

PM2.5 – TEOM92 "Werris Creek" PM10 – TEOM92 "Werris Creek" PM10 – HVP20 "Tonsley Park" PM10 – HVP1 "Escott" PM10 – HVP20 "Glenara" PM10 – HVP98 "Kyooma" TSP – HVT98 "Kyooma"

#### 2.1.1 Monitoring Data Results

The average results for the last three months are provided in the table below; however see HVAS/TEOM monitoring data under **Appendix 1** for individual results.



Figure 1 – WCC Dust Monitoring Locations

	Daily	Fahmuany	Manah	2013-	Annil	Criteria	$(\mu g/m^3)$
Monitor Location	Maximum (µg/m <sup>3</sup> )	2014 (µg/m <sup>3</sup> )	2014 (µg/m <sup>3</sup> )	2014 Average (µg/m <sup>3</sup> )	2014 (μg/m <sup>3</sup> )	Annual	Daily
PM2.5 – TEOM92	<b>25.5</b>	12.4	9.5	<mark>8.1</mark>	9.7	8	25
"Werris Creek"							
PM10 – TEOM92 "Werris Creek"	37.5	19.1	13.5	13.7	15.1	30	50
PM10 – HVP20 "Tonsley Park"	35.3	15.8	13.5	16.1	14.4	30	50
PM10 - HVP1 "Escott"	18.8	13.2	8.6	10.6	8.8	30	50
PM10 – HVP20 "Glenara"	40.0	18.8	16.5	17.6	18.2	30	50
PM10 – HVP98 "Kyooma"	17.0	12.8	7.5	9.8	7.2	30	50
TSP – HVT98 "Kyooma"	35.4	15.0	6.8	19.9	12.3	90	-

Yellow Bold – Elevated dust level.

#### 2.1.2 Discussion - Compliance / Non Compliance

An easing of the dry conditions resulted in the ambient dust levels to improve across the period with the PM10 annual average and daily maximum levels below the air quality criteria. However the Werris Creek PM2.5 dust level was measured above the daily limit of  $25\mu$ g/m<sup>3</sup> on 11<sup>th</sup> February 2014 between 4pm and 7:45pm peaking 25.5 $\mu$ g/m<sup>3</sup> at 6:15pm with the average wind direction from the west south west (2410) at 3.8m/s. That wind direction would not propagate dust emissions from WCC towards Werris Creek town. The Werris Creek PM2.5 annual average was measured to be 8.1 $\mu$ g/m<sup>3</sup>; fractionally above the annual criteria based on the interim guideline published in the relevant National Environment Protection Measure but did not exceed any air quality criteria outlined in the Project Approval. The elevated PM2.5 is a function of the prevailing climate of below average rain and strong north westerly winds from October 2013 which has increased the ambient dust levels not just in Werris Creek but the entire North West Slopes and Plains area.

#### 2.2 WERRIS CREEK MINE DEPOSITED DUST

Deposited dust monitoring measures particulate matter greater than 30 micron in size that readily settles out of the air related to visual impact. Dust deposition is monitored at 20 locations around WCC. Sampling is scheduled monthly in accordance with EPA guidelines and results are reported as grams per metre squared per month (g/m<sup>2</sup>/month). Dust monitoring locations are identified in **Figure 1**.

#### 2.2.1 Monitoring Data Results

The results for the last three months are provided in the table below; however **Appendix 2** has more information on Deposited Dust Monitoring Results.

Monitor Location	February 2014 (g/m <sup>2</sup> /month)	March 2014 (g/m <sup>2</sup> /month)	2013-2014 Average (g/m <sup>2</sup> /month)	April 2014 (g/m <sup>2</sup> /month)	Annual Criteria (g/m <sup>2</sup> /month)
DG2 "Cintra"	<mark>4.4</mark>	2.8	1.7	2.6*	4.0
DG5 "Railway View"	1.3	2.3*	0.9	0.1*	4.0
DG20 "Tonsley Park"	1.4	1.0	1.5	3.1	4.0
DG15 "Plain View"	1.0	<mark>8.8*</mark>	1.1	0.3*	4.0
DG9 "Marengo"	0.3*	2.5*	0.6	0.5*	4.0
DG22 "Mountain View"	<mark>4.7</mark>	2.8	1.7	1.9	4.0
DG11 "Glenara"	1.9*	0.1	0.7	0.3	4.0
DG24 "Hazeldene"	1.3	1.0	0.8	0.6	4.0
DG17 "Woodlands"	0.4	1.1	0.8	0.9*	4.0
DG96 "Talavera"	0.9	0.3*	0.5	0.4*	4.0
DG98 "Kyooma"	0.6	0.5*	0.3	0.2	4.0
DG14 "Greenslopes"	2.9	0.7*	0.5	0.4*	4.0
DG62 Werris Creek South	0.6	0.4*	0.5	0.2*	4.0
DG92 Werris Creek Centre	1.8*	0.4*	0.8	0.2*	4.0
DG101 "Westfall"	2.0	1.0	0.9	0.7	4.0
DG103 West Street	1.5	1.0	0.7	0.6	4.0
DG1 "Escott"	0.7	0.6	1.3	0.3*	4.0

Monitor Location	February 2014 (g/m <sup>2</sup> /month)	March 2014 (g/m <sup>2</sup> /month)	2013-2014 Average (g/m <sup>2</sup> /month)	April 2014 (g/m <sup>2</sup> /month)	Annual Criteria (g/m <sup>2</sup> /month)
DG3 "Eurunderee"	1.6	0.3*	0.8	2.4	4.0
DG34 8 Kurrara St	0.9	1.7*	12.8	0.3*	4.0
DG106 "Villamagna"	1.2	1.0	1.1	0.5	4.0

 \* - sample contaminated with excessive organic matter (>50%) from non-mining source (i.e. bird droppings and insects); c - indicates sample is contaminated from a Non-Werris Creek Coal dust source; Yellow Bold – Elevated dust level.

#### 2.2.2 Discussion - Compliance / Non Compliance

All dust deposition gauge averages were below the annual criteria of 4.0g/m<sup>2</sup>/month except for DG34 (8 Kurrara St) which has previously been affected by localized non-mining related dust contamination. Elevated monthly results identified during period occurred in February at DG2 ("Cintra") and DG22 ("Mountain View") and in March at DG15 ("Plain View"). The predominant wind direction in February was a south-south easterly, therefore the elevated monthly result for "Cintra" is likely to have been due to mining operations while "Mountain View" would have been from non-mining sources (paddocks being cultivated for winter crops). Similarly in March, the predominant wind direction was a south-south easterly, therefore the elevated monthly result for "Plain View" would have been from non-mining sources (excessive organic matter greater than 50% of the sample). Both "Cintra" and "Plain View" properties are owned by Werris Creek Coal to mitigate potential mining related impacts.

#### 2.3 QUIRINDI TRAIN DUST DEPOSITION

#### 2.3.1 Monitoring Data Results

The results for the last three months are provided in the table below; however **Appendix 3** has more information on the Train Dust Monitoring Results.

Monitor	February	2014	March 2014		April 2	Annual		
Location	g/m <sup>2</sup> /month	% Coal	g/m <sup>2</sup> /month	% Coal	g/m <sup>2</sup> /month	% Coal	(g/m <sup>2</sup> /month)	
DDW30	1.9	25%	0.8	20%	0.6	10	1.2	
DDW20	2.7	30%	1.3	40%	0.8	10	1.4	
DDW13	3.4	75%	1.2	60%	0.7	30	1.6	
			Trai	n Line				
DDE13	1.2	45%	-	-	0.2	10	1.3	
DDE20	0.7	25%	0.9	20%	0.6	20	1.2	
DDE30	1.8	5%	1.2	10%	1.1	10	1.4	

#### 2.3.2 Discussion - Compliance / Non Compliance

Overall the dust fallout levels adjacent to the train line are low (well below the impact assessment criteria nominated by the EPA of 4.0 g/m<sup>2</sup>/month) and comparable to the levels monitored around WCC. For five of the six dust gauges (excluding DDE30) the annual average for 2013-2014 was slightly higher than the previous year reflecting the regional increase in dust levels due to the below average rainfall.

#### 2.4 AIR QUALITY COMPLAINTS

There were four dust complaints during the period. Two of the dust complaints did not have a specific event but rather expressing concern at the increase in dust levels experienced in Werris Creek. Monitoring results demonstrate that dust levels had increased up to 40% for Summer 2013/2014 than Summer 2012/2013 due to below average rainfall impacting on ambient dust levels rather than specifically as a result of mining operations. Two dust complaints were related to dust haze sitting over the mine on the morning of the 10<sup>th</sup> February 2014 that was trapped by a strong temperature inversion. Specific actions taken in relation to these complaints are outlined in **Section 6**.

### 3.0 NOISE

#### 3.1 OPERATIONAL NOISE

Monthly attended noise monitoring is undertaken representative of the following 16 properties from 13 monitoring points below. Attended noise monitoring was undertaken twice for either 60 minutes at privately owned properties or 15 minutes at properties with private agreements; representative of the day period and the evening/night period.

- A "Rosehill" R5;
- o B1 "Almawille" (private agreement) R8;
- o B1 83 Wadwells Lane R7;
- o B2 "Mountain View" R22;
- o B2 "Gedhurst" R9;
- o C "Meadholme" (private agreement) R10;
- o C "Glenara" (private agreement) R11;
- o D "Hazeldene" R24;
- o E "Railway Cottage" R12;
- o F "Talavera" R96;
- o **G R97**;
- H "Kyooma" (private agreement) R98;
- o I Kurrara St, Werris Creek;
- J Coronation Ave, Werris Creek;
- o K "Alco Park" (private agreement) R21; and
- o L R103.

#### 3.1.1 Monitoring Data Results

The WCC operations only noise level (not ambient noise) results for the last three months are outlined below; however see Monthly Noise Monitoring Reports under **Appendix 4** for more detail. Noise monitoring locations are identified in **Figure 2**.

10000	ay 12 1 0010ary 2014				
	Location	Day dB(A)	Criteria dB(A)	<b>Evening/Night</b>	Criteria dB(A)
	Location	Leq 15min	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
Α	"Rosehill" R5	Inaudible#	35	Inaudible#	35
B1	West Quipolly R7, R8*	Inaudible#	37	Inaudible#	37
B2	West Quipolly R9 & R22	Inaudible#	37/36 <sup>1</sup>	Inaudible#	37/36 <sup>1</sup>
С	Central Quipolly R10*, R11*	Inaudible	39	Inaudible	39
D	"Hazeldene" R24	Inaudible	37	Inaudible	37
Е	"Railway Cottage" R12	Inaudible#	38	Inaudible#	38
F	"Talavera" R96	Occasionally audible	38	Inaudible#	37
G	R97	18	35	Inaudible#	35
Н	"Kyooma" R98*	20	36	Inaudible	36
Ι	Kurrara St, WC	Inaudible	35	Inaudible	35
J	Coronation Ave, WC	Inaudible	35	<20	35
K	South St, WC R21*	Inaudible	39	Inaudible#	37
L	West St, WC R103	Inaudible	35	Inaudible#	35

Wednesday 12<sup>th</sup> February 2014

WC – Werris Creek; \* - Private agreement in place with resident; Yellow Bold – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>



Figure 2 – WCC Noise Monitoring Locations

#### Thursday 6<sup>th</sup> March 2014

	Location	Day dB(A)	Criteria dB(A)	<b>Evening/Night</b>	Criteria dB(A)
	Location	L <sub>eq 15min</sub>	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
А	"Rosehill" R5	Inaudible#	35	Inaudible#	35
B1	West Quipolly R7, R8*	Inaudible#	37	26	37
B2	West Quipolly R9 & R22	Inaudible#	37/36 <sup>1</sup>	Faintly Audible	37/36 <sup>1</sup>
С	Central Quipolly R10*, R11*	Inaudible#	39	20	39
D	"Hazeldene" R24	Inaudible#	37	18#	37
Е	"Railway Cottage" R12	Inaudible#	38	22#	38
F	"Talavera" R96	Inaudible#	38	Inaudible	37
G	R97	Inaudible#	35	Inaudible#	35
Η	"Kyooma" R98*	Inaudible#	36	Inaudible	36
Ι	Kurrara St, WC	Inaudible#	35	Inaudible#	35
J	Coronation Ave, WC	Inaudible#	35	Inaudible	35
Κ	South St, WC R21*	Inaudible#	39	Barely audible#	37
L	West St, WC R103	Inaudible#	35	Inaudible#	35

WC – Werris Creek; \* - Private agreement in place with resident; **Yellow Bold** – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>

#### Wednesday 23<sup>rd</sup> April 2014

	Location	Day dB(A)	Criteria dB(A)	Evening/Night	Criteria dB(A)
	Location	L <sub>eq 15min</sub>	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
Α	"Rosehill" R5	Inaudible#	35	29	35
B1	West Quipolly (R7, R8*)	24#	37	33	37
B2	West Quipolly (R9 & R22)	26#	37/36 <sup>1</sup>	35	37/36 <sup>1</sup>
С	Central Quipolly(R10*,R11*)	22#	39	31	39
D	"Hazeldene" R24	22#	37	33	37
Е	"Railway Cottage" R12	Inaudible	38	31	38
F	"Talavera" R96	Inaudible#	38	31	37
G	R97	Inaudible#	35	22	35
Н	" <b>Kyooma</b> " R98*	Inaudible#	36	26	36
Ι	Kurrara St, WC	Inaudible#	35	26	35
J	Coronation Ave, WC	Inaudible#	35	Inaudible	35
K	South St, WC (R20*, R21*)	23	39	22	37
L	West St, WC (R103)	Inaudible	35	25	35

WC – Werris Creek; \* - Private agreement in place with resident; Yellow Bold – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>

#### 3.1.2 Discussion - Compliance / Non Compliance

There were no noise exceedances during February, March and April 2014. The last recorded noise exceedance was in September 2013.

#### 3.2 NOISE COMPLAINTS

There were two noise complaints during the period from a Werris Creek resident that alleged noise impacts from the WCC Train Load Out facility but were found to be due to rail traffic in the Werris Creek rail yard. Specific actions taken in relation to these complaints are outlined in **Section 6**.

#### 4.0 BLAST

During the period a total of nineteen blasts were fired by WCC with monitoring of each blast undertaken at "Glenara", "Kyooma", "Werris Creek South" and "Werris Creek Mid". Compliance limits for blasting overpressure is 115dBL (and up to 120dBL for only 5% of blasts) and vibration is 5mm/s (and up to 10mm/s for only 5% of blasts). Blast monitoring locations are identified in **Figure 3**.

#### 4.1 BLAST MONITORING

#### 4.1.1 Monitoring Data Results

The summary tables of blasting results over the last three months are provided below; however see the blasting results database under **Appendix 5** for more detail.



Figure 3 – WCC Blast Monitoring Locations

February 2014	"Glenara" R11		"Kyooma" R98		Werris Creek South R62		Werris Creek Mid R92	
<b>v</b>	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.12	97.2	0.64	100.1	0.26	97.8	0.16	99.7
Monthly Maximum	0.23	107.8	1.07	108.8	0.54	104.1	0.26	104.2
Annual Average	0.24	98.9	0.83	98.8	0.43	100.4	0.19	99.5
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	0%	0%	1.2%	0%	0%
# >0.5mm/s	0	/8	(	5/8	1,	/8	0.	/8

March 2014	"Glenara" R11		"Kyooma" R98		Werris Creek South R62		Werris Creek Mid R92	
	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.08	99.0	0.46	99.0	0.24	98.6	0.17	98.8
Monthly Maximum	0.19	104.6	0.98	107.3	0.51	108.9	0.38	107.8
Annual Average	0.24	99.2	0.73	98.3	0.42	100.4	0.20	99.0
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	0%	0%	1.2%	0%	0%
# >0.5mm/s	0	/6		3/6	1	/6	0	/6

April 2014	"Glenara" R11		"Kyooma" R98		Werris Creek South R62		Werris Creek Mid R92		
Ĩ	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	
Monthly Average	0.17	101.8	1.18	102.0	0.46	101.4	0.34	0.17	
Monthly Maximum	0.25	104.7	1.71	108.8	0.83	109.3	0.48	0.25	
Annual Average	0.17	101.8	1.18	102.0	0.46	101.4	0.34	0.17	
Criteria	5	115	5	115	5	115	5	115	
% >115dB(L) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%	
# >0.5mm/s	0	0/5		4/5		2/5		0/5	

Yellow – overpressure >115dB(L) or Werris Creek vibration >1mm/s.

#### 4.1.2 Discussion - Compliance / Non Compliance

All blasts over the period complied with maximum license limits (120d(B)L and 10mm/s) with no blast overpressure levels above 115dB(L) or vibration levels over 5mm/s for the three month period.

#### 4.2 BLAST COMPLAINTS

There were eleven blast complaints during the period from six separate blast events. The continuation of blasting complaints is believed to be due the sensitization of the Werris Creek community from an elevated blast overpressure on 8<sup>th</sup> July 2013. WCC are continuing to balance blasting to minimise community impact while also producing enough blasted inventory to achieve the budgeted 2.5Mt coal production rate for 2013-2014. Eight blasting complaints were related to vibration impacts with six complaints specifically from G Coal Interburden blasts that have caused community complaints in the past even though each shot was designed and achieved a vibration level less than 1mm/s. Three blasting complaints were in relation to dust clouds generated by the blast relating the very dry and hot conditions experienced in February 2014. Specific actions taken in relation to these complaints are outlined in **Section 6**.

### 5.0 WATER

The groundwater monitoring program monitors groundwater levels bi-monthly and groundwater quality six monthly. Surface water monitoring is undertaken quarterly. There were no dirty water discharge events during the period.

#### 5.1 GROUND WATER

Groundwater monitoring is undertaken to identify if there are any impacts on groundwater quality and levels as a result of the mining operations. WCC monitors 30 groundwater bores and piezometers in the key aquifers surrounding WCC including Werrie Basalt (next to WCC and further afield) and Quipolly Creek Alluvium. Bi-monthly groundwater level and six monthly/annual groundwater quality monitoring was completed between the 25<sup>th</sup> and 31<sup>st</sup> March 2014. Groundwater and Surface Water monitoring locations are identified in **Figure 4**.

#### 5.1.1 Monitoring Data Results

A summary of groundwater monitoring results is provided below with the field sheets provided in Appendix 6.

		Site	Mar	2014*	Comments
	r	MW1	56.42	-1%	No rainfall recharge, Level down
	lea	MW2	27.87	-2%	No rainfall recharge, Level down
	IE N	MW3	16.45	-3%	No rainfall recharge, Level down
	LSC CC	MW4B	12.14	-4%	No rainfall recharge, Level down
	Μ	MW5	9.88	-5%	No rainfall recharge, Level down
	rie	MW6	13.10	-2%	No rainfall recharge, Level down
	Ver	P1	36.63	-1%	No rainfall recharge, Level down
	5	MW27	45.68	0%	No rainfall recharge
MW8			17.22	-2%	No rainfall recharge, Level down
	alt	MW10	16.99	0%	No rainfall recharge
	3as	MW14	18.12	-2%	No rainfall recharge, Level down
	ie I	<b>MW17B</b>	11.07	-3%	No rainfall recharge, Level down
	, LL I	MW19A	e8.18	-	Water level measured while bore operating
	Ŵ	MW20	20.17	-1%	No rainfall recharge, Level down
		MW12	10.01	-4%	No rainfall recharge, Level down
		MW13	5.59	-4%	No rainfall recharge, Level down
		MW13B	4.12	-7%	No rainfall recharge, Level down
		MW13D	4.76	5%	No rainfall recharge, Level down
	Г	MW15	5.10	-5%	No rainfall recharge, Level down
	E.	MW16	5.97	-8%	No rainfall recharge, Level down
	ivn	MW17A	5.07	-7%	No rainfall recharge, Level down
	ЧI	MW18A	4.86	-7%	No rainfall recharge, Level down
	ly.	MW21A	8.38	-5%	No rainfall recharge, Level down
	pod	MW22A	6.09	-6%	No rainfall recharge, Level down
	ζui	MW22B	6.32	-6%	No rainfall recharge, Level down
		MW23A	3.87	2%	No rainfall recharge
		MW23B	4.26	0%	No rainfall recharge
		MW28A	12.92	-2%	No rainfall recharge, Level down
		MW32	4.10	1%	No rainfall recharge

\* mbgl – meters below ground level is the distance in meters from top of bore to groundwater surface; Red – Greater than 15% change/potential compliance issue; Orange – Change decrease; Green – change increase or no change.

#### 5.1.2 Discussion - Compliance / Non Compliance

The good rainfall in March 2014 was not enough to reverse the prevailing dry conditions resulting in no rainfall recharge to aquifers with the majority of monitoring bores groundwater levels declining over the period. Over twenty groundwater bores routinely monitored are at or close to record low groundwater levels since monitoring commenced. WCC is continuing with additional work to improve the resolution of the groundwater model for periods of extended low rainfall.

#### 5.2 SURFACE WATER

Surface water monitoring is undertaken from local creeks offsite as well as from discharge point dirty water dams to monitor for potential water quality issues. Quarterly surface water monitoring was undertaken on 25<sup>th</sup> February 2014.

#### 5.2.1 Monitoring Data Results

Summary of surface water quality monitoring results is provided below with the laboratory reports provided in **Appendix 7**.



Figure 4 – WCC Groundwater and Surface Water Monitoring Locations

Site	pН	EC	TSS	<b>O&amp;G</b>	Change from Previous Quarter		
					ONSITE		
SB2	9.04	1790	47	<5	pH increased 0.67, EC increased 490, TSS increased 3, O&G no change.		
SB9	8.44	670	17	<5	pH increased 0.11, EC increased 373, TSS decreased 117, O&G no change.		
SB10	7.85	199	197	<5	pH increased 0.12, EC increased 31, TSS decreased 833, O&G no change.		
					OFFSITE		
QCU	7.59	490	30	<5	pH increased 0.01, EC decrease 27, TSS increased 150, O&G no change.		
QCD	7.98	1010	16	<5	pH decreased 0.09, EC increased 50, TSS increased 10, O&G no change.		
WCU	Dry	Dry	Dry	Dry	Dry.		
WCD	8.32	1390	19	<5	pH increased 0.08, EC decreased 40, TSS increased 7, O&G no change.		

pH – measure of acidity/alkalinity; EC – Electrical Conductivity measures salinity; TSS – Total Suspended Solids is a measure of suspended sediment in water (i.e. similar to turbidity); O&G – Oil and Grease measures amount of hydrocarbons (oils and fuels) in water; Orange – Issue with water quality; Green – water quality OK.

#### 5.2.2 Discussion - Compliance / Non Compliance

Quarterly surface water monitoring was undertaken on 25th February 2014 with all onsite and offsite water quality within longer term averages and the Site Water Management Plan trigger values except for some parameters due to the dry conditions evaporating the remaining water into small pools.

#### 5.3 SURFACE WATER DISCHARGES

#### 5.3.1 Monitoring Data Results

There were no discharge events during the period. A summary of discharge monitoring results is provided below with the laboratory reports provided in **Appendix 8**.

Date	Dam	pН	EC	TSS	<b>0&amp;</b> G	Compliance	Туре	5 Day Rain
						No Discharges		
Crite	ria	8.5	N/A	50	10			

pH – measure of acidity/alkalinity; EC – Electrical Conductivity measures salinity; TSS – Total Suspended Solids is a measure of suspended sediment in water (i.e. similar to turbidity); O&G – Oil and Grease measures amount of hydrocarbons (oils and fuels) in water; **Yellow** – indicates results outside criteria due to 5 day rain >39.2mm.

#### 5.3.2 Discussion - Compliance / Non Compliance

There were no impacts on water quality monitored in Quipolly and Werris Creeks' catchments as a result of the dirty water discharge events.

#### 5.3 WATER COMPLAINTS

There was one groundwater complaint during the period due to declining groundwater levels. As the monitoring results demonstrate in Section 5.1.1; the decline is reflected across all the aquifers regionally including the Quipolly Alluvium aquifer which had a number of bores at the lowest levels ever measured by WCC. Specific action taken in relation to this complaint is outlined in **Section 6**.

#### 6.0 COMPLAINTS SUMMARY

There were nineteen complaints received during the period with the details summarised below. There were eleven complaints related to blasting; four complaints related to dust; two complaints relating to noise; one complaint related to road transport and one complaint relating to groundwater. There were ten different complainants during the period with seventeen complaints from Werris Creek residents and one complaint from the Liverpool Plains Shire Council.

#	Date	Complainant	Complaint	Investigation	Action Taken
363	08/02/2014 12:48pm	U Werris Creek	Large dust cloud generated by blast on 8th February 2014 that the complainant thought the dust was going to fall out over his house.	WCC blast #06-2014 (S15_19-23_370-350) at 12:39pm 8th February 2014 was in compliance with PA10_0059 and EPL12290. Wind direction at time of blast was a southerly (1710) but not towards Werris Creek (1820 to 2040). Operations Manager confirmed that dust cloud had dispersed before left site. Ground conditions dry due to low rainfall.	Written response provided to complainant.

364 & 365	10/02/2014 7:50am	U & M Werris Creek	Huge dust cloud just sitting over the mine and moving west towards the Gap.	Strong temperature inversion (peaked at +8.60C/100m at 6am) prevented any dust from dispersing until 8am when the haze disappeared as the wind picked up and lapse rate became positive. Real time dust monitoring did not spike during this period indicating that the dust cloud was limited to the mine site. Limited water carts in operation due to maintenance issues.	Operations stopped to allow extra road watering. Lost production included 2 hours for excavators, 7.5 hours for trucks, 11 hours for drills, 2 hours for crushing plant, 2 hours for train load out. Water carts to water down active areas at shift start. Written response provided to complainant.
366 & 367	20/02/2014 12:47pm & 4:36pm	BB & BC Werris Creek	Complainant indicates that dust is the worst in Werris Creek for 12 years.	Dust levels are 5% to 40% higher in 2013/2014 than 2012/2013 due to rain being 53% lower associated with dry conditions locally as well as from western NSW. Highest dust levels recorded are during bush fire periods. Dust monitoring results in Werris Creek are considered good quality because PM10 is below 30µg/m3.	Written response provided to complainant.
368	21/02/2014 2:50pm	A/EPA Werris Creek	Deafening shunting noise from train on Friday 1:05am 21st February 2014 lasting for 10 minutes.	Train arrived at Train Load Out at 1:24am on Friday 21st February 2014. The shunting noise could have been from the train bound for WCC Train Load Out as it requires the locomotives to be transferred from the northern end to the southern end in the Werris Creek rail yard (not on WCC managed land) so that the train can be propelled down the rail spur and around the loop.	Written response provided to EPA.
369 & 370	25/02/2014 11:53am	U & BD Werris Creek	Large dust cloud generated by blast on Monday 25th February 2014.	WCC blast #10-2014 (S13_8- 10_310+S14_Ramp_Remnant) at 11:43pm 25th February 2014 was in compliance with PA10_0059 and EPL12290. Wind direction at time of blast was a north westerly (3070) and blowing away from Werris Creek (1820 to 2040). Video confirmed that dust cloud had dispersed before left site. Ground conditions dry due to low rainfall.	Written response provided to complainant.
371	25/03/2014 10:36pm	A Werris Creek	Loud noise from the Coal Loader woke the husband from the "sound of throwing very large rocks into an empty barrel" at 4am on 25th March 2014.	A review of the audio and lighting camera records show that the only significant noise source was the sound of a train (most likely the train that finished being loaded at 3:28am) moving into Werris Creek Rail Yard and after leaving WCC's premise. WCC is not responsible for activities undertaken in the Werris Creek Rail Yard.	Written response provided to EPA.
372- 374	01/04/2014 3:10pm	AL, U, S Werris Creek	Blast caused significant ground movement and shaking houses.	WCC shot #21-2014 (S13_7-10_Gcoal TSB) was fired at 3:08pm on Tuesday 1st April 2014 was in compliance. Blast in bottom of pit has previously caused complaints.	Written response provided to complainant.
375- 376	08/04/2014 1:10pm	AL, I Werris Creek	Blast caused significant ground movement and shaking houses.	WCC shot #23-2014 (S15_10-12_350) was fired at 1:08pm on Tuesday 8th April 2014 was in compliance. Blast performed as expected and both Werris Creek blast monitor results below 0.5mm/s.	Written response provided to complainant.
377- 379	16/04/2014 3:15pm	U, I, AT Werris Creek	Blast caused significant ground movement and shaking houses.	WCC shot #24-2014 (S13_7-10_GCoal TSB Part2) was fired at 3:13pm on Wednesday 16th April 2014 was in compliance. Blast in bottom of pit has previously caused complaints.	Written response provided to complainant.
380	23/04/2014 3:24pm	LPSC	Council received complaints from public and councilors regarding the speed that some trucks are travelling when exiting the site.	The supervisors responsible for managing delivery and coal transport heavy vehicles have been made aware of the issue to address with their contractors. WCC campaign hauling coal over to Gunnedah by road ceased.	Written response provided to complainant.
381	30/04/2014 10:01am	M Quipolly	Groundwater level in bore been dropping rapidly recently.	The previous measurement on 26th March 2014 was 8.38m while the 30th April 2014 measurement was 9.32m. This is a larger decrease (-10%) in groundwater compared to the recent trend since May 2013 of between -3% to - 6% fall which was believed to be reflecting the lack of rainfall recharge to the Quipolly alluvial aquifer.	EO met with complainant and referred to expert Hydro geologist for analysis. Written response provided to complainant.

## 7.0 GENERAL

Please feel free to ask any questions in relation to the information contained within this document during Item 7 of the meeting agenda.

## Appendix 1 – Dust Monitoring Results – PM10

#### Werris Creek Coal HVAS TEOM Dust Monitoring 2013-2014

Site	2.5TEOM92 Werris	Monthly	Annual	10TEOM92 Werris	EPL#30 Monthly	Annual	HVP20 Tonsley	EPL#1 Monthly	Rolling Annual	HVP98	EPL#28 Monthly	Rolling Annual	HVP1	Monthly	Rolling Annual	HVP11	EPL#29 Monthly	Rolling Annual	HVT98	Monthly	Rolling Annual	PM10 24hr	PM10 Annual	TSP Annual
Date	Creek	Summary	Average	Creek	Summary	Average	Park	Summary	Average	Kyooma	Summary	Average	Escott	Summary	Average	Glenara	Summary	Average	Kyooma	Summary	Average	Limit	Average	Average
03-Apr-13		1.8	6.2		4.0	10.0	18	8.8	17.9	8	3.5	7.9	11	4.8	11.4	12	12.3	12.4	14	7.1	14.4	50	30	90
15-Apr-13		5.9	0.2		11.3	12.5	16	14.0	16.5	3.5 13	6.1	8.2	4.0 14	8.2	9.9	31	14.3	12.4	20	11.4	13.8	50 50	30	90 90
21-Apr-13		12.7			25.7		9	17.9	14.6	4	13.1	7.2	5	13.5	8.7	16	30.5	17.8	8	20.0	12.5	50	30	90
27-Apr-13							19		15.4	17		9.1	16		10.2	27		19.7	50		19.9	50	30	90
03-May-13		2.3	6.4		5.0	10.1	15	5.5	15.4	8	5.2	8.9	11	3.2	10.3	15	6.7	19.0	18.9	17.4	19.8	50	30	90
15-May-13		6.5	0.4		11.9	12.1	6	18.3	14.5	5	9.6	9.8	3	9.9	9.0	7	19.1	17.6	17.4	18.9	26.4	50 50	30	90 90
21-May-13		14.0			26.8		19	19.0	15.0	10	19.6	9.8	10	16.2	9.1	19	27.4	17.7	18	75.5	25.4	50	30	90
27-May-13							17		15.2	6		9.4	7		8.9	11		17.0	13		24.2	50	30	90
02-Jun-13		2.9	64		4.0	11.1	3	1.3 77	14.1	1	1.1	8.7	2	1.7	8.3	3	1.3	15.8	3	3.2	22.3	50	30	90
14-Jun-13		6.3	0.4		8.5		1	6.4	12.5	3	3.2	7.8	2	3.5	7.4	1	3.3	13.7	3	4.6	19.6	50	30	90 90
20-Jun-13		12.2			16.7		11	16.5	12.4	4	6.2	7.5	6	7.2	7.3	9	10.8	13.4	<0.1	13.1	19.6	50	30	90
26-Jun-13		0.5			0.5		9	5.0	12.2	3	0.7	7.2	4	10	7.1	2	1.0	12.7			19.6	50	30	90
02-Jul-13 08- Jul-13		2.5	64		3.5 9 3	10.6	12	5.6 11 9	12.2	3	2.7	6.9	6	4.2	7.0	5	1.9	12.2	4	3.9 67	18.5 17.8	50 50	30 30	90 90
14-Jul-13		5.9	0.1		9.2	10.0	14	12.1	12.6	5	3.3	6.7	6	5.6	7.0	9	4.8	11.8	8	6.9	17.2	50	30	90
20-Jul-13		15.2			17.7		6	18.6	12.3	3	5.6	6.5	4	8.6	6.9	2	9.3	11.3	6	9.2	16.5	50	30	90
26-Jul-13		0.4			4.5		15	0.0	12.4	10	6.4	6.7	9		7.0	14	7.5	11.4	12	0.0	16.3	50	30	90
07-Aug-13		5.5	6.2		1.5 9.9	10.5	20	9.8	12.3	6 7	6.4 8.6	6.7	8	0.0 7.5	7.0	10	7.5 12.6	11.3	8 16	8.3 14.1	15.9	50 50	30	90
13-Aug-13		4.8			8.3		12	11.5	12.6	9	8.5	6.8	7	7.0	7.0	14	13.5	11.8	12	12.4	15.7	50	30	90
19-Aug-13		20.0			30.3		11	19.8	12.5	11	11.0	7.0	7	9.4	7.0	8	18.6	11.6	22	22.1	16.0	50	30	90
25-Aug-13							10		12.4	7		7.0	7		7.0	12		11.6	13		15.9	50	30	90
06-Sep-13		1.8			5.0		30	5.2	13.3	12	3.7	7.6	17	4.6	7.6	39	7.7	12.8	27	6.4	16.4	50	30	90 90
12-Sep-13		8.1	6.5		15.3	11.3	28	21.4	13.9	10	14.0	7.7	17	14.3	7.9	30	25.2	13.4	22	26.5	16.6	50	30	90
18-Sep-13		7.4			14.8		5	23.6	13.6	4	11.3	7.5	5	14.9	7.8	8	22.8	13.2	6	20.4	16.3	50	30	90
24-Sep-13 30-Sep-13		17.8			33.7		35	35.2	14.3	32	32.4	8.4	28	27.6	8.5	46	46.3	14.3 15.7	16	(1./	18.2	50	30	90
06-Oct-13		4.0			8.8		13	12.8	14.5	8	7.7	8.4	8	6.8	8.6	22	22.1	15.9	14	14.3	18.0	50	30	90
12-Oct-13		8.2	6.8		16.6	12.1	41	27.2	15.3	20	15.9	8.8	22	17.0	9.0	32	34.9	16.4	37	26.7	18.6	50	30	90
18-Oct-13		7.1			14.4		38	22.6	16.0	31	11.5	9.4	36	12.0	9.8	42	31.6	17.1	46	21.3	19.5	50	30	90
30-Oct-13		24.5			43.7		16	41.1	16.1	9	31.2	9.4	10	30.2	9.7	23 16	56.4	17.3	16	45.6	19.5	50	30	90
05-Nov-13		1.5			1.5		21	5.8	16.3	11	3.2	9.5	12	5.4	9.8	31	4.2	17.6	23	5.6	19.5	50	30	90
11-Nov-13		8.7	7.0		15.0	12.4	13	12.5	16.2	6	6.8	9.4	8	8.5	9.7	16	14.8	17.5	13	15.7	19.3	50	30	90
17-Nov-13 23-Nov-13		7.4 27.6			12.4		6	13.1	15.9	5	6.1 10.5	9.3	5	7.6 12.2	9.6	8	15.7 30.7	17.3	21	16.1 22.5	19.4 19.0	50 50	30 30	90 90
29-Nov-13		21.0			40.0		16	21.2	15.7	13	10.0	9.2	13	12.2	9.6	16	00.1	16.9	22	22.0	19.1	50	30	90
05-Dec-13		3.9			6.2		12	10.1	15.6	12	5.9	9.3	12	7.8	9.7	12	9.3	16.8	23	9.5	19.2	50	30	90
11-Dec-13		8.7 9.1	7.2		14.9	12.7	21	17.1	15.7	11	12.1 12.0	9.3	12	12.1	9.7	13	16.9	16.7	21	22.8	19.2	50 50	30	90
23-Dec-13		15.5			28.4		27	27.4	15.8	18	12.0	9.4	16	16.0	9.8	34	33.9	16.9	38	38.3	19.5	50	30	90
29-Dec-13							25		16.0	20		9.7	20		10.0	26		17.1	31		19.7	50	30	90
04-Jan-14		3.5	7.6		7.1	12.2	28	15.0	16.3	22	2.0	9.9	24	9.0	10.3	37	12.5	17.5	38	14.0	20.1	50	30	90
10-Jan-14 16-Jan-14		9.6	7.0		16.5	13.2	20	21.4	16.3	4	15.9	9.6	9 16	16.6	10.3	20	25.1	17.4	22	28.6	20.0	50 50	30	90 90
22-Jan-14		28.0			37.9		19	27.8	16.4	16	22.1	9.8	17	23.5	10.5	25	37.1	17.6	29	37.9	20.2	50	30	90
28-Jan-14							8	-	16.2	8		9.7	7		10.5	7	-	17.4	15		20.1	50	30	90
03-Feb-14		5.5	80		9.9	13.7	18 11	7.6	16.3 16.2	9 14	7.9	9.7	13 12	6.8 13.2	10.5	18 29	7.0	17.4 17.7	14	14.4 25.0	20.0	50 50	30 30	90 90
15-Feb-14		11.4	0.0		17.7	10.7	20	18.3	16.2	17	13.7	9.9	18	12.7	10.7	20	20.2	17.7	35	26.7	20.6	50	30	90
21-Feb-14		25.5			37.5		21	21.3	16.3	16	17.0	10.1	16	18.3	10.8	20	28.7	17.7	27	35.4	20.7	50	30	90
27-Feb-14							35		16.7	16		10.2	19		10.9	40		18.1	24		20.7	50	30	90
11-Mar-14		4.2			7.2		7	5.4	16.5	4	3.5	10.1	10	2.7	10.9	10	4.0	18.1	7	6.8	20.7	50	30 30	90 90
17-Mar-14		9.5	8.1		13.5	13.7	11	13.5	16.4	6	7.5	10.0	6	8.6	10.8	8	16.5	17.9	11	13.2	20.3	50	30	90
23-Mar-14		9.1			13.0		5	9.3	16.2	6	5.9	9.9	5	7.7	10.7	16	13.0	17.9	11	11.2	20.1	50	30	90
∠9-Mar-14 Min	1	18.9			27.3		/ 1,3	35.3	16.1	4	15.8	9.8	3 1.7	18.8	10.6	4	40.0	17.6	3.2	24.3	19.9	50	30	90
Median							15.4			8.2			9.0			15.7			16.1					
wax Capture							41.1 100%			32.4 100%			36.2			56.4 100%	•		75.5 97%					
-																								

<u>Appendix 2 – Dust Monitoring Results – Deposited Dust</u>

							Depos	ited D	ust - Wer	ris Cre	ek Coal	Mine 20	13-2014	4							
	N (a/m	IONTH 2/month)		April 2013	May 2013	June 2013	July 2013	August 2013	September 2013	October 2013	November 2013	December 2013	January 2014	February 2014	March 2014		AVERAGE -	MINIMUM	MAXIMUM	AQGHGMP Criteria	
		0:	Total Matter	4.1	1.5	1.3	1.2	0.4	2.2	0.5	1.3	2.7	1.5	4.4	2.8	ATENAOE					
-	DG2	Cintra	Ash Content	3.0	0.8	0.9	0.8	0.3	1.2	0.4	0.7	1.7	0.6	2.2	1.4	2.0	2.0	0.4	4.4	4.0	
			Total Matter	0.7	1.0	0.9	0.8	0.5	1.2	1.0	1.8	1.1	0.1	1.3	2.3						
-	DG5	Railway View	Ash	0.5	0.6	0.9	0.6	0.5	0.8	0.7	1.2	0.7	<0.1	0.8	0.3	1.1	0.9	0.1	2.3	4.0	
			Total	1.2	0.6	0.4	0.6	0.4	1.4	0.5	1.2	7.8	0.7	1.4	1.0						
EPL #1	DG20	Tonsley Park	Ash	0.7	0.3	0.4	0.4	0.3	0.6	0.4	0.8	1.7	0.3	0.9	0.6	1.4	0.8	0.4	7.8	4.0	
			Total	2.6	1.0	1.2	0.8	1.1	0.8	0.7	1.3	0.3	<0.1	1.0	8.8						
-	DG15	Plain View	Ash	1.3	0.6	1.0	0.5	0.7	0.5	0.6	0.9	0.2	<0.1	0.6	0.3	1.8	1.1	0.3	8.8	4.0	
			Total	1.4	0.8	0.3	0.4	0.5	0.6	0.5	1.2	0.6	0.1	0.3	2.5						
-	DG9	Marengo	Ash	0.6	0.3	0.2	0.2	0.4	0.3	0.4	0.6	0.6	<0.1	<0.1	0.1	0.8	0.5	0.1	2.5	4.0	
		Mountain	Total	0.7	0.8	1.5	0.5	0.5	2.8	1.3	6.9	0.7	<0.1	4.7	2.8						
-	DG22	View	Ash	0.5	0.7	1.2	0.4	0.5	2.0	0.8	3.3	0.6	<0.1	3.4	1.8	2.1	1.6	0.5	6.9	4.0	
			Total	0.2	0.2	0.2	0.1	0.8	1.1	0.9	1.6	1.2	0.7	1.9	0.1						
EPL#29	DG11	Glenara	Ash Content	0.1	0.1	0.1	0.1	0.6	0.8	0.6	1.1	0.7	0.6	0.8	0.1	0.8	0.6	0.1	1.9	4.0	
			Total Matter	0.8	0.5	0.4	0.3	0.4	0.6	0.7	2.4	1.0	<0.1	1.3	1.0						
-	DG24	Hazeldene	Ash Content	0.4	0.4	0.4	0.2	0.3	0.6	0.6	1.3	0.7	<0.1	1.0	0.6	0.9	0.9	0.3	2.4	4.0	
			Total Matter	0.8	0.7	0.4	0.4	0.5	0.5	1.3	1.8	0.7	0.7	0.4	1.1						
-	DG17	Woodlands	Ash Content	0.5	0.4	0.4	0.3	0.5	0.5	1.1	1.1	0.6	0.5	0.2	0.6	0.8	0.8	0.4	1.8	4.0	
		Televisi	Tola	Total Matter	0.7	0.4	0.2	0.2	0.4	0.6	0.5	1.1	0.7	0.6	0.9	0.3					
-	DG96	Talavera	Ash Content	0.4	0.2	0.2	0.2	0.2	0.3	0.4	0.9	0.6	0.4	0.6	<0.1	0.6	0.6	0.2	1.1	4.0	
EDI #20	DCOO	Kusama	Total Matter	0.2	0.2	0.1	0.2	0.2	0.3	0.4	0.6	0.3	<0.1	0.6	0.5			0.1	0.6	4.0	
EFL#20	DG98	куоопа	Ash Content	0.2	0.2	0.1	0.2	0.2	0.3	0.4	0.5	0.3	<0.1	0.3	0.2	0.5	0.3				
	DC14	Creanalance	Total Matter	0.4	0.3	0.3	0.3	0.3	0.6	0.3	1.1	0.8	0.1	2.9	0.7	0.7	0.7			4.0	
-	0014	Greenslopes	Ash Content	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.8	0.6	<0.1	2.0	0.3	0.7	0.7	0.1	2.9	4.0	
	DOCO	Werris Creek	Total Matter	0.3	0.3	0.2	0.9	0.2	0.3	0.3	1.4	0.9	<0.1	0.6	0.4	0.5					
-	DG62	South	Ash Content	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.8	0.6	<0.1	0.3	0.1	0.5	0.5	0.2	1.4	4.0	
EDI #20	DC00	Werris Creek	Total Matter	0.5	0.8	0.3	0.3	0.1	0.3	0.2	1.1	0.6	3.9	1.8	0.4				2.0	4.0	
EPL#30	DG92	Centre	Ash Content	0.3	0.6	0.2	0.2	0.1	0.2	0.2	0.7	0.5	1.6	0.7	0.1	0.9	0.8	0.1	3.9	4.0	
	DOUDI	Mr 16-11	Total Matter	1.2	0.5	0.4	0.5	0.4	0.6	0.7	1.3	3.0	0.6	2.0	1.0	4.0	4.0			4.0	
-	DG101	westrail	Ash Content	0.8	0.5	0.2	0.3	0.2	0.5	0.4	0.9	2.5	0.4	1.5	0.8	1.0	1.0	0.4	3.0	4.0	
			Total Matter	0.8	0.5	0.3	0.7	0.5	0.6	0.5	1.5	1.8	0.1	1.5	1.0						
-	DG103	West Street	Ash Content	0.6	0.5	0.2	0.4	0.3	0.5	0.5	1.0	1.4	0.1	1.1	0.6	0.8	0.8	0.1	1.8	4.0	
			Total Matter	2.4	0.2	1.6	0.7	0.2	0.5	5.0	1.4	0.7	0.5	0.7	0.6						
-	DG1	Escott	Ash Content	1.0	0.2	0.6	0.5	0.1	0.2	1.4	0.9	0.6	0.2	0.5	0.3	1.2	0.8	0.2	5.0	4.0	
			Total Matter	1.1	0.6	0.7	0.4	0.6	1.6	0.2	1.0	1.2	<0.1	1.6	0.3						
	DG3	∟urunderee	Ash Content	0.8	0.5	0.4	0.2	0.4	1.4	0.2	0.6	0.9	<0.1	1.0	<0.1	0.8	0.9	0.2	1.6	4.0	
		8 Kurrara	Total Matter	13.7	6.2	54.1	0.4	0.2	0.6	0.3	0.9	19.6	31.8	0.9	1.7					4.0	
-	DG34	Street	Ash Content	9.8	4.6	43.6	0.2	0.2	0.3	0.3	0.6	13.1	10.4	0.6	0.9	10.9	0.6	0.2	54.1		
		N/III	Total Matter	0.8	0.4	0.4	0.3	0.4	0.4	3.0	2.6	1.3	0.2	1.2	1.0						
· ·	DG106	Villamagna	Ash Content	0.5	0.3	0.2	0.1	0.3	0.3	1.3	1.6	1.0	0.2	0.8	0.8	1.0	0.9	0.2	3.0	4.0	

Note: All results are in the form of Insoluble Matter (g/m2/month); NS - Not sampled BROWN - indicates sample is contaminated from a Non-Werris Creek Coal dust source YELLOW - sample contaminated with excessive organic matter (>50%) from non-mining source (i.e bird droppings and insects)

# Appendix 3 – Train Dust Deposition Monitoring

						Dep	oosi	ted	Dus	st - C	Quir	indi	Tra	ins :	2013	3-20	14								
		DD	W30		DDW20			DDW13			DDE13			DDE20				DDE30				line			
	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Guidel
April 2013	0.8	15%	45%	40%	0.5	15%	50%	35%	-	-	-	-	1.0	15%	45%	15%	0.9	15%	60%	25%	0.7	5%	55%	40%	4.0
May 2013	1.4	<1%	50%	30%	0.7	<1%	90%	10%	0.5	10%	85%	5%	0.6	<1%	70%	20%	0.9	<1%	30%	60%	0.5	<1%	90%	10%	4.0
June 2013	1.0	30%	30%	35%	0.5	40%	35%	20%	-	-	-	-	-	-	-	-	0.4	30%	40%	20%	0.8	15%	50%	15%	4.0
July 2013	1.0	30%	40%	20%	1.2	25%	40%	10%	0.9	30%	20%	10%	0.8	20%	40%	20%	1.7	20%	30%	40%	1.6	10%	25%	30%	4.0
August 2013	0.8	5%	30%	60%	0.5	10%	30%	50%	0.5	35%	20%	45%	0.7	30%	40%	25%	0.6	30%	40%	20%	0.9	5%	30%	35%	4.0
September 2013	1.2	-	-	-	1.1	-	-	-	1.7	-	-	-	1.8	-	-	-	1.2	-	-	-	1.0	-	-	-	4.0
October 2013	-	-	-	-	1.9	20%	40%	30%	1.4	40%	20%	40%	2.9	70%	10%	20%	2.4	60%	20%	20%	3.1	20%	20%	30%	4.0
November 2013	2.0	15%	45%	35%	2.6	15%	30%	50%	2.8	75%	10%	15%	c18.1	<1%	10%	90%	1.3	35%	20%	40%	1.5	10%	35%	40%	4.0
December 2013	1.5	10%	40%	20%	1.6	10%	30%	20%	c5.7	10%	20%	10%	0.9	10%	40%	40%	2.5	20%	10%	10%	2.1	5%	35%	10%	4.0
January 2014	0.6	40%	30%	20%	2.3	40%	10%	<1%	1.9	55%	15%	20%	1.4	80%	15%	5%	0.8	50%	20%	20%	1.6	20%	10%	10%	4.0
February 2014	1.9	25%	35%	30%	2.7	30%	10%	55%	3.4	75%	5%	20%	1.2	45%	<1	50%	0.7	25%	15%	55%	1.8	5%	65%	20%	4.0
March 2014	0.8	20%	20%	60%	1.3	40%	20%	40%	1.2	60%	10%	30%	-	-	-	-	0.9	20%	20%	60%	1.2	10%	20%	70%	4.0
ANNUAL AVERAGE 1.2 1.4					1	.6			1	.3			1	.2			1	.4		4.0					
Average Coal %	Average Coal % 21.1% 24.5%				43.	3%			38.	.6%		30.5%				10.5%				-					
Average Coal g/m2	verage Coal g/m2 0.25 0.35				0.	69		0.48				0.36				0.15				-					
MINIMUM	INIMUM 0.6 0.5				0.5 0.6				0.4				0.5				-								
MAXIMUM		2	.0			2	.7			3	.4			2	.9			2	.5			3	.1		4.0

Note: All results are in the form of Insoluble Matter (g/m2/month)

# Appendix 4 – Noise Monitoring Results



19 February 2014

Ref: 04035/5069

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

#### RE: FEBRUARY 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Wednesday 12<sup>th</sup> February, 2014 as required by the draft Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

#### Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

			Table 1										
WCC Attended Noise Monitoring Program													
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements									
A	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ									
B1	$60 \text{ minutes}^2$	R7	83 Wadwells Lane	60 minutes as per EPL 12290									
	00 111110165	R8*	Almawillee	Private Agreement									
B2	$60 \text{ minutes}^2$	R9	Gedhurst	60 minutes as per EPL 12290									
DZ	00 111110165	R22	Mountain View	60 minutes as per EPL 12290									
C	15 minutes <sup>1</sup>	R10*	Meadholme	Private Agreement									
C		R11*	Glenara	Filvate Agreement									
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290									
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290									
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290									
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ									
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement									
I	60 minutes <sup>2</sup>	R57	Kurrara Street <sup>®</sup>	60 minutes as per EPL 12290									
J	15 minutes <sup>1</sup>	ĺ	Coronation Avenue <sup>@</sup>	PA10_0059 Private Property outside NMZ									
К	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement									
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ									

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

Monitoring points B1, B2, and C are considered representative of multiple receivers because they are sufficiently close together that therefore noise monitoring at the monitoring points are acoustically representative of individual receivers in accordance with EPL 12290 Condition L4.6.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



#### **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Wednesday 12<sup>th</sup> February 2014 had the 5600 excavator in Strip 13 centre at RL310m, a 3600 excavator in Strip 15 west at RL370m, a 1900 excavator in Strip 15 west at RL370m, a 1900 excavator in Strip 16 centre at RL390m and a 1900 excavator in Strip 13 east at RL310m. The Strip 13 east overburden truck fleet were running to the in pit dump at RL350m, the Strip 13 west overburden fleet were short hauling to another inpit dump at RL310m; while the other truck fleets were running to the Western Out of Pit Dump at RL445m on dayshift and RL430m on night shift. There were no production delays due to noise impacts. The crushing plant and train load out operated to 3:30am with one train loaded between 22:30 and 00:30.

#### Noise Compliance Assessment

The results of the noise measurements are shown below in **Tables 2** and **3**.



				Table 2										
WCC Noise Monitoring Results – 12 February 2014 (Day)														
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Inversion <sup>o</sup> C/100m	Wind speed (m/s),dir <sup>o</sup>	Identified Noise Sources								
A R5 Rosehill	2:08 pm	37	35	n/a	3.4,230	Birds (36), traffic (28), WCC inaudible								
<b>B1</b> R7 83 Wadwells Lane/R8 Almawillee	2:27 pm	32	37	n/a	3.9,145	Air conditioner (29), wind (27), birds (23), WCC inaudible								
B2 R9Gedhurst/ R22 Mountain View	1:04 pm	40	37/36*	n/a	3.3,246	Birds (39), traffic (30), wind (30), WCC inaudible								
C R10 Meadholme/ R11 Glenara	3:32 pm	39	39	n/a	2.9,254	Insects & birds (39), traffic (28), WCC inaudible								
D R24 Hazeldene	4:55 pm	33	37	n/a	2.4,211	Traffic (29), wind (29), birds (25), WCC inaudible								
E R12 Railway Cottage	1:03 pm	42	38	n/a	3.3,246	Traffic (40), birds (35), trains (32), WCC inaudible								
F R96 Talavera	2:12 pm	38	38	n/a	2.1,147	Birds (34), traffic (32), planes (31), wind (29), WCC occasionally audible								
<b>G</b> R97	3:20 pm	26	35	n/a	2.1,196	Wind (25), WCC (18)								
H R98 Kyooma	3:48 pm	26	36	n/a	2.8,200	Birds (23), wind (20), WCC (20)								
I R57 Kurrara St	4:35 pm	36	35	n/a	2.6,218	Traffic (34), insects (30), WCC inaudible								
J R57 Coronation Ave	4:16 pm	34	35	n/a	2.4,242	Traffic (31), trains (27), insects (27), WCC inaudible								
K R21 Alco Park	4:25 pm	33	39	n/a	1.8,229	Traffic (30), birds (30), WCC inaudible								
L R103	4:03 pm	35	35	n/a	2.4,242	Train (34), wind (30), WCC inaudible								

\* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.

				T	able 3								
WCC Noise Monitoring Results – 12 February 2014 (Evening/Night)													
		dB(A),	dB(A),	Criterion	Inversion <sup>o</sup> C/100m,								
Location	Time	L1	Leq	dB(A) Leq	Wind speed	Identified Noise Sources							
		(1min) <sup>1</sup>			(m/s),dir <sup>o</sup>								
A R5 Rosehill	9:09 pm	n/a	35	35	Lapse, 3.3, 144	Insects (31), traffic (31), generator (25) WCC inaudible							
B1 R7 83 Wadwells	9:30 pm	n/a	35	37	Lapse, 3.6, 150	Insects (31), traffic (31). air conditioner (27), WCC							
Lane/R8 Almawillee						inaudible							
B2 R9Gedhurst/ R22	8:05pm	n/a	39	37/36*	Lapse, 4.9, 141	Birds (37), wind (32), domestic (27), traffic (27), WCC							
Mountain View						inaudible							
C R10 Meadholme/ R11	10:33 pm	n/a	35	39	Lapse, 2.2, 171	Traffic (33), insects (30), WCC inaudible							
Glenara													
D R24 Hazeldene	10:50 pm	n/a	36	37	Lapse, 2.4, 192	Traffic (33), insects (33), WCC inaudible							
E R12 Railway Cottage	7:11 pm	n/a	35	38	Lapse, 5.4, 137	Traffic (32), birds (30), trains (25), WCC inaudible							
F R96 Talavera	8:22 pm	n/a	45	37	Lapse, 5.5, 143	Insects & birds (45), cows (30), WCC inaudible							
<b>G</b> R97	9:35 pm	n/a	36	35	Lapse, 3.8, 145	Insects (35), wind (27), WCC inaudible							
H R98 Kyooma	10:07 pm	n/a	37	36	Lapse, 2.7, 200	Insects (37), WCC inaudible							
I R57 Kurrara St	10:57 pm	n/a	35	35	Lapse, 2.4, 202	Insects (31), Traffic (31), air conditioner (25), WCC							
						inaudible							
J R57 Coronation Ave	10:35 pm	n/a	32	35	Lapse, 2.2, 171	Traffic (28), Insects (26), trains (23), WCC (<20)							
K R21 Alco Park	7:39 pm	n/a	42	37	Lapse, 5.4, 137	Traffic (38), birds (38), wind (33), WCC inaudible							
L R103	7:18 pm	n/a	42	35	Lapse, 7.2, 139	Trains (42), wind (36), WCC inaudible							

1. L1 (1 min) from mine noise only \* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.



The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.

Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-




minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Cass

Ross Hodge Acoustical Consultant

Review:

Neil Pont

Neil Pennington Acoustical Consultant



SPECTRUM USTICS

# Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Location		Day	Evening/Night	Night	Long Term	Acquisition
		L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R7	83 Wadwells Lane	37	37	45	35	40
R9	"Gedhurst"	37	37	45	35	40
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R22	"Mountain View"	36	36	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

#### LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

Location		Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R8	"Almawillee"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R98	"Kyooma"	40	45

#### Table 21: Properties with Private Agreements Noise Criteria



# Appendix III

Plant Sound Power Levels

Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measureu
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116	118	28/1/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	114		11/9/12
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13



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Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.





11 March 2014

Ref: 04035/5111

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

#### RE: MARCH 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Thursday 6<sup>th</sup> March, 2014 as required by the draft Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

#### Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

Table 1										
	WCC Attended Noise Monitoring Program									
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements						
A	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ						
B1	$60 \text{ minutes}^2$	R7	83 Wadwells Lane	60 minutes as per EPL 12290						
	00 minutes	R8*	Almawillee	Private Agreement						
B2	$60 \text{ minutes}^2$	R9	Gedhurst	60 minutes as per EPL 12290						
DZ	00 minutes	R22	Mountain View	60 minutes as per EPL 12290						
C	15 minutes <sup>1</sup>	R10*	Meadholme	Private Agreement						
U		R11*	Glenara	r iivate Agreement						
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290						
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290						
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290						
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ						
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement						
I	60 minutes <sup>2</sup>	R57	Kurrara Street <sup>@</sup>	60 minutes as per EPL 12290						
J	15 minutes <sup>1</sup>		Coronation Avenue <sup>@</sup>	PA10_0059 Private Property outside NMZ						
K	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement						
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ						

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

Monitoring points B1, B2, and C are considered representative of multiple receivers because they are sufficiently close together that therefore noise monitoring at the monitoring points are acoustically representative of individual receivers in accordance with EPL 12290 Condition L4.6.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



#### **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Thursday 6<sup>th</sup> March 2014 had the 5600, 3600 and two 1900 excavators in Strip 13 between RL310m and RL330m and one 1900 excavator in Strip 15 west at RL370m. The Strip 13 overburden truck fleets were running to the in pit dump at RL350m and the Strip 15 truck fleet were running to the Western Out of Pit Dump at RL420m. One truck fleet was hauling coal from Strip 13 to the ROM Pad. There were no production delays due to noise impacts, however there was a delay waiting for a blast between 4pm and 5pm. The crushing plant and train load out operated to 3:30am with one train loaded between 8:57pm and 10:50pm.

#### Noise Compliance Assessment

The results of the noise measurements are shown below in **Tables 2** and **3**.

Table 2										
	WCC Noise Monitoring Results – 6 March 2014 (Day)									
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Inversion <sup>o</sup> C/100m	Wind speed	Identified Noise Sources				
					(m/s),dir <sup>o</sup>					
A R5 Rosehill	1:56 pm	39	35	n/a	4.3,182	Birds & insects (37), traffic (34), WCC inaudible				
B1 R7 83 Wadwells	2:17 pm	39	37	n/a	4.3,192	Domestic noise (35), birds & insects (34), traffic (32),				
Lane/R8 Almawillee						WCC inaudible				
B2 R9Gedhurst/ R22	12:50 pm	38	37/36*	n/a	3.3,189	Birds & insects (36), traffic (33), WCC inaudible				
Mountain View										
C R10 Meadholme/	3:21 pm	45	39	n/a	5.6,186	Wind in trees (44), birds & insects (38), WCC inaudible				
R11 Glenara										
D R24 Hazeldene	3:40 pm	37	37	n/a	6.5,174	Traffic (34), birds & insects (34), WCC inaudible				
E R12 Railway Cottage	4:47 pm	40	38	n/a	6.9,162	Wind (37), birds (35), traffic (33), WCC inaudible				
F R96 Talavera	3:42 pm	41	38	n/a	6.5,174	Wind (39), birds (36), WCC inaudible				
<b>G</b> R97	3:22 pm	36	35	n/a	5.6,186	Wind (36), WCC inaudible				
H R98 Kyooma	2:58 pm	44	36	n/a	5.2,197	Birds (43), wind (36), WCC inaudible				
I R57 Kurrara St	1:28 pm	40	35	n/a	3.5,191	Traffic (36), trains (35), birds (33), WCC inaudible				
J R57 Coronation Ave	2:33 pm	44	35	n/a	4.1,181	Trains (40), traffic (38), birds (33), WCC inaudible				
K R21 Alco Park	5:13 pm	43	39	n/a	7.1,165	Traffic (43), birds & insects (32), WCC inaudible				
L R103	4:49 pm	40	35	n/a	6.9,164	Trains (36), wind (36), birds & insects (30), WCC				
						inaudible				

\* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.

Table 3										
	WCC Noise Monitoring Results – 6 March 2014 (Evening/Night)									
Location	Time	dB(A), L1 (1min) <sup>1</sup>	dB(A), Leq	Criterion dB(A) Leq	Inversion <sup>o</sup> C/100m, Wind speed (m/s),dir <sup>o</sup>	Identified Noise Sources				
A R5 Rosehill	8:58 pm	n/a	33	35	Lapse, 3.5, 139	Generator (29), insects (28), traffic (28), WCC inaudible				
B1 R7 83 Wadwells Lane/R8 Almawillee	9:18 pm	30	41	37	+1.1,1.6,145	Insects (41), WCC (26)				
B2 R9Gedhurst/ R22 Mountain View	7:55 pm	n/a	34	37/36*	Lapse,2.4,128	Traffic (33), birds & insects (28), WCC faintly audible				
C R10 Meadholme/ R11 Glenara	10:23 pm	23	34	39	+2.6,1.7,166	Traffic (31), insects (31), WCC (20)				
D R24 Hazeldene	10:43 pm	22	44	37	+2.4,2.0,145	Insects (44), traffic (32), WCC (18)				
E R12 Railway Cottage	10:39 pm	30	34	38	+2.4,2.0,146	Traffic (32), insects (29), WCC (22)				
F R96 Talavera	9:34 pm	n/a	45	37	+1.7,1.4,154	Insects (45), traffic (25), WCC inaudible				
<b>G</b> R97	9:02 pm	n/a	35	35	Lapse, 3.5, 139	Insects (35), WCC inaudible				
H R98 Kyooma	8:36 pm	n/a	37	36	Lapse, 2.7, 164	Insects (37), WCC inaudible				
I R57 Kurrara St	7:10 pm	n/a	36	35	Lapse,4.5,124	Insects (32), traffic (32), domestic noise (30), WCC inaudible				
J R57 Coronation Ave	8:15 pm	n/a	33	35	Lapse, 1.5, 109	Traffic (30), insects (29), dogs (25), WCC inaudible				
K R21 Alco Park	7:30 pm	n/a	45	37	Lapse, 5.7, 132	Insects (43), traffic (40), trains (25), WCC barely audible				
L R103	7:11 pm	n/a	42	35	Lapse, 6.3, 135	Trains (42), birds & insects (31), WCC inaudible				

1. L1 (1 min) from mine noise only \* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.



The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.

Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-





minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Cass

Ross Hodge Acoustical Consultant

Review:

Neil Pont

Neil Pennington Acoustical Consultant



SPECTRUM USTICS

# Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Location		Day	Evening/Night	Night	Long Term	Acquisition
		L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R7	83 Wadwells Lane	37	37	45	35	40
R9	"Gedhurst"	37	37	45	35	40
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R22	"Mountain View"	36	36	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

#### LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

Location		Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R8	"Almawillee"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R98	"Kyooma"	40	45

#### Table 21: Properties with Private Agreements Noise Criteria



# Appendix III

Plant Sound Power Levels

Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116	118	28/1/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	114		11/9/12
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13



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Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.





29 April 2014

Ref: 04035/5155

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

#### RE: APRIL 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Wednesday 23rd April, 2014 as required by the draft Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

#### Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

Table 1									
WCC Attended Noise Monitoring Program									
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements					
А	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ					
D1	$40 \text{ minutos}^2$	R7	83 Wadwells Lane	60 minutes as per EPL 12290					
Ы	ou minutes <sup>2</sup>	R8*	Almawillee	Private Agreement					
00	$(0 \text{ minuto })^2$	R9	Gedhurst	60 minutes as per EPL 12290					
BZ	60 minules <sup>2</sup>	R22	Mountain View	60 minutes as per EPL 12290					
0	15 minutes <sup>1</sup>	R10*	Meadholme						
U		R11*	Glenara	Privale Agreement					
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290					
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290					
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290					
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ					
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement					
I	60 minutes <sup>2</sup>	R57	Kurrara Street@	60 minutes as per EPL 12290					
J	15 minutes <sup>1</sup>		Coronation Avenue@	PA10_0059 Private Property outside NMZ					
К	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement					
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ					

Notes accompanying the table are on the following page

 $^{\ast}$  - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

Monitoring points B1, B2, and C are considered representative of multiple receivers because they are sufficiently close together that therefore noise monitoring at the monitoring points are acoustically representative of individual receivers in accordance with EPL 12290 Condition L4.6.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



#### **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Wednesday 23<sup>rd</sup> April, 2014 had the 5600 excavator and one 1900 excavator in Strip 13 east at RL300m, 3600 excavator in Strip 15 centre at RL370m and one 1900 excavator in Strip 16 west at RL390m. The Strip 13 overburden truck fleets were running to the in pit dump at RL400m on day and night shift with the Strip 15/16 truck fleets running to the Top Dump at RL445m on day shift and to the in pit dump on night shift. There were no production delays either day or night shift. The crushing plant and train load out operated to 3:30am with no trains loaded.

#### Noise Compliance Assessment

The results of the noise measurements are shown below in **Tables 2** and **3**.



				Table 2	2	
			WCC Noise M	onitoring Resul	ts – 23 April 20	014 (Day)
		dB(A),	Criterion	Inversion	Wind	
Location	Time	Leq	dB(A) Leq	<sup>o</sup> C/100m	speed	Identified Noise Sources
					(m/s),dir <sup>o</sup>	
A R5 Rosehill	1:49 pm	33	35	n/a	5.2,294	Birds (30), traffic (30), WCC inaudible
B1 R7 83 Wadwells	2:09 pm	40	37	n/a	5.5,281	Wind in trees (38), birds (33), traffic (29), WCC (24)
Lane/R8 Almawillee						
B2 R9Gedhurst/ R22	12:43 pm	41	37/36*	n/a	5.2,286	Birds (40), wind in trees (33), traffic (28), WCC (26)
Mountain View						
C R10 Meadholme/	3:14 pm	44	39	n/a	4.5,289	Traffic (42), birds (39), WCC (22)
R11 Glenara						
D R24 Hazeldene	3:33 pm	49	37	n/a	4.7,286	Traffic (48), birds (41), WCC (22)
E R12 Railway Cottage	4:19 pm	45	38	n/a	2.7,278	Traffic (45), birds (29), WCC inaudible
F R96 Talavera	3:09 pm	38	38	n/a	5.0,290	Wind in trees (37), birds (29), traffic (25), WCC inaudible
<b>G</b> R97	2:17 pm	39	35	n/a	5.9,280	Wind in trees (39), birds (26), WCC inaudible
H R98 Kyooma	2:46 pm	44	36	n/a	5.4,274	Wind in trees (44), birds (30), WCC inaudible
I R57 Kurrara St	12:40 pm	50	35	n/a	5.2,286	Wind in trees (49), traffic (41), road works (35), birds (33),
						WCC inaudible
J R57 Coronation Ave	1:46 pm	50	35	n/a	5.2,294	Wind in trees (50), traffic (37), road works (33), birds (29),
						WCC inaudible
K R21 Alco Park	5:06 pm	38	39	n/a	2.3,283	Birds (36), traffic (34), WCC (23)
L R103	4:47 pm	46	35	n/a	2.2,282	Birds (46), traffic (32), WCC inaudible

\* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.

				Tab	le 3					
		WCC N	loise Monit	oring Results	– 23 April 2014 (Evening	ŋ/Night)				
		dB(A),	dB(A),	Criterion	Inversion <sup>o</sup> C/100m,					
Location	Time	L1	Leq	dB(A) Leq	Wind speed	Identified Noise Sources				
		(1min) <sup>1</sup>			(m/s),dir <sup>o</sup>					
A R5 Rosehill	9:14 pm	35	37	35	+8.1,0.3,187	Traffic (34), insects (33), WCC (29)				
B1 R7 83 Wadwells	9:34 pm	38	36	37	+7.9,1.5,318	WCC (33), traffic (32), insects (19)				
Lane/R8 Almawillee										
B2 R9Gedhurst/ R22	8:10 pm	39	48	37/36*	+8.8,0.4,90	Traffic (48), WCC (35), insects (32)				
Mountain View										
C R10 Meadholme/ R11	10:38 pm	36	44	39	+7.6,1.4,321	Dog (43), traffic (37), WCC (31), insects (23)				
Glenara										
D R24 Hazeldene	10:58 pm	44	38	37	+8.6,1.6,313	Traffic (36), WCC (33), insects (19)				
E R12 Railway Cottage	10:47 pm	36	40	38	+8.6,1.6316	Traffic (39), WCC (31)				
F R96 Talavera	9:37 pm	35	33	37	+7.9,1.2,286	WCC (31), traffic (27), insects (20)				
<b>G</b> R97	9:12 pm	26	26	35	+8.1,0.3,187	WCC (22), traffic (21), insects (19)				
H R98 Kyooma	8:48 pm	31	30	36	+9.1,0.1,0	WCC (26), train (26), insects (21)				
I R57 Kurrara St	7:15 pm	30	48	35	+9.0,0.6,334	Traffic (48), insects (33), plane (32), WCC (26)				
J R57 Coronation Ave	8:22 pm	n/a	52	35	+8.7,0.4,90	Traffic (51), trains (44), WCC inaudible				
K R21 Alco Park	7:44 pm	26	51	37	+7.3,0.5,108	Dogs (51), traffic (40), insects (31), WCC (22)				
L R103	7:23 pm	28	39	35	+8.8,1.1,344	Traffic (37), insects (33), WCC (25)				

1. L1 (1 min) from mine noise only \* Gedhurst noise criterion is 37dB(A) Leq while Mountain View noise criterion is 36 dB(A) Leq.



The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.

Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-





minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Cass

Ross Hodge Acoustical Consultant

Review:

Neil Port

Neil Pennington Acoustical Consultant





Appendix I





#### Attended Noise Monitoring Locations





## Appendix II

Noise Limits

	Location	Day	Evening/Night	Night	Long Term	Acquisition
	Location	L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R7	83 Wadwells Lane	37	37	45	35	40
R9	"Gedhurst"	37	37	45	35	40
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R22	"Mountain View"	36	36	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

#### LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R8	"Almawillee"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R98	"Kyooma"	40	45

#### Table 21: Properties with Private Agreements Noise Criteria





# Appendix III

Plant Sound Power Levels

Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116.7	118	24/4/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (attenuated)	614	117.7	117.5	119	24/4/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (attenuated)	609	117.7	117.4	119	11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (attenuated)	612	117.7	117.8	120	24/4/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (attenuated)	613	117.7	117.9		24/4/14
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 785C (attenuated)	624	117.7	118.1		24/4/14
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	115		24/4/14
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13



Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13
Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Water Cart (Cat 773D)	869	113	117.5	119	24/4/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14
Water pump (Dam 4)			106		24/4/14
Evaporation fan (Dam 4)			105		24/4/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.

# Appendix 5 – Blasting Monitoring Results

													WERRIS	CREEK CO	DAL BLASTING RESUL	TS							
Shot number	Date fired	Time Fired	Location	Туре	Glenar	a R11	Kyoom	a R98	Werris Ck	Sth R62	Werris Ck	Mid R92	COMPL	IANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	WIN	ID	FUME	C	OMPLAINT	s
					Vib (mm/s)	OP (dB)	Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	0 to 5	OP/Vib	Dust/Fume	Other								
2014-05&06	4/02/2014	13:09	S13_6_Gseam + Rock Pop Shot	IB	0.11	98.6	0.74	99.7	0.28	104.1	0.17	104.2	10.00	120.0	Not Monitored	50.00	-3.6	142	5.2	0	0	0	0
2014-07	8/02/2014	12:39	S15_19-23_370-350	TSB	0.23	99.3	0.94	99.1	0.54	100.8	0.26	101.0	10.00	120.0	Not Monitored	50.00	-3.4	171	2.4	0	0	1	0
2014-08	11/02/2014	16:37	S13_10-16_UG Collapse + Rock Pop Shot	IB	0.13	96.6	1.07	97.3	0.32	103.2	0.22	102.9	10.00	120.0	Not Monitored	50.00	-3.1	159	3.0	0	0	0	0
2014-09	20/02/2014	13:04	S13_17-23_310 TSB	TSB	0.16	100.7	0.65	101.4	0.26	94.9	0.21	93.8	10.00	120.0	Not Monitored	50.00	-3.5	297	4.3	0	0	0	0
2014-10&11	25/02/2014	11:43	S13_8-10_310 + S14_Ramp_Remnant	IB	0.18	107.8	0.73	108.8	0.32	101.1	0.16	99.4	10.00	120.0	Not Monitored	50.00	-3.3	307	1.9	0	0	2	0
2014-12	26/02/2014	13:20	S13_10-16_UG Collapse Secondary Blast	IB	0.00	91.0	0.03	99.3	0.00	93.1	0.00	96.5	10.00	120.0	Not Monitored	50.00	-3.8	315	3.5	0	0	0	0
2014-12a	26/02/2014	14:42	Misfire refire S13_10-16_UG Collapse Secondary Blast	IB	0.00	82.9	0.02	93.0	0.00	88.2	0.00	103.2	10.00	120.0	Not Monitored	50.00	-3.3	284	3.3	0	0	0	0
2014-13	28/02/2014	12:23	S13_16-20_DE UG Collapse	IB	0.13	100.7	0.97	101.8	0.32	96.8	0.24	96.9	10.00	120.0	Not Monitored	50.00	-2.6	155	4.2	0	0	0	0
TOTALS	FEBRUARY 2014	# BLAST	8	AVERAGE	0.12	97.2	0.64	100.1	0.26	97.8	0.16	99.7	5.00	115.0									
TOTALS	FEBRUARY 2014	#>0.5mm	5	HIGHEST	0.23	107.8	1.07	108.8	0.54	104.1	0.26	104.2	10.00	120.0									
TOTALS	ANNUAL	# BLAST	84	AVERAGE	0.24	98.9	0.83	98.8	0.43	100.4	0.19	99.5	5.00	115.0									
TOTALS	ANNUAL	%	>115dB(L) or 5mm/s or MAX # Blasts Per Month	15	0%	0%	0%	0%	0%	1.2%	0%	0.0%	5%	5%									

Chataumhan	Data fire d	Time Fined	Fired Location T	Tures									WERRIS	CREEK CO MAI	OAL BLASTING RESUL RCH 2014	TS							
Shot number	Date fired	rime Fired	Location	Type	Glenara R11 Kyooma R98 Werris Ck Sth R62 Werris Ck Mid R92 COMPLIANCE ARTC Culvert COMPLIANCE TEMPERATURE WIND FUME										С	OMPLAINTS	\$						
					Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	0 to 5	OP/Vib	Dust/Fume	Other
2014-14&15	6/03/2014	16:43	S13_17-22_310 Part 2 and Rock Pop Shot	IB	0.19	104.0	0.88	107.3	0.51	108.9	0.38	105.9	10.00	120.0	Not Monitored	50.00	-2.7	179	6.3	0	0	0	0
2014-16	10/03/2014	13:02	S13_Rock Pop Shot	SB	0.01	93.4	0.03	89.2	0.01	88.3	0.01	88.7	10.00	120.0	Not Monitored	50.00	-3.2	169	1.5	0	0	0	0
2014-17	13/03/2014	13:59	S13_Rock Pop Shot	SB	0.01	100.0	0.04	100.0	0.01	95.6	0.01	96.6	10.00	120.0	Not Monitored	50.00	-4.0	229	2.6	0	0	0	0
2014-18	14/03/2014	13:18	S15_Ramp Shot	IB	0.16	104.6	0.98	97.9	0.45	97.2	0.36	97.3	10.00	120.0	Not Monitored	50.00	-3.2	269	4.6	0	0	0	0
2014-19	18/03/2014	13:08	S13_Rock Pop Shot	SB	0.01	91.2	0.05	97.7	0.01	99.5	0.01	96.7	10.00	120.0	Not Monitored	50.00	-3.0	49	0.5	0	0	0	0
2014-20	20/03/2014	13:09	S13_7-10_G Seam Terrace Shot and Rock Pop Shot	IB	0.10	100.7	0.76	101.8	0.45	102.1	0.22	107.8	10.00	120.0	Not Monitored	50.00	-3.1	113	4.4	0	0	0	0
TOTALS	MARCH 2014	# BLAST	6	AVERAGE	0.08	99.0	0.46	99.0	0.24	98.6	0.17	98.8	5.00	115.0									
TOTALS	MARCH 2014	#>0.5mm	3	HIGHEST	0.19	104.6	0.98	107.3	0.51	108.9	0.38	107.8	10.00	120.0									
TOTALS	ANNUAL	# BLAST	90	AVERAGE	0.22	98.9	0.70	98.9	0.41	100.2	0.18	99.3	5.00	115.0									
TOTALS	ANNUAL	%	>115dB(L) or 5mm/s or MAX # Blasts Per Month	15	0%	0%	0%	0%	0%	1.1%	0%	0.0%	5%	5%									

				WC South										WE	RRIS CREE	EK COAL BLASTING R	ESULTS							1	
o	Data Carl		1	Predicted	-											APRIL 2014									
Shot number	Date fired	Time Fired	Location	Vibration K50	туре	Glenar	a R11	Kyoon	na R98	Werris Ck	Sth R62	Werris Cl	Mid R92	COMPI	LIANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	WIN	ND .	FREQ	FUME	C	OMPLAINT	S
				mm/s		Vib (mm/s)	OP (dB)	Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	Hz	0 to 5	OP/Vib	Dust/Fume	Other								
2014-21	1/04/2014	15:08	S13_7-10_Gcoal TSB Part 1	0.4	TSB	0.25	101.9	1.71	96.7	0.75	92.7	0.48	71.5	10.00	120.0	Not Monitored	50.00	-2.7	273	2.8		0	3	0	0
2014-22	4/04/2014	13:14	Ramp 14	0.3	IB	0.12	98.5	0.37	97.5	0.22	96.9	0.18	101.8	10.00	120.0	Not Monitored	50.00	-3.6	322	6.8		0	0	0	0
2014-23	8/04/2014	13:08	S15_10-12_350	0.6	IB	0.15	104.7	1.22	105.3	0.24	109.3	0.38	111.9	10.00	120.0	Not Monitored	50.00	-2.8	283	0.5		0	2	0	0
2014-24	16/04/2014	15:13	S13_7-10_Gcoal TSB Part 2	0.7	TSB	0.21	101.5	1.70	108.8	0.83	109.0	0.45	103.1	10.00	120.0	Not Monitored	50.00	-2.4	152	6.4		0	2	1	0
2014-25	17/04/2014	10:13	S15_8-10	0.5	IB	0.10	102.6	0.92	101.6	0.28	98.9	0.20	97.2	10.00	120.0	Not Monitored	50.00	-3.2	229	1.5		0	0	0	0
TOTALS	APRIL 2014	# BLAST	5	TARGET	AVERAGE	0.17	101.8	1.18	102.0	0.46	101.4	0.34	97.1	5.00	115.0										
TOTALS	APRIL 2014	#>0.5mm	3	<1mm/s	HIGHEST	0.25	104.7	1.71	108.8	0.83	109.3	0.48	111.9	10.00	120.0										
TOTALS	ANNUAL	# BLAST	5		AVERAGE	0.17	101.8	1.18	102.0	0.46	101.4	0.34	97.1	5.00	115.0										
TOTALS	ANNUAL	%	>115dB(L) or 5mm/s or MAX # Blasts Per Month	15		0%	0%	0%	0%	0%	0%	0%	0%	5%	5%										

# Appendix 6 – Groundwater Monitoring Results



	CERTIFICATE OF ANALYSIS										
Work Order	ES1406544	Page	: 1 of 10								
Client		Laboratory	: Environmental Division Sydney								
Contact	: A WRIGHT	Contact	: Client Services								
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164								
	TALBOT RD										
	GUNNEDAH NSW 2380										
E-mail	: awright@whitehavencoal.com.au	E-mail	: sydney@alsglobal.com								
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555								
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500								
Project	: WCC ANNUAL GROUNDWATER	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement								
Order number	: 7595										
C-O-C number	:	Date Samples Received	: 26-MAR-2014								
Sampler	: CE & BP	Issue Date	: 02-APR-2014								
Site	:										
		No. of samples received	: 9								
Quote number	: SY/417/13	No. of samples analysed	: 9								

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

#### Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting ^ = This result is computed from individual analyte detections at or above the level of reporting

- AC01: Bore data supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC02: Sampling data supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC03: Field tests supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC04: Field observations supplied by ALS ACIRL.
- EK071G: It has been noted that Reactive P is greater than Total P for various samples, however this difference is within the limits of experimental variation.

	NATA Accredited Laboratory 825	Signatories This document has been electronically	signed by the authorized signatories indica	ated below. Electronic signing has been carried out in
NIATA	Accredited for compliance with	compliance with procedures specified in 21 C	FR Part 11.	
NAIA	ISO/IEC 17025.	Signatories	Position	Accreditation Category
		Alex Rossi	Organic Chemist	Sydney Organics
		Ankit Joshi	Inorganic Chemist	Sydney Inorganics
ACCREDITATION		Ashesh Patel	Inorganic Chemist	Sydney Inorganics
		Kim Phan	Sample Receipt Clerk	ACIRL Sampling
		Raymond Commodor	Instrument Chemist	Sydney Inorganics
		Shobhna Chandra	Metals Coordinator	Svdnev Inorganics



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-MW13 116810	WER-MW13B 116811	WER-MW13D 116812	WER-MW15 116813	WER-MW23A 116814
	Cl	ient samplii	ng date / time	25-MAR-2014 11:50	25-MAR-2014 11:30	25-MAR-2014 11:10	25-MAR-2014 09:15	25-MAR-2014 10:00
Compound	CAS Number	LOR	Unit	ES1406544-001	ES1406544-002	ES1406544-003	ES1406544-004	ES1406544-005
AC01: Bore Data								
Standing Water Level		0.01	m	5.59	4.12	4.76	5.10	3.87
Stick up		0.01	m	0.40	0.30	0.20	0.20	0.20
AC02: Sampling Data								
Purge Type		-						TAP
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	µS/cm	655	1080	1120	1000	843
рН		0.01	pH Unit	7.10	8.20	7.20	7.40	7.10
Temperature		0.1	°C	20.4	21.0	20.5	19.5	22.1
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	7.38	7.64	7.37	7.49	7.37
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	706	1150	1210	1060	876
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C		10	mg/L	402	767	725	619	503
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	180	77	298	296	235
Total Alkalinity as CaCO3		1	mg/L	180	77	298	296	235
ED041G: Sulfate (Turbidimetric) as SO4 2	2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	27	<1	14	36	34
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	85	309	210	145	113
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	52	63	100	69	63
Magnesium	7439-95-4	1	mg/L	25	22	41	36	30
Sodium	7440-23-5	1	mg/L	54	111	95	109	80
Potassium	7440-09-7	1	mg/L	1	13	2	2	<1
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.025	0.002	0.001	0.001
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L	0.027	0.358	0.038	0.044	0.020

# Page : 4 of 10 Work Order : ES1406544 Client : ACIRL PTY LTD Project : WCC ANNUAL GROUNDWATER



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-MW13	WER-MW13B	WER-MW13D	WER-MW15	WER-MW23A		
Client compling data / time		116810 25 MAR 2014 11:50	116811 25 MAR 2014 11:30	116812 25 MAR 2014 11:10	116813 25 MAR 2014 00:15	116814 25 MAR 2014 10:00				
	01			23-IVIAR-2014 11.50	23-IMAR-2014 11.30	23-WAR-2014 11.10	23-IMAR-2014 09.15	23-WAR-2014 10.00		
Compound	CAS Number	LOR	Unit	ES1406544-001	ES1406544-002	ES1406544-003	ES1406544-004	E31406544-005		
EG020T: Total Metals by ICP-MS - Conti	inued		ä							
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0006	<0.0001	<0.0001	<0.0001		
Chromium	7440-47-3	0.001	mg/L	<0.001	0.005	<0.001	<0.001	<0.001		
Copper	7440-50-8	0.001	mg/L	0.024	0.380	0.032	0.191	0.016		
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001		
Nickel	7440-02-0	0.001	mg/L	<0.001	0.006	<0.001	0.004	<0.001		
Lead	7439-92-1	0.001	mg/L	<0.001	0.015	0.001	0.011	<0.001		
Zinc	7440-66-6	0.005	mg/L	0.048	3.51	0.119	0.109	0.009		
Manganese	7439-96-5	0.001	mg/L	0.009	0.349	0.646	0.017	<0.001		
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	0.02	0.01		
Iron	7439-89-6	0.05	mg/L	0.20	75.4	0.25	0.41	<0.05		
EG035T: Total Recoverable Mercury b	y FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
EK055G: Ammonia as N by Discrete Ar	nalyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	3.83	0.02	0.02	<0.01		
EK057G: Nitrite as N by Discrete Analy	yser									
Nitrite as N		0.01	mg/L	<0.01	0.08	<0.01	0.02	<0.01		
EK058G: Nitrate as N by Discrete Anal	lyser									
Nitrate as N	14797-55-8	0.01	mg/L	1.62	0.24	0.04	1.42	1.33		
EK059G: Nitrite plus Nitrate as N (NOx	x) by Discrete Ana	lyser								
Nitrite + Nitrate as N		0.01	mg/L	1.62	0.32	0.04	1.44	1.33		
EK061G: Total Kjeldahl Nitrogen By Di	screte Analyser									
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.3	4.7	0.1	0.3	0.2		
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser										
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	1.9	5.0	0.1	1.7	1.5		
EK067G: Total Phosphorus as P by Dis	screte Analyser									
Total Phosphorus as P		0.01	mg/L	0.09	0.49	0.09	0.08	0.07		
EK071G: Reactive Phosphorus as P by	v discrete analvse									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.10	<0.01	0.06	0.10	0.09		
EN055: Ionic Balance										
Total Anions		0.01	meq/L		10.2	12.2	10.8			
Total Anions		0.01	meq/L	7.24				9.36		
Total Cations		0.01	meq/L	7.03	10.1	12.6	11.2	9.09		
Ionic Balance		0.01	%		0.67	1.54	2.02			

# Page: 5 of 10Work Order: ES1406544Client: ACIRL PTY LTDProject: WCC ANNUAL GROUNDWATER



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			WER-MW13	WER-MW13B	WER-MW13D	WER-MW15	WER-MW23A				
				116810	116811	116812	116813	116814				
	Cli	Client sampling date / time		25-MAR-2014 11:50	25-MAR-2014 11:30	25-MAR-2014 11:10	25-MAR-2014 09:15	25-MAR-2014 10:00				
Compound	CAS Number	LOR	Unit	ES1406544-001	ES1406544-002	ES1406544-003	ES1406544-004	ES1406544-005				
EN055: Ionic Balance - Continued												
Ionic Balance		0.01	%	1.51				1.46				
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction		20	µg/L	<20	<20	<20	<20	<20				
C10 - C14 Fraction		50	µg/L	<50	<50	<50	<50	<50				
C15 - C28 Fraction		100	µg/L	<100	<100	<100	<100	<100				
C29 - C36 Fraction		50	µg/L	<50	<50	<50	<50	<50				
<sup>^</sup> C10 - C36 Fraction (sum)		50	µg/L	<50	<50	<50	<50	<50				
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013												
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20				
<sup>^</sup> C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20				
>C10 - C16 Fraction	>C10_C16	100	μg/L	<100	<100	<100	<100	<100				
>C16 - C34 Fraction		100	μg/L	<100	<100	<100	<100	<100				
>C34 - C40 Fraction		100	μg/L	<100	<100	<100	<100	<100				
^ >C10 - C40 Fraction (sum)		100	μg/L	<100	<100	<100	<100	<100				
^ >C10 - C16 Fraction minus Naphthalene		100	µg/L	<100	<100	<100	<100	<100				
(F2)												
EP080: BTEXN												
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1				
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2				
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2				
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2				
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2				
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2				
<sup>^</sup> Sum of BTEX		1	µg/L	<1	<1	<1	<1	<1				
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5				
EP080S: TPH(V)/BTEX Surrogates												
1.2-Dichloroethane-D4	17060-07-0	0.1	%	105	101	95.4	107	97.2				
Toluene-D8	2037-26-5	0.1	%	92.2	93.5	92.9	108	92.3				
4-Bromofluorobenzene	460-00-4	0.1	%	91.8	86.9	86.6	97.3	88.6				


Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		WER-MW23B 116815	WER-MW7 116816	WER-MW32 (NARANJI) 116817	WER-MW10 116818		
	Cl	ient samplii	ng date / time	25-MAR-2014 10:20	25-MAR-2014 09:30	25-MAR-2014 10:50	25-MAR-2014 12:50	
Compound	CAS Number	LOR	Unit	ES1406544-006	ES1406544-007	ES1406544-008	ES1406544-009	
AC01: Bore Data								
Standing Water Level		0.01	m	4.26	4.60	4.10	17.0	
Stick up		0.01	m	0.10		0.45	0.20	
AC02: Sampling Data								
Purge Type		-		BAIL				
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	μS/cm	805	485	720	1150	
рН		0.01	pH Unit	7.10	7.20	7.00	7.80	
Temperature		0.1	°C	21.0	21.4	21.7	31.7	
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	7.33	7.25	7.20	7.76	
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	846	504	744	1220	
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C		10	mg/L	451	323	444	692	
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	227	157	199	393	
Total Alkalinity as CaCO3		1	mg/L	227	157	199	393	
ED041G: Sulfate (Turbidimetric) as SO4 2	2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	29	25	31	24	
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	108	43	94	130	
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	61	37	51	70	
Magnesium	7439-95-4	1	mg/L	30	17	23	58	
Sodium	7440-23-5	1	mg/L	79	47	77	115	
Potassium	7440-09-7	1	mg/L	<1	<1	1	<1	
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	<0.001	<0.001	
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	
Barium	7440-39-3	0.001	mg/L	0.019	0.020	0.016	0.005	

# Page : 7 of 10 Work Order : ES1406544 Client : ACIRL PTY LTD Project : WCC ANNUAL GROUNDWATER



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-MW23B	WER-MW7	WER-MW32 (NARANJI)	WER-MW10	
				116815	116816	116817	116818	
	Cl	ient sampli	ng date / time	25-MAR-2014 10:20	25-MAR-2014 09:30	25-MAR-2014 10:50	25-MAR-2014 12:50	
Compound	CAS Number	LOR	Unit	ES1406544-006	ES1406544-007	ES1406544-008	ES1406544-009	
EG020T: Total Metals by ICP-MS - Continue	∍d							
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0004	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.026	0.002	<0.001	0.001	
Copper	7440-50-8	0.001	mg/L	0.035	0.076	0.023	0.002	
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	
Nickel	7440-02-0	0.001	mg/L	0.002	0.002	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	0.005	0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	0.028	0.235	0.035	0.011	
Manganese	7439-96-5	0.001	mg/L	0.004	0.012	0.002	0.003	
Vanadium	7440-62-2	0.01	mg/L	0.01	<0.01	<0.01	0.04	
Iron	7439-89-6	0.05	mg/L	0.18	0.46	0.07	0.54	
EG035T: Total Recoverable Mercury by F	IMS							
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	
EK055G: Ammonia as N by Discrete Analy	/ser							
Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.03	0.01	<0.01	
EK057G: Nitrite as N by Discrete Analyse	r							
Nitrite as N		0.01	mg/L	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyse	ər							
Nitrate as N	14797-55-8	0.01	mg/L	0.87	1.23	0.86	11.1	
EK059G: Nitrite plus Nitrate as N (NOx) b	y Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	0.87	1.23	0.86	11.1	
EK061G: Total Kjeldahl Nitrogen By Discr	ete Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.1	0.2	<0.1	0.8	
EK062G: Total Nitrogen as N (TKN + NOx)	by Discrete Ar	nalyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	1.0	1.4	0.9	11.9	
EK067G: Total Phosphorus as P by Discre	ete Analyser							
Total Phosphorus as P		0.01	mg/L	0.11	0.09	0.10	0.05	
EK071G: Reactive Phosphorus as P by dis	screte analyser							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.12	0.08	0.12	0.03	
EN055: Ionic Balance								
Total Anions		0.01	meq/L				12.0	
Total Anions		0.01	meq/L	8.94	5.48	7.95		
Total Cations		0.01	meq/L	8.95	5.29	7.81	13.3	
Ionic Balance		0.01	%				4.93	



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		WER-MW23B	WER-MW7	WER-MW32 (NARANJI)	WER-MW10		
			na data (tima	116815	116816	116817	116818	
		ient sampli	ng date / time	25-MAR-2014 10:20	25-MAR-2014 09:30	25-MAR-2014 10:50	25-MAR-2014 12:50	
Compound	CAS Number	LOR	Unit	ES1406544-006	ES1406544-007	ES1406544-008	ES1406544-009	
EN055: Ionic Balance - Continued								
Ionic Balance		0.01	%	0.04	1.77	0.86		
EP080/071: Total Petroleum Hydrocar	bons							
C6 - C9 Fraction		20	µg/L	<20	<20	<20	<20	
C10 - C14 Fraction		50	µg/L	<50	<50	<50	<50	
C15 - C28 Fraction		100	µg/L	<100	<100	<100	<100	
C29 - C36 Fraction		50	μg/L	<50	<50	<50	<50	
<sup>^</sup> C10 - C36 Fraction (sum)		50	µg/L	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3						
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	<100	<100	
>C16 - C34 Fraction		100	µg/L	<100	<100	<100	<100	
>C34 - C40 Fraction		100	µg/L	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)		100	µg/L	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)		100	µg/L	<100	<100	<100	<100	
EP080: BTEXN	i i i i i i i i i i i i i i i i i i i							
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	
^ Sum of BTEX		1	µg/L	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	104	108	106	108	
Toluene-D8	2037-26-5	0.1	%	94.5	95.9	96.4	90.4	
4-Bromofluorobenzene	460-00-4	0.1	%	82.7	84.0	81.2	91.6	



### **Descriptive Results**

#### Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Field Observations		
AC04: Appearance	WER-MW13116810 - 25-MAR-2014 11:50	CLEAR
AC04: Appearance	WER-MW13B116811 - 25-MAR-2014 11:30	TURBID
AC04: Appearance	WER-MW13D116812 - 25-MAR-2014 11:10	CLEAR
AC04: Appearance	WER-MW15116813 - 25-MAR-2014 09:15	CLEAR
AC04: Appearance	WER-MW23A116814 - 25-MAR-2014 10:00	CLEAR
AC04: Appearance	WER-MW23B116815 - 25-MAR-2014 10:20	CLEAR
AC04: Appearance	WER-MW7116816 - 25-MAR-2014 09:30	CLEAR
AC04: Appearance	WER-MW32 (NARANJI)116817 - 25-MAR-2014	CLEAR
	10:50	
AC04: Appearance	WER-MW10116818 - 25-MAR-2014 12:50	CLEAR
AC04: Odour	WER-MW13116810 - 25-MAR-2014 11:50	NIL
AC04: Odour	WER-MW13B116811 - 25-MAR-2014 11:30	NIL
AC04: Odour	WER-MW13D116812 - 25-MAR-2014 11:10	NIL
AC04: Odour	WER-MW15116813 - 25-MAR-2014 09:15	NIL
AC04: Odour	WER-MW23A116814 - 25-MAR-2014 10:00	NIL
AC04: Odour	WER-MW23B116815 - 25-MAR-2014 10:20	NIL
AC04: Odour	WER-MW7116816 - 25-MAR-2014 09:30	NIL
AC04: Odour	WER-MW32 (NARANJI)116817 - 25-MAR-2014	NIL
	10:50	
AC04: Odour	WER-MW10116818 - 25-MAR-2014 12:50	NIL
AC04: Colour	WER-MW13116810 - 25-MAR-2014 11:50	CLEAR
AC04: Colour	WER-MW13B116811 - 25-MAR-2014 11:30	BROWN
AC04: Colour	WER-MW13D116812 - 25-MAR-2014 11:10	CLEAR
AC04: Colour	WER-MW15116813 - 25-MAR-2014 09:15	CLEAR
AC04: Colour	WER-MW23A116814 - 25-MAR-2014 10:00	CLEAR
AC04: Colour	WER-MW23B116815 - 25-MAR-2014 10:20	CLEAR
AC04: Colour	WER-MW7116816 - 25-MAR-2014 09:30	CLEAR
AC04: Colour	WER-MW32 (NARANJI)116817 - 25-MAR-2014	CLEAR
	10:50	
AC04: Colour	WER-MW10116818 - 25-MAR-2014 12:50	CLEAR

Page	: 10 of 10
Work Order	: ES1406544
Client	: ACIRL PTY LTD
Project	: WCC ANNUAL GROUNDWATER



### Surrogate Control Limits

Sub-Matrix: WATER	Recovery Limits (%)		
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128



	CERTIFICATE OF ANALYSIS										
Work Order	ES1406683	Page	: 1 of 10								
Client		Laboratory	: Environmental Division Sydney								
Contact	: GUNNEDAH LABORATORY	Contact	: Client Services								
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164								
	TALBOT RD										
	GUNNEDAH NSW 2380										
E-mail	: gun.lab@alsglobal.com	E-mail	: sydney@alsglobal.com								
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555								
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500								
Project	: WCC ANNUAL GROUNDWATER	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement								
Order number	: 7595										
C-O-C number	:	Date Samples Received	: 27-MAR-2014								
Sampler	: BP	Issue Date	: 03-APR-2014								
Site	: WERRIS CREEK										
		No. of samples received	: 8								
Quote number	: SY/417/13	No. of samples analysed	: 8								

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

#### Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting ^ = This result is computed from individual analyte detections at or above the level of reporting

- AC01: Bore data supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC02: Sampling data supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC03: Field tests supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC04: Field observations supplied by ALS ACIRL.
- EG035:Positive mercury results have been confirmed by re-analysis
- EK071G: It has been noted that Reactive P is greater than Total P for various samples, however this difference is within the limits of experimental variation.
- Reactive P and Total P results have been confirmed by reanalysis for sample 4

	NATA Accredited Laboratory 825	Signatories This document has been electronically	signed by the authorized signatories	indicated below. Electronic signing has bee	n carried out in							
	Accredited for compliance with	compliance with procedures specified in 21 C	mpliance with procedures specified in 21 CFR Part 11.									
NAIA	ISO/IEC 17025.	Signatories	Position	Accreditation Category								
		Ankit Joshi	Inorganic Chemist	Sydney Inorganics								
		Ashesh Patel	Inorganic Chemist	Sydney Inorganics								
ACCREDITATION		Celine Conceicao	Senior Spectroscopist	Sydney Inorganics								
		Kim Phan	Kim Phan Sample Receipt Clerk ACIRL Sampling									
		Pabi Subba	Senior Organic Chemist	Sydney Organics								
		Shobhna Chandra	Metals Coordinator	Sydney Inorganics								



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		WER-MW17A	WER-MW18A	WER-MW21A	WER-MW1	WER-MW2	
	Cl	ient sampli	na date / time	26-MAR-2014 12:20	26-MAR-2014 12:40	26-MAR-2014 12:00	116822 26-MAR-2014 10:45	26-MAR-2014 11:10
Compound	CAS Number	I OR	I Init	ES1406683-001	ES1406683-002	ES1406683-003	ES1406683-004	ES1406683-005
AC01: Boro Data	CAS Number	LOIT	onic					
Standing Water Level		0.01	m	5.07	4.86	8.38	56.6	27.9
Stick up		0.01	m	0.50		0.30	0.25	0.15
AC02: Sampling Data								
Purge Type		-				Тар	Bail	Тар
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	μS/cm	890	859	764	1170	788
рН		0.01	pH Unit	7.30	7.20	7.20	6.90	7.50
Temperature		0.1	°C	20.7	23.0	23.3	20.9	20.4
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	7.68	7.58	8.10	7.46	7.81
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	945	910	800	1250	991
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C		10	mg/L	497	523	489	708	485
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	268	268	244	525	373
Total Alkalinity as CaCO3		1	mg/L	268	268	244	525	373
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	31	32	46	8	5
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	112	104	69	68	31
ED093F: Dissolved Major Cations		-						
Calcium	7440-70-2	1	mg/L	72	71	75	128	68
Magnesium	7439-95-4	1	mg/L	35	34	29	60	46
Sodium	7440-23-5	1	mg/L	78	66	52	56	49
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	<1
EG020T: Total Metals by ICP-MS	_ ,	0.001		0.000		10.001		10.001
Arsenic	7440-38-2	0.001	mg/L	0.003	0.004	<0.001	0.001	<0.001
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L	0.021	0.021	0.019	0.013	<0.001

# Page: 4 of 10Work Order: ES1406683Client: ACIRL PTY LTDProject: WCC ANNUAL GROUNDWATER



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-MW17A	WER-MW18A	WER-MW21A	WER-MW1	WER-MW2
				116819	116820	116821	116822	116823
	Cl	lient sampli	ng date / time	26-MAR-2014 12:20	26-MAR-2014 12:40	26-MAR-2014 12:00	26-MAR-2014 10:45	26-MAR-2014 11:10
Compound	CAS Number	LOR	Unit	ES1406683-001	ES1406683-002	ES1406683-003	ES1406683-004	ES1406683-005
EG020T: Total Metals by ICP-MS - Cont	tinued							
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	0.0003	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.001	0.002	0.001
Copper	7440-50-8	0.001	mg/L	0.006	0.055	0.027	0.786	0.006
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.010	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.002	0.044	0.006
Zinc	7440-66-6	0.005	mg/L	0.014	0.022	0.403	0.632	0.101
Manganese	7439-96-5	0.001	mg/L	<0.001	0.003	0.001	0.089	0.005
Vanadium	7440-62-2	0.01	mg/L	0.02	0.02	0.01	0.03	0.04
Iron	7439-89-6	0.05	mg/L	<0.05	0.06	0.16	1.54	0.46
EG035T: Total Recoverable Mercury b	by FIMS							
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G-NH4: Ammonium as N by DA								
Ammonium as N		0.01	mg/L	<0.01	0.02	<0.01	0.05	<0.01
EK057G: Nitrite as N by Discrete Anal	lyser							
Nitrite as N		0.01	mg/L	<0.01	0.01	<0.01	0.01	<0.01
EK058G: Nitrate as N by Discrete Ana	llyser							
Nitrate as N	14797-55-8	0.01	mg/L	1.28	1.30	1.70	6.82	3.05
EK059G: Nitrite plus Nitrate as N (NO)	x) by Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	1.28	1.31	1.70	6.83	3.05
EK061G: Total Kjeldahl Nitrogen By Di	iscrete Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	<0.1	0.2	0.1	0.5	0.4
EK062G: Total Nitrogen as N (TKN + N	lOx) by Discrete Ar	nalyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	1.3	1.5	1.8	7.3	3.4
EK067G: Total Phosphorus as P by Di	screte Analyser							
Total Phosphorus as P		0.01	mg/L	0.09	0.09	0.08	0.03	0.05
EK071G: Reactive Phosphorus as P by	y discrete analyse	r						
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.10	0.10	0.09	0.14	0.07
EN055: Ionic Balance								
Total Anions		0.01	meq/L		8.95		12.6	
Total Anions		0.01	meq/L	9.94		8.52		9.45
Total Cations		0.01	meq/L	9.87	9.21	8.39	13.8	9.31
Ionic Balance		0.01	%		1.42		4.51	

# Page: 5 of 10Work Order: ES1406683Client: ACIRL PTY LTDProject: WCC ANNUAL GROUNDWATER



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		WER-MW17A	WER-MW18A	WER-MW21A	WER-MW1	WER-MW2	
	CI	iont compli	na data / tima	116819 26 MAR 2014 12:20	116820	116821 26 MAR 2014 12:00	116822 26 MAR 2014 10:45	116823
				ES1406683 001	ES1406683 002	ES1406682 003	20-WAR-2014 10.45	20-WAR-2014 11.10
Compound	CAS Number	LOR	Unit	E31400003-001	E31400003-002	E3 1400003-003	E31400003-004	E31400003-005
EN055: Ionic Balance - Continued								
Ionic Balance		0.01	%	0.39		0.76		0.73
EP080/071: Total Petroleum Hydrocar	bons							
C6 - C9 Fraction		20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction		50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction		100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction		50	μg/L	<50	<50	<50	<50	<50
<sup>^</sup> C10 - C36 Fraction (sum)		50	μg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3						
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
<sup>^</sup> C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction		100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction		100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)		100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene		100	µg/L	<100	<100	<100	<100	<100
(F2)								
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	μg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
<sup>^</sup> Sum of BTEX		1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	91.4	83.4	90.2	90.0	90.2
Toluene-D8	2037-26-5	0.1	%	97.7	109	96.1	95.8	94.6
4-Bromofluorobenzene	460-00-4	0.1	%	93.3	84.2	91.6	91.9	93.4



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		WER-MW6 116824	WER-MW27 116825	WER-MW29 116826	 	
	Cl	ient samplii	ng date / time	26-MAR-2014 11:35	26-MAR-2014 10:15	26-MAR-2014 13:30	 
Compound	CAS Number	LOR	Unit	ES1406683-006	ES1406683-007	ES1406683-008	 
AC01: Bore Data							
Standing Water Level		0.01	m	13.1	45.7	12.3	 
Stick up		0.01	m	1.05	0.45		 
AC02: Sampling Data							
Purge Type		-		Bail	Bail		 
AC03: Field Tests							
Electrical Conductivity (Non Compensated)		1	µS/cm	1720	1270	1070	 
pH		0.01	pH Unit	7.40	7.30	8.80	 
Temperature		0.1	°C	21.1	22.4	22.3	 
EA005P: pH by PC Titrator							
pH Value		0.01	pH Unit	7.72	7.66	8.34	 
EA010P: Conductivity by PC Titrator							
Electrical Conductivity @ 25°C		1	µS/cm	1860	1380	1140	 
EA015: Total Dissolved Solids							
Total Dissolved Solids @180°C		10	mg/L	1010	784	654	 
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	 
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	7	 
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	633	241	422	 
Total Alkalinity as CaCO3		1	mg/L	633	241	429	 
ED041G: Sulfate (Turbidimetric) as SO4 2	- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	29	75	48	 
ED045G: Chloride Discrete analyser							
Chloride	16887-00-6	1	mg/L	214	219	87	 
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L	66	94	34	 
Magnesium	7439-95-4	1	mg/L	74	22	73	 
Sodium	7440-23-5	1	mg/L	209	141	108	 
Potassium	7440-09-7	1	mg/L	<1	6	<1	 
EG020T: Total Metals by ICP-MS							
Arsenic	7440-38-2	0.001	mg/L	0.005	0.008	<0.001	 
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	 
Barium	7440-39-3	0.001	mg/L	0.062	0.026	0.003	 

# Page: 7 of 10Work Order: ES1406683Client: ACIRL PTY LTDProject: WCC ANNUAL GROUNDWATER



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-MW6	WER-MW27	WER-MW29	 
	_			116824	116825	116826	
	Ci	lient sampli	ng date / time	26-MAR-2014 11:35	26-MAR-2014 10:15	26-MAR-2014 13:30	 
Compound	CAS Number	LOR	Unit	ES1406683-006	ES1406683-007	ES1406683-008	 
EG020T: Total Metals by ICP-MS - Contin	ued						
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0011	<0.0001	 
Chromium	7440-47-3	0.001	mg/L	0.017	0.009	<0.001	 
Copper	7440-50-8	0.001	mg/L	0.079	2.60	0.016	 
Cobalt	7440-48-4	0.001	mg/L	0.011	0.002	<0.001	 
Nickel	7440-02-0	0.001	mg/L	0.018	0.051	<0.001	 
Lead	7439-92-1	0.001	mg/L	0.006	0.252	<0.001	 
Zinc	7440-66-6	0.005	mg/L	0.112	3.09	0.168	 
Manganese	7439-96-5	0.001	mg/L	0.215	0.182	0.013	 
Vanadium	7440-62-2	0.01	mg/L	0.06	0.04	0.02	 
Iron	7439-89-6	0.05	mg/L	9.35	14.0	<0.05	 
EG035T: Total Recoverable Mercury by	FIMS						
Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.0002	<0.0001	 
EK055G-NH4: Ammonium as N by DA							
Ammonium as N		0.01	mg/L	0.02	0.02	0.08	 
EK057G: Nitrite as N by Discrete Analys	ser						
Nitrite as N		0.01	mg/L	0.02	<0.01	0.04	 
EK058G: Nitrate as N by Discrete Analy	ser						
Nitrate as N	14797-55-8	0.01	mg/L	4.40	14.9	1.08	 
EK059G: Nitrite plus Nitrate as N (NOx)	by Discrete Ana	lyser					
Nitrite + Nitrate as N		0.01	mg/L	4.42	14.9	1.12	 
EK061G: Total Kjeldahl Nitrogen By Disc	crete Analyser						
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.6	1.2	0.7	 
EK062G: Total Nitrogen as N (TKN + NO	x) by Discrete A	nalyser					
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	5.0	16.1	1.8	 
EK067G: Total Phosphorus as P by Disc	rete Analvser						
Total Phosphorus as P		0.01	mg/L	0.22	0.14	<0.01	 
EK071G: Reactive Phosphorus as P by o	discrete analvse	r					
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.07	<0.01	<0.01	 
EN055: Ionic Balance							
Total Anions		0.01	meq/L	19.3	12.6	12.0	 
Total Cations		0.01	meq/L	18.5	12.8	12.4	 
Ionic Balance		0.01	%	2.18	0.92	1.51	 
FP080/071: Total Petroleum Hydrocarbo	ns						



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-MW6	WER-MW27	WER-MW29	 
				116824	116825	116826	
	Cli	ient samplii	ng date / time	26-MAR-2014 11:35	26-MAR-2014 10:15	26-MAR-2014 13:30	 
Compound	CAS Number	LOR	Unit	ES1406683-006	ES1406683-007	ES1406683-008	 
EP080/071: Total Petroleum Hydrocart	oons - Continued						
C6 - C9 Fraction		20	µg/L	<20	<20	<20	 
C10 - C14 Fraction		50	µg/L	<50	<50	<50	 
C15 - C28 Fraction		100	µg/L	<100	<100	<100	 
C29 - C36 Fraction		50	µg/L	<50	<50	<50	 
<sup>^</sup> C10 - C36 Fraction (sum)		50	µg/L	<50	<50	<50	 
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3					
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	 
<sup>^</sup> C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	 
>C10 - C16 Fraction	>C10 C16	100	µg/L	<100	<100	<100	 
>C16 - C34 Fraction		100	μg/L	<100	<100	<100	 
>C34 - C40 Fraction		100	µg/L	<100	<100	<100	 
^ >C10 - C40 Fraction (sum)		100	µg/L	<100	<100	<100	 
>C10 - C16 Fraction minus Naphthalene		100	µg/L	<100	<100	<100	 
(F2)							
EP080: BTEXN							
Benzene	71-43-2	1	µg/L	<1	<1	<1	 
Toluene	108-88-3	2	µg/L	<2	<2	<2	 
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	 
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	 
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	 
<sup>^</sup> Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	 
<sup>^</sup> Sum of BTEX		1	µg/L	<1	<1	<1	 
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	 
EP080S: TPH(V)/BTEX Surrogates							
1.2-Dichloroethane-D4	17060-07-0	0.1	%	82.4	94.9	90.7	 
Toluene-D8	2037-26-5	0.1	%	102	82.9	118	 
4-Bromofluorobenzene	460-00-4	0.1	%	81.7	102	91.6	 



### **Descriptive Results**

#### Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Field Observations		
AC04: Appearance	WER-MW17A116819 - 26-MAR-2014 12:20	Clear
AC04: Appearance	WER-MW18A116820 - 26-MAR-2014 12:40	Clear
AC04: Appearance	WER-MW21A116821 - 26-MAR-2014 12:00	Clear
AC04: Appearance	WER-MW1116822 - 26-MAR-2014 10:45	Clear
AC04: Appearance	WER-MW2116823 - 26-MAR-2014 11:10	Clear
AC04: Appearance	WER-MW6116824 - 26-MAR-2014 11:35	Slight Turbid
AC04: Appearance	WER-MW27116825 - 26-MAR-2014 10:15	Slight Turbid
AC04: Appearance	WER-MW29116826 - 26-MAR-2014 13:30	Clear
AC04: Odour	WER-MW17A116819 - 26-MAR-2014 12:20	Nil
AC04: Odour	WER-MW18A116820 - 26-MAR-2014 12:40	Nil
AC04: Odour	WER-MW21A116821 - 26-MAR-2014 12:00	Nil
AC04: Odour	WER-MW1116822 - 26-MAR-2014 10:45	Nil
AC04: Odour	WER-MW2116823 - 26-MAR-2014 11:10	Nil
AC04: Odour	WER-MW6116824 - 26-MAR-2014 11:35	Nil
AC04: Odour	WER-MW27116825 - 26-MAR-2014 10:15	Nil
AC04: Odour	WER-MW29116826 - 26-MAR-2014 13:30	Nil
AC04: Colour	WER-MW17A116819 - 26-MAR-2014 12:20	Clear
AC04: Colour	WER-MW18A116820 - 26-MAR-2014 12:40	Clear
AC04: Colour	WER-MW21A116821 - 26-MAR-2014 12:00	Clear
AC04: Colour	WER-MW1116822 - 26-MAR-2014 10:45	Clear
AC04: Colour	WER-MW2116823 - 26-MAR-2014 11:10	Clear
AC04: Colour	WER-MW6116824 - 26-MAR-2014 11:35	Rusty
AC04: Colour	WER-MW27116825 - 26-MAR-2014 10:15	Rusty
AC04: Colour	WER-MW29116826 - 26-MAR-2014 13:30	Clear

Page	: 10 of 10
Work Order	: ES1406683
Client	: ACIRL PTY LTD
Project	: WCC ANNUAL GROUNDWATER



### Surrogate Control Limits

Sub-Matrix: WATER	Recovery Limits (%)			
Compound	CAS Number	Low	High	
EP080S: TPH(V)/BTEX Surrogates				
1.2-Dichloroethane-D4	17060-07-0	71	137	
Toluene-D8	2037-26-5	79	131	
4-Bromofluorobenzene	460-00-4	70	128	



	CE	RTIFICATE OF ANALYSIS	
Work Order	ES1407113	Page	: 1 of 10
Client		Laboratory	: Environmental Division Sydney
Contact	: A WRIGHT	Contact	: Client Services
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	TALBOT RD		
	GUNNEDAH NSW 2380		
E-mail	: awright@whitehavencoal.com.au	E-mail	: sydney@alsglobal.com
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500
Project	: WCC ANNUAL GROUNDWATER	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 7595		
C-O-C number	:	Date Samples Received	: 01-APR-2014
Sampler	: C.ELLBOURN	Issue Date	: 08-APR-2014
Site	:		
		No. of samples received	: 7
Quote number	: SY/417/13	No. of samples analysed	: 7

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

### Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

\* = This result is computed from individual analyte detections at or above the level of reporting

- AC01: Bore data supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC02: Sampling data supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC03: Field tests supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC04: Field observations supplied by ALS ACIRL.

	NATA Accredited Laboratory 825	<i>Signatories</i> This document has been electronically	signed by the authorized signatories indic	ated below. Electronic signing has been carried out in
NATA	Accredited for compliance with	compliance with procedures specified in 21 C	FR Part 11.	
NAIA	ISO/IEC 17025.	Signatories	Position	Accreditation Category
		Ankit Joshi	Inorganic Chemist	Sydney Inorganics
		Ashesh Patel	Inorganic Chemist	Sydney Inorganics
ACCREDITATION		Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
		Kim Phan	Sample Receipt Clerk	ACIRL Sampling
		Lana Nguyen	Senior LCMS Chemist	Sydney Organics
		Pabi Subba	Senior Organic Chemist	Sydney Organics



Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	WER-MW17B 116841	WER-MW24A 116842	WER-MW12 116843	WER-MW16 116844	WER-MW22A 116845
	CI	ient sampli	ng date / time	28-MAR-2014 09:20	28-MAR-2014 10:55	28-MAR-2014 11:15	28-MAR-2014 09:45	28-MAR-2014 11:40
Compound	CAS Number	LOR	Unit	ES1407113-001	ES1407113-002	ES1407113-003	ES1407113-004	ES1407113-005
AC01: Bore Data								
Standing Water Level		0.01	m	11.1	14.1	10.0	5.97	6.09
Bore Depth		0.01	m		37.5	10.6		8.00
Stick up		0.01	m	0.65	0.15	0.50	0.30	0.55
AC02: Sampling Data								
Purge Type		-		Tank		Тар	Тар	Тар
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	μS/cm	2150	2120	526	634	515
pH		0.01	pH Unit	8.70	6.90	7.50	6.90	7.00
Temperature		0.1	°C	19.5	21.1	21.8	20.1	25.8
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	8.23	7.49	7.74	7.52	7.57
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	2310	2310	557	670	547
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C		10	mg/L	1130	1300	291	361	299
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	268	610	199	195	169
Total Alkalinity as CaCO3		1	mg/L	268	610	199	195	169
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	36	218	24	35	27
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	540	257	31	55	44
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	51	133	51	52	42
Magnesium	7439-95-4	1	mg/L	49	87	21	24	19
Sodium	7440-23-5	1	mg/L	325	232	32	47	40
Potassium	7440-09-7	1	mg/L	2	1	<1	<1	<1
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

# Page : 4 of 10 Work Order : ES1407113 Client : ACIRL PTY LTD Project : WCC ANNUAL GROUNDWATER



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-MW17B	WER-MW24A	WER-MW12	WER-MW16	WER-MW22A	
				116841	116842	116843	116844	116845	
	Ci	lient samplii	ng date / time	28-MAR-2014 09:20	28-MAR-2014 10:55	28-MAR-2014 11:15	28-MAR-2014 09:45	28-MAR-2014 11:40	
Compound	CAS Number	LOR	Unit	ES1407113-001	ES1407113-002	ES1407113-003	ES1407113-004	ES1407113-005	
EG020T: Total Metals by ICP-MS - Conti	nued								
Barium	7440-39-3	0.001	mg/L	0.018	0.039	0.002	0.015	0.012	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.010	0.003	
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	0.002	0.020	0.001	0.022	0.008	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.004	0.002	0.018	0.002	<0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.01	0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	0.008	0.037	0.021	0.030	0.015	
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.18	0.08	<0.05	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N		0.01	mg/L	0.13	0.02	0.02	<0.01	0.03	
EK057G: Nitrite as N by Discrete Analy	/ser								
Nitrite as N		0.01	mg/L	<0.01	0.02	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Anal	vser								
Nitrate as N	14797-55-8	0.01	mg/L	0.04	8.69	0.93	1.67	1.47	
EK059G: Nitrite plus Nitrate as N (NOx	) bv Discrete Ana	alvser							
Nitrite + Nitrate as N		0.01	mg/L	0.04	8.71	0.93	1.67	1.47	
EK061G: Total Kieldahl Nitrogen By Dis	screte Analvser								
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.6	0.7	<0.1	<0.1	<0.1	
EK062G: Total Nitrogen as N (TKN + NC	Ox) by Discrete Ar	nalvser							
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	0.6	9.4	0.9	1.7	1.5	
FK067G <sup>•</sup> Total Phosphorus as P by Dis	crete Analyser								
Total Phosphorus as P		0.01	mg/L	0.02	<0.01	0.04	0.07	0.07	
EK071G: Reactive Phosphorus as P by	discrete analyse	r							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.03	0.07	0.07	
EN055: Ionic Balance									
Total Anions		0.01	meq/L	21.3	24.0				
Total Anions		0.01	meq/L			5.42	6.32	5.18	
Total Cations		0.01	meq/L	20.8	23.9				

# Page: 5 of 10Work Order: ES1407113Client: ACIRL PTY LTDProject: WCC ANNUAL GROUNDWATER



Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	WER-MW17B 116841	WER-MW24A 116842	WER-MW12 116843	WER-MW16	WER-MW22A 116845
	Cl	ient sampli	ng date / time	28-MAR-2014 09:20	28-MAR-2014 10:55	28-MAR-2014 11:15	28-MAR-2014 09:45	28-MAR-2014 11:40
Compound	CAS Number	LOR	Unit	ES1407113-001	ES1407113-002	ES1407113-003	ES1407113-004	ES1407113-005
EN055: Ionic Balance - Continued								
Total Cations		0.01	meq/L			5.66	6.61	5.40
Ionic Balance		0.01	%	1.37	0.14			
Ionic Balance		0.01	%			2.22	2.25	2.07
EP080/071: Total Petroleum Hydrocar	bons							
C6 - C9 Fraction		20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction		50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction		100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction		50	µg/L	<50	<50	<50	<50	<50
<sup>^</sup> C10 - C36 Fraction (sum)		50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3						
C6 - C10 Fraction	C6_C10	20	μg/L	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction		100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction		100	μg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)		100	µg/L	<100	<100	<100	<100	<100
<ul> <li>&gt;C10 - C16 Fraction minus Naphthalene (F2)</li> </ul>		100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	μg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
<sup>^</sup> Sum of BTEX		1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	98.7	111	111	114	96.2
Toluene-D8	2037-26-5	0.1	%	114	107	98.9	110	91.1
4-Bromofluorobenzene	460-00-4	0.1	%	99.5	101	93.0	103	86.0



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		WER-MW22B 116846	WER-MW28A 116847	 		
	Cli	ient sampli	ng date / time	28-MAR-2014 12:10	28-MAR-2014 10:10	 	
Compound	CAS Number	LOR	Unit	ES1407113-006	ES1407113-007	 	
AC01: Bore Data							
Standing Water Level		0.01	m	6.32	12.9	 	
Bore Depth		0.01	m	8.00	19.0	 	
Stick up		0.01	m	0.45	0.25	 	
AC02: Sampling Data							
Purge Type		-		Bail	Bail	 	
AC03: Field Tests							
Electrical Conductivity (Non Compensated)		1	μS/cm	390	337	 	
рН		0.01	pH Unit	7.20	7.50	 	
Temperature		0.1	°C	20.6	20.7	 	
EA005P: pH by PC Titrator							
pH Value		0.01	pH Unit	7.47	7.62	 	
EA010P: Conductivity by PC Titrator							
Electrical Conductivity @ 25°C		1	μS/cm	443	356	 	
EA015: Total Dissolved Solids							
Total Dissolved Solids @180°C		10	mg/L	222	170	 	
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	 	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	 	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	123	105	 	
Total Alkalinity as CaCO3		1	mg/L	123	105	 	
ED041G: Sulfate (Turbidimetric) as SO4 2	- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	18	11	 	
ED045G: Chloride Discrete analyser							
Chloride	16887-00-6	1	mg/L	42	31	 	
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L	34	19	 	
Magnesium	7439-95-4	1	mg/L	15	8	 	
Sodium	7440-23-5	1	mg/L	31	25	 	
Potassium	7440-09-7	1	mg/L	2	6	 	
EG020T: Total Metals by ICP-MS							
Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	 	
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	 	

# Page: 7 of 10Work Order: ES1407113Client: ACIRL PTY LTDProject: WCC ANNUAL GROUNDWATER



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-MW22B	WER-MW28A				
				116846	116847				
	CI	lient samplii	ng date / time	28-MAR-2014 12:10	28-MAR-2014 10:10				
Compound	CAS Number	LOR	Unit	ES1407113-006	ES1407113-007				
EG020T: Total Metals by ICP-MS - Continue	∋d								
Barium	7440-39-3	0.001	mg/L	0.062	0.038				
Cadmium	7440-43-9	0.0001	mg/L	0.0008	0.0003				
Chromium	7440-47-3	0.001	mg/L	0.004	0.002				
Cobalt	7440-48-4	0.001	mg/L	0.003	0.002				
Copper	7440-50-8	0.001	mg/L	0.171	0.174				
Lead	7439-92-1	0.001	mg/L	0.029	0.011				
Manganese	7439-96-5	0.001	mg/L	0.100	1.60				
Nickel	7440-02-0	0.001	mg/L	0.005	0.005				
Vanadium	7440-62-2	0.01	mg/L	0.02	0.02				
Zinc	7440-66-6	0.005	mg/L	0.731	1.36				
Iron	7439-89-6	0.05	mg/L	5.52	38.5				
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001				
EK055G-NH4: Ammonium as N by DA									
Ammonium as N		0.01	mg/L	0.10	2.88				
EK057G: Nitrite as N by Discrete Analyse	r								
Nitrite as N		0.01	mg/L	0.01	0.11				
EK058G: Nitrate as N by Discrete Analyse	er								
Nitrate as N	14797-55-8	0.01	mg/L	2.66	0.63				
EK059G: Nitrite plus Nitrate as N (NOx) b	ov Discrete Ana	lvser							
Nitrite + Nitrate as N		0.01	mg/L	2.67	0.74				
EK061G: Total Kieldahl Nitrogen By Discr	ete Analvser								
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.3	4.6				
EK062G: Total Nitrogen as N (TKN + NOx)	bv Discrete Ar	nalvser							
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	3.0	5.3				
EK067G: Total Phosphorus as P by Discre	ete Analyser								
Total Phosphorus as P		0.01	mg/L	0.22	0.32				
EK071G: Reactive Phosphorus as P by div	screte analyse	-							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.16	0.02				
EN055: Ionic Balance									
Total Anions		0.01	meq/L	4.16	3.20				
Total Cations		0.01	meq/L	4.33	3.06				
Ionic Balance		0.01	%	1.98	2.26				
H								I	



Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	WER-MW22B	WER-MW28A	 	
				116846	116847		
	Cli	ent sampli	ng date / time	28-MAR-2014 12:10	28-MAR-2014 10:10	 	
Compound	CAS Number	LOR	Unit	ES1407113-006	ES1407113-007	 	
EP080/071: Total Petroleum Hydrocarb	oons						
C6 - C9 Fraction		20	µg/L	<20	<20	 	
C10 - C14 Fraction		50	µg/L	<50	<50	 	
C15 - C28 Fraction		100	µg/L	<100	<100	 	
C29 - C36 Fraction		50	µg/L	<50	<50	 	
<sup>^</sup> C10 - C36 Fraction (sum)		50	µg/L	<50	<50	 	
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3					
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	 	
<sup>^</sup> C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	 	
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	 	
>C16 - C34 Fraction		100	µg/L	<100	<100	 	
>C34 - C40 Fraction		100	µg/L	<100	<100	 	
^ >C10 - C40 Fraction (sum)		100	µg/L	<100	<100	 	
^ >C10 - C16 Fraction minus Naphthalene (F2)		100	µg/L	<100	<100	 	
EP080: BTEXN							
Benzene	71-43-2	1	µg/L	<1	<1	 	
Toluene	108-88-3	2	µg/L	<2	<2	 	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	 	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	 	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	 	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	 	
<sup>^</sup> Sum of BTEX		1	µg/L	<1	<1	 	
Naphthalene	91-20-3	5	µg/L	<5	<5	 	
EP080S: TPH(V)/BTEX Surrogates							
1.2-Dichloroethane-D4	17060-07-0	0.1	%	101	107	 	
Toluene-D8	2037-26-5	0.1	%	106	118	 	
4-Bromofluorobenzene	460-00-4	0.1	%	99.7	106	 	



### **Descriptive Results**

#### Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Field Observations		
AC04: Appearance	WER-MW17B116841 - 28-MAR-2014 09:20	Clear
AC04: Appearance	WER-MW24A116842 - 28-MAR-2014 10:55	Clear
AC04: Appearance	WER-MW12116843 - 28-MAR-2014 11:15	Clear
AC04: Appearance	WER-MW16116844 - 28-MAR-2014 09:45	Clear
AC04: Appearance	WER-MW22A116845 - 28-MAR-2014 11:40	Clear
AC04: Appearance	WER-MW22B116846 - 28-MAR-2014 12:10	Clear
AC04: Appearance	WER-MW28A116847 - 28-MAR-2014 10:10	Slight Turbid
AC04: Odour	WER-MW17B116841 - 28-MAR-2014 09:20	Nil
AC04: Odour	WER-MW24A116842 - 28-MAR-2014 10:55	Nil
AC04: Odour	WER-MW12116843 - 28-MAR-2014 11:15	Nil
AC04: Odour	WER-MW16116844 - 28-MAR-2014 09:45	Nil
AC04: Odour	WER-MW22A116845 - 28-MAR-2014 11:40	Nil
AC04: Odour	WER-MW22B116846 - 28-MAR-2014 12:10	Nil
AC04: Odour	WER-MW28A116847 - 28-MAR-2014 10:10	Nil
AC04: Colour	WER-MW17B116841 - 28-MAR-2014 09:20	Clear
AC04: Colour	WER-MW24A116842 - 28-MAR-2014 10:55	Clear
AC04: Colour	WER-MW12116843 - 28-MAR-2014 11:15	Clear
AC04: Colour	WER-MW16116844 - 28-MAR-2014 09:45	Clear
AC04: Colour	WER-MW22A116845 - 28-MAR-2014 11:40	Clear
AC04: Colour	WER-MW22B116846 - 28-MAR-2014 12:10	Clear
AC04: Colour	WER-MW28A116847 - 28-MAR-2014 10:10	Slight Brown

Page	: 10 of 10
Work Order	: ES1407113
Client	: ACIRL PTY LTD
Project	: WCC ANNUAL GROUNDWATER



### Surrogate Control Limits

Sub-Matrix: WATER	Recovery Limits (%)			
Compound	CAS Number	Low	High	
EP080S: TPH(V)/BTEX Surrogates				
1.2-Dichloroethane-D4	17060-07-0	71	137	
Toluene-D8	2037-26-5	79	131	
4-Bromofluorobenzene	460-00-4	70	128	



	CERTIFICATE OF ANALYSIS										
Work Order	ES1407119	Page	: 1 of 10								
Client		Laboratory	: Environmental Division Sydney								
Contact	: A WRIGHT	Contact	: Client Services								
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164								
	TALBOT RD										
	GUNNEDAH NSW 2380										
E-mail	: awright@whitehavencoal.com.au	E-mail	: sydney@alsglobal.com								
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555								
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500								
Project	: WERRIS CREEK GROUNDWATER 6 MONTHLY	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement								
Order number	: 7595										
C-O-C number	:	Date Samples Received	: 01-APR-2014								
Sampler	: BYRON PHILLIPS	Issue Date	: 08-APR-2014								
Site	:										
		No. of samples received	: 8								
Quote number	: SY/417/13	No. of samples analysed	: 8								

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

#### Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting ^ = This result is computed from individual analyte detections at or above the level of reporting

- AC01: Bore data supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC02: Sampling data supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC03: Field tests supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC04: Field observations supplied by ALS ACIRL.
- EK071G: It has been noted that Reactive P is greater than Total P on sample ID( MW5), however this difference is within the limits of experimental variation.



#### NATA Accredited Laboratory 825 Signatories

Accredited for compliance with ISO/IEC 17025.

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

17025.	Signatories	Position	Accreditation Category	
	Ankit Joshi	Inorganic Chemist	Sydney Inorganics	
	Ashesh Patel	Inorganic Chemist	Sydney Inorganics	
	Celine Conceicao	Senior Spectroscopist	Sydney Inorganics	
	Edwandy Fadjar	Organic Coordinator	Sydney Organics	
	Kim Phan	Sample Receipt Clerk	ACIRL Sampling	
	Pabi Subba	Senior Organic Chemist	Sydney Organics	
	Shobhna Chandra	Metals Coordinator	Sydney Inorganics	

# Page : 3 of 10 Work Order : ES1407119 Client : ACIRL PTY LTD Project : WERRIS CREEK GROUNDWATER 6 MONTHLY



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	MW4B	MW5	MW5B	MW14	MW14B
	Cl	ient samplii	ng date / time	31-MAR-2014 12:20	31-MAR-2014 11:30	31-MAR-2014 11:45	31-MAR-2014 13:10	31-MAR-2014 12:50
Compound	CAS Number	LOR	Unit	ES1407119-001	ES1407119-002	ES1407119-003	ES1407119-004	ES1407119-005
AC01: Bore Data	one number							
Standing Water Level		0.01	m	12.1	9.88	9.42	18.1	17.9
Stick up		0.01	m	0.70	1.15	0.70	0.95	0.75
AC02: Sampling Data								
Purge Type		-			Bail		Bail	Bail
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	µS/cm	956	2390	2460	1060	402
рН		0.01	pH Unit	8.00	7.70	7.40	7.50	8.20
Temperature		0.1	°C	20.0	20.6	20.7	21.7	21.2
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	7.99	7.93	7.72	7.79	7.96
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	1010	2600	2690	1120	410
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C		10	mg/L	524	1560	1680	588	250
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	413	336	341	418	106
Total Alkalinity as CaCO3		1	mg/L	413	336	341	418	106
ED041G: Sulfate (Turbidimetric) as SO4 2	2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	8	44	45	40	44
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	67	583	612	54	24
ED093F: Dissolved Major Cations		4				107	•	
	7440-70-2	1	mg/L	/6	187	187	91	45
Magnesium	7439-95-4	1	mg/L	43	113	115	62	11
Botossium	7440-23-5	1	mg/L	90	148	159	12	21
	/440-09-/	I	my/L	2	4		2	0
EG020T: Total Metals by ICP-MS	7440.00.0	0.001	ma/l	<0.001	<0.001	<0.001	<0.001	<0.001
Barvillium	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-41-7	0.001	mg/L	0.001	0.024	0.001	0.001	0.001
Barium	7440-39-3	0.001	iiiy/L	0.070	0.024	0.012	0.030	0.035

# Page : 4 of 10 Work Order : ES1407119 Client : ACIRL PTY LTD Project : WERRIS CREEK GROUNDWATER 6 MONTHLY



Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	MW4B	MW5	MW5B	MW14	MW14B
	Cl	ient sampli	ng date / time	31-MAR-2014 12:20	31-MAR-2014 11:30	31-MAR-2014 11:45	31-MAR-2014 13:10	31-MAR-2014 12:50
Compound	CAS Number	LOR	Unit	ES1407119-001	ES1407119-002	ES1407119-003	ES1407119-004	ES1407119-005
EG020T: Total Metals by ICP-MS - Continu	led							
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.003	0.002	0.002	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	0.002	<0.001
Copper	7440-50-8	0.001	mg/L	0.085	0.049	0.027	0.031	0.029
Lead	7439-92-1	0.001	mg/L	0.010	0.004	0.001	0.004	0.002
Manganese	7439-96-5	0.001	mg/L	0.128	0.032	0.009	0.476	0.011
Nickel	7440-02-0	0.001	mg/L	0.006	0.004	0.001	0.008	0.002
Vanadium	7440-62-2	0.01	mg/L	0.02	0.01	0.02	<0.01	0.01
Zinc	7440-66-6	0.005	mg/L	0.156	0.171	0.094	0.088	0.044
Iron	7439-89-6	0.05	mg/L	0.52	0.44	0.11	0.43	0.58
EG035T: Total Recoverable Mercury by F	FIMS							
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G-NH4: Ammonium as N by DA								
Ammonium as N		0.01	mg/L	0.02	0.06	0.02	0.13	0.06
EK057G: Nitrite as N by Discrete Analyse	er							
Nitrite as N		0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analys	er							
Nitrate as N	14797-55-8	0.01	mg/L	1.99	5.80	2.13	14.4	1.98
EK059G: Nitrite plus Nitrate as N (NOx)	by Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	1.99	5.80	2.13	14.4	1.98
EK061G: Total Kjeldahl Nitrogen By Disc	rete Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.1	0.5	0.3	1.2	0.7
EK062G: Total Nitrogen as N (TKN + NOx	) by Discrete Ar	nalyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	2.1	6.3	2.4	15.6	2.7
EK067G: Total Phosphorus as P by Discr	rete Analyser							
Total Phosphorus as P		0.01	mg/L	0.03	0.77	0.05	0.13	0.36
EK071G: Reactive Phosphorus as P by d	iscrete analyser							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	0.78	0.04	0.07	0.36
EN055: Ionic Balance								
Total Anions		0.01	meq/L	10.3	24.1	25.0		
Total Anions		0.01	meq/L				11.8	4.23
Total Cations		0.01	meq/L	11.3	25.2	25.7	12.8	
Total Cations		0.01	meq/L					4.22

# Page : 5 of 10 Work Order : ES1407119 Client : ACIRL PTY LTD Project : WERRIS CREEK GROUNDWATER 6 MONTHLY



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	MW4B	MW5	MW5B	MW14	MW14B
	Cli	ent sampli	ng date / time	31-MAR-2014 12:20	31-MAR-2014 11:30	31-MAR-2014 11:45	31-MAR-2014 13:10	31-MAR-2014 12:50
Compound	CAS Number	LOR	Unit	ES1407119-001	ES1407119-002	ES1407119-003	ES1407119-004	ES1407119-005
EN055: Ionic Balance - Continued								
Ionic Balance		0.01	%	4.56	2.24	1.39		
Ionic Balance		0.01	%				4.04	0.17
EP080/071: Total Petroleum Hydrocarl	bons							
C6 - C9 Fraction		20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction		50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction		100	μg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction		50	µg/L	<50	<50	<50	<50	<50
<sup>^</sup> C10 - C36 Fraction (sum)		50	μg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3						
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
<sup>^</sup> C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	>C10_C16	100	ug/l	<100	<100	<100	<100	<100
>C16 C34 Eraction	2010_010	100	µg/l	<100	<100	<100	<100	<100
>C34 - C40 Fraction		100	ug/L	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)		100	ua/L	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Nanhthalene		100	ua/L	<100	<100	<100	<100	<100
(F2)			P-5-					
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	μg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
<sup>^</sup> Sum of BTEX		1	μg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	7	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	122	122	122	123	117
Toluene-D8	2037-26-5	0.1	%	113	104	107	99.2	102
4-Bromofluorobenzene	460-00-4	0.1	%	98.9	92.5	96.6	89.9	92.4

# Page : 6 of 10 Work Order : ES1407119 Client : ACIRL PTY LTD Project : WERRIS CREEK GROUNDWATER 6 MONTHLY



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		MW8	MW19A	MW3	 	
	Cl	lient sampli	ng date / time	31-MAR-2014 10:00	31-MAR-2014 10:30	31-MAR-2014 11:00	 
Compound	CAS Number	LOR	Unit	ES1407119-006	ES1407119-007	ES1407119-008	 
AC01: Bore Data							
Standing Water Level		0.01	m	17.2	8.18	16.4	 
Stick up		0.01	m	0.20	0.15	0.95	 
AC02: Sampling Data							
Purge Type		-		Тар	Тар	Pump	 
Purge Volume		0.01	L			200	 
AC03: Field Tests							
Electrical Conductivity (Non Compensated)		1	μS/cm	1320	820	3320	 
рН		0.01	pH Unit	7.60	8.80	6.70	 
Temperature		0.1	°C	20.7	22.3	22.0	 
EA005P: pH by PC Titrator							
pH Value		0.01	pH Unit	7.64	8.35	7.34	 
EA010P: Conductivity by PC Titrator							
Electrical Conductivity @ 25°C		1	µS/cm	1420	871	3680	 
EA015: Total Dissolved Solids							
Total Dissolved Solids @180°C		10	mg/L	814	418	2290	 
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	 
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	3	<1	 
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	351	136	447	 
Total Alkalinity as CaCO3		1	mg/L	351	139	447	 
ED041G: Sulfate (Turbidimetric) as SO4 2	- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	43	80	16	 
ED045G: Chloride Discrete analyser							
Chloride	16887-00-6	1	mg/L	198	106	820	 
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L	117	5	333	 
Magnesium	7439-95-4	1	mg/L	65	<1	191	 
Sodium	7440-23-5	1	mg/L	87	171	101	 
Potassium	7440-09-7	1	mg/L	2	<1	<1	 
EG020T: Total Metals by ICP-MS							
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.003	0.001	 
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	 

# Page : 7 of 10 Work Order : ES1407119 Client : ACIRL PTY LTD Project : WERRIS CREEK GROUNDWATER 6 MONTHLY



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	MW8	MW19A	MW3	 
	CI	ient samplir	ng date / time	31-MAR-2014 10:00	31-MAR-2014 10:30	31-MAR-2014 11:00	 
Compound	AS Number	I OR	Unit	ES1407119-006	ES1407119-007	ES1407119-008	 
EG020T: Total Motals by ICB-MS_Continued	AS Number		<b>U</b>				
Barium	7440-39-3	0.001	mg/L	0.004	0.004	0.068	 
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	 
Chromium	7440-47-3	0.001	mg/L	0.039	0.002	<0.001	 
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	 
Copper	7440-50-8	0.001	mg/L	0.023	0.004	0.002	 
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	 
Manganese	7439-96-5	0.001	mg/L	0.012	0.004	0.009	 
Nickel	7440-02-0	0.001	mg/L	0.146	<0.001	0.002	 
Vanadium	7440-62-2	0.01	mg/L	0.01	<0.01	0.02	 
Zinc	7440-66-6	0.005	mg/L	0.067	0.018	<0.005	 
Iron	7439-89-6	0.05	mg/L	1.55	<0.05	0.26	 
EG035T: Total Recoverable Mercury by FIMS							
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	 
EK055G-NH4: Ammonium as N by DA							
Ammonium as N		0.01	mg/L	0.03	0.02	0.03	 
EK057G: Nitrite as N by Discrete Analyser							
Nitrite as N		0.01	mg/L	0.02	<0.01	<0.01	 
EK058G: Nitrate as N by Discrete Analyser							
Nitrate as N	14797-55-8	0.01	mg/L	5.83	<0.01	23.0	 
EK059G: Nitrite plus Nitrate as N (NOx) by Di	iscrete Ana	lyser					
Nitrite + Nitrate as N		0.01	mg/L	5.85	<0.01	23.0	 
EK061G: Total Kjeldahl Nitrogen By Discrete	Analyser						
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.9	<0.1	2.0	 
EK062G: Total Nitrogen as N (TKN + NOx) by	Discrete Ar	nalyser					
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	6.8	<0.1	25.0	 
EK067G: Total Phosphorus as P by Discrete A	Analyser						
Total Phosphorus as P		0.01	mg/L	0.03	<0.01	0.01	 
EK071G: Reactive Phosphorus as P by discre	ete analyser						
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	 
EN055: Ionic Balance		0.01			-		
Total Anions		0.01	meq/L		7.43		 
Total Anions		0.01	meq/L	14.0		34.2	 
Total Cations		0.01	meq/L		7.69		 

# Page : 8 of 10 Work Order : ES1407119 Client : ACIRL PTY LTD Project : WERRIS CREEK GROUNDWATER 6 MONTHLY



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	MW8	MW19A	MW3	 
	Cl	ient sampli	ng date / time	31-MAR-2014 10:00	31-MAR-2014 10:30	31-MAR-2014 11:00	 
Compound	CAS Number	LOR	Unit	ES1407119-006	ES1407119-007	ES1407119-008	 
EN055: Ionic Balance - Continued	CAS Number						
Total Cations		0.01	meq/L	15.0		36.7	 
Ionic Balance		0.01	%		1.64		 
Ionic Balance		0.01	%	3.59		3.58	 
EP080/071: Total Petroleum Hydrocar	bons						
C6 - C9 Fraction		20	µg/L	<20	<20	<20	 
C10 - C14 Fraction		50	µg/L	<50	<50	<50	 
C15 - C28 Fraction		100	µg/L	<100	<100	<100	 
C29 - C36 Fraction		50	µg/L	<50	<50	<50	 
<sup>^</sup> C10 - C36 Fraction (sum)		50	µg/L	<50	<50	<50	 
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3					
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	 
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	 
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	<100	 
>C16 - C34 Fraction		100	µg/L	<100	<100	<100	 
>C34 - C40 Fraction		100	µg/L	<100	<100	<100	 
>C10 - C40 Fraction (sum)		100	µg/L	<100	<100	<100	 
^ >C10 - C16 Fraction minus Naphthalene		100	µg/L	<100	<100	<100	 
(F2)							
EP080: BTEXN					·	·	
Benzene	71-43-2	1	µg/L	<1	<1	<1	 
Toluene	108-88-3	2	µg/L	<2	<2	<2	 
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	 
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	 
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	 
↑ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	 
Sum of BTEX		1	µg/L	<1	<1	<1	 
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	 
EP080S: TPH(V)/BTEX Surrogates		<u>.</u>	01				
1.2-Dichloroethane-D4	17060-07-0	0.1	%	110	129	126	 
Toluene-D8	2037-26-5	0.1	%	90.0	108	109	 
4-Bromofluorobenzene	460-00-4	0.1	%	84.2	100	100	 



### **Descriptive Results**

#### Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results		
AC04: Field Observations				
AC04: Appearance	MW4B - 31-MAR-2014 12:20	Clear		
AC04: Appearance	MW5 - 31-MAR-2014 11:30	Clear		
AC04: Appearance	MW5B - 31-MAR-2014 11:45	Clear		
AC04: Appearance	MW14 - 31-MAR-2014 13:10	Clear		
AC04: Appearance	MW14B - 31-MAR-2014 12:50	Slight Turbid		
AC04: Appearance	MW8 - 31-MAR-2014 10:00	Clear		
AC04: Appearance	MW19A - 31-MAR-2014 10:30	Clear		
AC04: Appearance	MW3 - 31-MAR-2014 11:00	Clear		
AC04: Odour	MW4B - 31-MAR-2014 12:20	Nil		
AC04: Odour	MW5 - 31-MAR-2014 11:30	Nil		
AC04: Odour	MW5B - 31-MAR-2014 11:45	Nil		
AC04: Odour	MW14 - 31-MAR-2014 13:10	Nil		
AC04: Odour	MW14B - 31-MAR-2014 12:50	Nil		
AC04: Odour	MW8 - 31-MAR-2014 10:00	Nil		
AC04: Odour	MW19A - 31-MAR-2014 10:30	Nil		
AC04: Odour	MW3 - 31-MAR-2014 11:00	Nil		
AC04: Colour	MW4B - 31-MAR-2014 12:20	Clear		
AC04: Colour	MW5 - 31-MAR-2014 11:30	Clear		
AC04: Colour	MW5B - 31-MAR-2014 11:45	Clear		
AC04: Colour	MW14 - 31-MAR-2014 13:10	Clear		
AC04: Colour	MW14B - 31-MAR-2014 12:50	Grey		
AC04: Colour	MW8 - 31-MAR-2014 10:00	Clear		
AC04: Colour	MW19A - 31-MAR-2014 10:30	Clear		
AC04: Colour	MW3 - 31-MAR-2014 11:00	Clear		



### Surrogate Control Limits

Sub-Matrix: WATER	Recovery Limits (%)				
Compound	CAS Number	Low	High		
EP080S: TPH(V)/BTEX Surrogates					
1.2-Dichloroethane-D4	17060-07-0	71	137		
Toluene-D8	2037-26-5	79	131		
4-Bromofluorobenzene	460-00-4	70	128		

### Appendix 7 – Surface Water Monitoring Results


	CERTIFICATE OF ANALYSIS									
Work Order	ES1404026	Page	: 1 of 7							
Client		Laboratory	: Environmental Division Sydney							
Contact	: A WRIGHT	Contact	Client Services							
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164							
	TALBOT RD									
	GUNNEDAH NSW 2380									
E-mail	: awright@whitehavencoal.com.au	E-mail	: sydney@alsglobal.com							
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555							
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500							
Project	: WCC QUARTERLY SURFACE WATER	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement							
Order number	: 7425									
C-O-C number	:	Date Samples Received	: 26-FEB-2014							
Sampler	: CE/BH	Issue Date	: 05-MAR-2014							
Site	:									
		No. of samples received	: 12							
Quote number	: SY/417/13	No. of samples analysed	: 12							

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

Accredited for compliance with

ISO/IEC 17025.

- General Comments
- Analytical Results
- Descriptive Results



NATA Accredited Laboratory 825	Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Kim Phan	Sample Receipt Clerk	ACIRL Sampling

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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

#### Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

\* = This result is computed from individual analyte detections at or above the level of reporting

- AC03: Field tests supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC04: Field observations supplied by ALS ACIRL.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-SEDIMENT BASIN2 116471	WER-SEDIMENT BASIN 9 116472	WER-SEDIMENT BASIN10 116473	WER-SEDIMENT DETENTION4 116474	WER-SEDIMENT DETENTION5 116475
	Cli	ent sampli	ng date / time	25-FEB-2014 11:05	18-FEB-2014 10:15	25-FEB-2014 13:10	25-FEB-2014 12:50	25-FEB-2014 12:30
Compound	CAS Number	LOR	Unit	ES1404026-001	ES1404026-002	ES1404026-003	ES1404026-004	ES1404026-005
AC03: Field Tests								
Electrical Conductivity (Non		1	µS/cm	1660	645	198	377	443
Compensated)								
рН		0.01	pH Unit	10.6	9.30	9.90	9.20	9.60
Temperature		0.1	°C	24.1	23.9	30.6	28.9	26.9
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	9.04	8.44	7.85	8.33	8.65
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	μS/cm	1790	670	199	384	457
EA025: Suspended Solids								
Suspended Solids (SS)		5	mg/L	47	17	197	292	71
EK057G: Nitrite as N by Discrete Analys	er							
Nitrite as N		0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analys	ser							
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	<0.01	0.02	0.01
EK059G: Nitrite plus Nitrate as N (NOx)	by Discrete Anal	yser						
Nitrite + Nitrate as N		0.01	mg/L	<0.01	0.01	0.02	0.02	0.01
EK061G: Total Kjeldahl Nitrogen By Disc	rete Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.9	0.6	10.5	1.4	1.7
EK062G: Total Nitrogen as N (TKN + NO	<) by Discrete An	alyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	0.9	0.6	10.5	1.4	1.7
EK067G: Total Phosphorus as P by Disc	rete Analyser							
Total Phosphorus as P		0.01	mg/L	0.04	0.03	1.92	0.31	0.28
EK071G: Reactive Phosphorus as P by d	liscrete analyser							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.38	0.07	0.19
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L		<5	<5	<5	<5
Oil & Grease		5	mg/L	<5				



Sub-Matrix: WATER (Matrix: WATER)	Cli	ent sample ID	WER-VOLA WATER	WER-VOLA WATER	WER-QUIPOLLY	WER-QUIPOLLY	WER-WERRIS CREEK
			DAM1	DAM2	CREEK UPSTREAM	CREEK DOWNSTREAM	DOWNSTREAM DA
			116476	116477	116478	116479	116480
Cl	ient sampli	ng date / time	25-FEB-2014 12:15	25-FEB-2014 10:45	25-FEB-2014 11:50	25-FEB-2014 12:20	25-FEB-2014 10:20
Compound CAS Number	LOR	Unit	ES1404026-006	ES1404026-007	ES1404026-008	ES1404026-009	ES1404026-010
AC03: Field Tests							
Electrical Conductivity (Non	1	µS/cm	994	931	435	1030	1280
Compensated)							
рН	0.01	pH Unit	8.90	8.80	10.4	8.60	8.10
Temperature	0.1	°C	25.0	25.1	25.2	23.2	24.1
EA005P: pH by PC Titrator							
pH Value	0.01	pH Unit	8.29	8.21	7.60	7.89	8.38
EA010P: Conductivity by PC Titrator							
Electrical Conductivity @ 25°C	1	µS/cm	1050	980	463	1080	1350
EA025: Suspended Solids							
Suspended Solids (SS)	5	mg/L	14	14	180	26	27
EK057G: Nitrite as N by Discrete Analyser							
Nitrite as N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser							
Nitrate as N 14797-55-8	0.01	mg/L	0.55	0.39	<0.01	0.01	0.02
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ana	lyser						
Nitrite + Nitrate as N	0.01	mg/L	0.55	0.39	<0.01	0.01	0.02
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Total Kjeldahl Nitrogen as N	0.1	mg/L	0.2	0.2	5.0	0.6	0.5
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Ar	alyser						
^ Total Nitrogen as N	0.1	mg/L	0.8	0.6	5.0	0.6	0.5
EK067G: Total Phosphorus as P by Discrete Analyser							
Total Phosphorus as P	0.01	mg/L	<0.01	0.01	0.90	0.16	0.18
EK071G: Reactive Phosphorus as P by discrete analyser							
Reactive Phosphorus as P 14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	0.11	0.15
EP020: Oil and Grease (O&G)							
Oil & Grease	5	mg/L	<5	<5	<5	<5	<5



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	WER-VOTA WATER	WER-VOTA WATER	 	
				DAM3	DAM4		
				116481	116482		
	Cli	ent samplii	ng date / time	25-FEB-2014 11:30	25-FEB-2014 11:50	 	
Compound CAS I	Number	LOR	Unit	ES1404026-011	ES1404026-012	 	
AC03: Field Tests							
Electrical Conductivity (Non		1	μS/cm	1070	988	 	
Compensated)							
рН		0.01	pH Unit	9.30	9.10	 	
Temperature		0.1	°C	26.1	25.4	 	
EA005P: pH by PC Titrator							
pH Value		0.01	pH Unit	8.39	8.34	 	
EA010P: Conductivity by PC Titrator							
Electrical Conductivity @ 25°C		1	μS/cm	1120	1050	 	
EA025: Suspended Solids							
Suspended Solids (SS)		5	mg/L	42	8	 	
EK057G: Nitrite as N by Discrete Analyser							
Nitrite as N		0.01	mg/L	0.02	0.01	 	
EK058G: Nitrate as N by Discrete Analyser							
Nitrate as N 147	97-55-8	0.01	mg/L	0.88	0.41	 	
EK059G: Nitrite plus Nitrate as N (NOx) by Discr	ete Ana	lyser					
Nitrite + Nitrate as N		0.01	mg/L	0.90	0.42	 	
EK061G: Total Kjeldahl Nitrogen By Discrete Ana	lyser						
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.6	0.4	 	
EK062G: Total Nitrogen as N (TKN + NOx) by Disc	crete An	alvser					
^ Total Nitrogen as N		0.1	mg/L	1.5	0.8	 	
EK067G: Total Phosphorus as P by Discrete Ana	lyser						
Total Phosphorus as P		0.01	mg/L	0.02	<0.01	 	
EK071G: Reactive Phosphorus as P by discrete a	nalys <u>er</u>						
Reactive Phosphorus as P 142	65-44-2	0.01	mg/L	<0.01	<0.01	 	
EP020: Oil and Grease (O&G)							
Oil & Grease		5	mg/L	<5	<5	 	



**Descriptive Results** 

Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Field Observations		
AC04: Appearance	WER-SEDIMENT BASIN2116471 - 25-FEB-2014 11:05	Clear
AC04: Appearance	WER-SEDIMENT BASIN 9116472 - 18-FEB-2014 10:15	Clear
AC04: Appearance	WER-SEDIMENT BASIN10116473 - 25-FEB-2014 13:10	Turbid
AC04: Appearance	WER-SEDIMENT DETENTION4116474 - 25-FEB-2014 12:50	Turbid
AC04: Appearance	WER-SEDIMENT DETENTION5116475 - 25-FEB-2014 12:30	Slight Turbid
AC04: Appearance	WER-VOLA WATER DAM1116476 - 25-FEB-2014 12:15	Clear
AC04: Appearance	WER-VOLA WATER DAM2116477 - 25-FEB-2014 10:45	Clear
AC04: Appearance	WER-QUIPOLLY CREEK UPSTREAM116478 - 25-FEB-2014 11:50	Slight Turbid
AC04: Appearance	WER-QUIPOLLY CREEK DOWNSTREAM116479 - 25-FEB-2014 12:20	Clear
AC04: Appearance	WER-WERRIS CREEK DOWNSTREAM DA116480 - 25-FEB-2014 10:20	Clear
AC04: Appearance	WER-VOTA WATER DAM3116481 - 25-FEB-2014 11:30	Clear
AC04: Appearance	WER-VOTA WATER DAM4116482 - 25-FEB-2014 11:50	Clear
AC04: Odour	WER-SEDIMENT BASIN2116471 - 25-FEB-2014 11:05	Nil
AC04: Odour	WER-SEDIMENT BASIN 9116472 - 18-FEB-2014 10:15	Nil
AC04: Odour	WER-SEDIMENT BASIN10116473 - 25-FEB-2014 13:10	Nil
AC04: Odour	WER-SEDIMENT DETENTION4116474 - 25-FEB-2014 12:50	Nil
AC04: Odour	WER-SEDIMENT DETENTION5116475 - 25-FEB-2014 12:30	Nil
AC04: Odour	WER-VOLA WATER DAM1116476 - 25-FEB-2014 12:15	Nil
AC04: Odour	WER-VOLA WATER DAM2116477 - 25-FEB-2014 10:45	Nil



Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Odour	WER-QUIPOLLY CREEK UPSTREAM116478 -	Nil
	25-FEB-2014 11:50	
AC04: Odour	WER-QUIPOLLY CREEK DOWNSTREAM116479 -	Nil
	25-FEB-2014 12:20	
AC04: Odour	WER-WERRIS CREEK DOWNSTREAM DA116480 -	Nil
	25-FEB-2014 10:20	
AC04: Odour	WER-VOTA WATER DAM3116481 - 25-FEB-2014	Nil
	11:30	
AC04: Odour	WER-VOTA WATER DAM4116482 - 25-FEB-2014	Nil
	11:50	
AC04: Colour	WER-SEDIMENT BASIN2116471 - 25-FEB-2014	Clear
	11:05	
AC04: Colour	WER-SEDIMENT BASIN 9116472 - 18-FEB-2014	Clear
	10:15	
AC04: Colour	WER-SEDIMENT BASIN10116473 - 25-FEB-2014	Brown
	13:10	
AC04: Colour	WER-SEDIMENT DETENTION4116474 -	Brown
	25-FEB-2014 12:50	
AC04: Colour	WER-SEDIMENT DETENTION5116475 -	Slight Brown
	25-FEB-2014 12:30	
AC04: Colour	WER-VOLA WATER DAM1116476 - 25-FEB-2014	Clear
	12:15	
AC04: Colour	WER-VOLA WATER DAM2116477 - 25-FEB-2014	Clear
	10:45	
AC04: Colour	WER-QUIPOLLY CREEK UPSTREAM116478 -	Green
	25-FEB-2014 11:50	
AC04: Colour	WER-QUIPOLLY CREEK DOWNSTREAM116479 -	Clear
	25-FEB-2014 12:20	
AC04: Colour	WER-WERRIS CREEK DOWNSTREAM DA116480 -	Clear
	25-FEB-2014 10:20	
AC04: Colour	WER-VOTA WATER DAM3116481 - 25-FEB-2014	Clear
	11:30	
AC04: Colour	WER-VOTA WATER DAM4116482 - 25-FEB-2014	Clear
	11:50	

# Appendix 8 – Discharge Monitoring Results

# Werris Creek Coal Community Consultative Committee

# <u>Thirty Second Meeting of the Committee</u> <u>Training Room, Werris Creek Coal</u> <u>9:30am Thursday 25<sup>th</sup> September 2014</u> <u>MINUTES</u>

Werris Creek Coal (WCC) Community Consultative Committee (CCC) met at 9:30am and had a pit tour of the mine site before the meeting inspecting operations from the eastern and southern lookouts.

#### 1. Record of Attendance:

Present: Gae Swain (Independent Chairperson); Noel Taylor (Community Representative); Geoff Dunn (Community Representative); Lindsay Bridge (Community Representative); Col Stewart (Liverpool Plains Shire Council - Councilor); Eamonn Browne (WCC Operations Manager) and Andrew Wright (WCC Environmental Officer and Minute Taker).

Apologies: Jill Coleman (Community Representative) has resigned as a Community Representative and Ron Van Katwyk (Liverpool Plains Shire Council – Director Environmental Services).

#### 2. Declaration of Pecuniary or Other Interests

Noel Taylor declared that his son works for Whitehaven Coal at Werris Creek Coal.

#### 3. New Matters for Discussion under General Business

None.

#### 4. Minutes of Previous Meeting

Minutes of the previous meeting on the 29<sup>th</sup> May 2014 were accepted as true and accurate representation of business conducted on that day.

Moved: Col Stewart. Seconded: Geoff Dunn. Motion carried.

#### 5. Matters Arising

#### a) Actions from Previous Meeting

None.

#### b) Other Matters Arising

None.

#### 6. Environmental Monitoring Report: May, June, July and August 2014

**Meteorology** – The rainfall during the period was below average, with the prevailing wind direction transitioned from the south-south east to a north westerly reflecting the change in seasons.

**Air Quality** – The Particulate Matter less than 10 microns (PM10) annual average and daily maximum levels were within the air quality criteria for the period; despite the below average rainfall resulting in the elevated ambient dust levels.

The Werris Creek Particulate Matter less than 2.5 microns (PM2.5) dust level was trending above the annual criteria for the months of May, June and July before the TEOM monitor had a routine service including cleaning of the chiller and for August 2014 the monthly average fell below the  $8.0\mu g/m^3$  annual average criteria.

All dust deposition gauge averages were below the annual criteria of 4.0g/m<sup>2</sup>/month except for DG34 (8 Kurrara St) which has previously been affected by localized non-mining related dust contamination.

There were three dust complaints during the period. Two of the dust complaints did not have a specific event but rather expressing concern at the increase in dust levels allegedly from mining operations. Monitoring results demonstrate that dust levels had increased due to below average rainfall impacting on ambient dust levels rather than specifically as a result of mining operations. One dust complaint was related to dust haze sitting over the mine on the morning of the 3<sup>rd</sup> June 2014 that was trapped by a strong temperature inversion.

**Noise** – There were no noise exceedances during the period. There were two noise complaints during the period from a Werris Creek resident that alleged noise impacts from the WCC Train Load Out facility but were found to be due to rail traffic in the Werris Creek rail yard.

**Blasting** – During the period a total of forty four blasts were fired by WCC. All blasts over the period complied with maximum license limits (120d(B)L and 10mm/s) with no blast overpressure levels above 115dB(L) or vibration levels over 5mm/s for the four month period. Unfortunately during the period there was a blast related non-compliance. A single blast event took place in the open cut area of the Werris Creek mine on Wednesday 2<sup>nd</sup> July 2014 as part of standard operational production activity. The blast event was located 3.7km away from Werris Creek town. The blast created a oxides of nitrogen plume approximately 50m off the ground that moved in a northwesterly direction across vacant land owned by Werris Creek mine and dissipated 500m north of the Train Load Out facility. Despite the plume being highly visible for a short duration, it did not pose any short term or long term health risks to the community. Given the height off the ground and distance from the community, there was no risk of exposure to the plume. A visual classification of the blast following its initiation confirmed that the intensity and extent of the plume was unexpected and unusual. Plumes from blasts dissipate after a relatively short time. Consistent with the mine's Environmental Protection Licence and Project Approval conditions, the company has reported the incident to the NSW Environmental Protection Authority (EPA).

There were thirty blast complaints during the period from eight separate blast events. Twenty of the complaints were related to the blast on the 2<sup>nd</sup> July 2014 as discussed above. Subsequent to the incident, WCC have developed a blast fume management procedure which limits the sleep time (number of days from when explosives are first loaded into blast area and when the blast is detonated) to 5 days. Oxides of nitrogen plumes can occur from the incomplete detonation of explosive; so a reduced sleep time will minimise the potential deterioration and desensitization of explosives and mitigate future recurrence of the incident. Four blasting complaints were related to vibration impacts specifically from G Coal Interburden blasts that have caused community complaints in the past even though each shot was designed and achieved a vibration level less than 1mm/s. The other six blasting complaints were also in relation to vibration impacts from other areas of the mine.

**Groundwater** – Continuing dry conditions resulting in no rainfall recharge to aquifers with the majority of monitoring bores groundwater levels declining over the period. Over twenty groundwater bores routinely monitored are at or close to record low groundwater levels since monitoring commenced. A cumulative sum (cusum) trend analysis was completed in the Annual Environment Management Report 2013-2014 to evaluate the effects of seasonal variation on background groundwater levels. The cusum analysis found only three bores

located on the mining lease were outside of the calculated statistical range for normal seasonal conditions but this was considered to be within the predicted impacts given the close proximity to mining operations. The investigation found that no Quipolly Alluvium aquifer bores are being impacted by mining and that the current dry conditions and reduced rainfall recharge are the cause of the declining groundwater levels. There was one groundwater complaint during the period due to declining groundwater levels.

**Surface Water** – Quarterly surface water monitoring found all onsite and offsite water quality within longer term averages and the Site Water Management Plan trigger values except for some parameters due to the dry conditions evaporating the remaining water into small pools.

**Surface Water Discharges** – There were no discharge events during the period. There were no impacts on water quality monitored in Quipolly and Werris Creeks' catchments as a result of the dirty water discharge events.

**Complaints** – There were thirty six complaints received during the period. There were thirty complaints related to blasting (including 20 complaints from the blast event on 2<sup>nd</sup> July 2014); three complaints related to dust; two complaints relating to noise and one complaint relating to groundwater. There were twenty different complainants during the period with thirty three complaints from Werris Creek residents and three complaints from Quipolly residents.

Motion moved to accept the Environmental Monitoring Report for May, June, July and August 2014.

Moved: Lindsay Bridge. Seconded: Noel Taylor. Motion Carried.

#### 7. General Business

#### a. Alternatives to Using Evaporators

Noel Taylor raised that a number of Quipolly residents had approached him regarding WCC wasting water by using Evaporators while the farmers are struggling in the dry conditions. Noel Taylor enquired if the water is surplus to the mine's needs then why can't it be provided to local farmers. Andrew Wright explained that the Environmental Approvals and Licences explicitly not allow any void water (predominantly rainfall runoff and groundwater that collects in the bottom of pit) to leave the mine site whether is it is discharged or pumped. The CCC offered to write a letter of support for WCC to change the approvals to allow the water to be returned to the environment.

Motion moved for the CCC to write a Letter of Support for WCC to investigate changes to its Environmental Approvals and Licences to return void water to the environment.

Moved: Geoff Dunn. Seconded: Noel Taylor. Motion Carried.

#### b. Community Enhancement Fund (CEF) Update

Andrew Wright gave an update since the previous Committee meeting that WCC had spent \$36,000 on works at the Railway Museum with an open day planned later in the year. Col Stewart outlined that 2015 Werris Creek playground project which has been incorporated into a larger grant application to upgrade David Taylor Oval in Werris Creek was unsuccessful. LPSC are to write to the CCC to outline what is now proposed for the 2015 Werris Creek playground project. CCC is to write a letter to LPSC requesting for two public seats to be installed in Werris Creek as per the CEF program.

#### c. CCC Community Representative Vacancy

Andrew Wright advised that the CCC needed to have between three and five community representatives; even with the two vacancies now that Jill Coleman resigned there are currently three community representatives. The committee requested WCC to ask specific residents if they would nominate for the vacant Community Representative positions.

#### d. Blast Fume Incident 2<sup>nd</sup> July 2014

Andrew Wright advised the CCC that a blast event on Wednesday 2 July 2014 at 1:05pm created a nitrogen dioxide plume (fume) approximately 50m off the ground that moved in a northwesterly direction across vacant land owned by Werris Creek mine and dissipated 500m north of the Train Load Out facility. Despite the plume being highly visible for a short duration, it did not pose any short term or long term health risks to the community. Given the height off the ground and distance from the community, there was no risk of exposure to the plume. A visual classification of the blast following its initiation confirmed that the intensity and extent of the plume was unexpected and unusual. WCC reported the incident and is currently under investigation by the NSW Environment Protection Authority (EPA).

#### e. Project Approval Modification

Andrew Wright advised that the CCC that recent mine planning for the remaining coal resource at WCC had found increasing overburden and decreasing coal reserves. Werris Creek Coal is investigating options to improve mining efficiencies due to less coal and more overburden that require the Project Approval 10\_0059 to be modified including minor overburden/waste emplacement expansions within current disturbance footprint; advancing mining on the western side of the "Old Colliery" Hill and incorporating Irrigation, Coal Deshaling and Road Transport modifications. The committee enquired about the remaining mine life at WCC (~8 years) but did not raise any other comments, concerns or issues regarding WCC progressing its application for Project Approval Modification.

#### Meeting Closed 11:30am.

#### Next Meeting scheduled for Thursday 27<sup>th</sup> November 2014.

#### Copy to:

Gae Śwain	Independent Chairperson
Jill Coleman	Community Representative
Noel Taylor	Community Representative
Lindsay Bridge	Community Representative
Geoff Dunn	Community Representative
Ron Van Katwyk	LPSC
Cr Col Stewart	LPSC

DoPI

DRE

EPA

Cr Col Stewart Ben Harrison John Trotter Kharl Turnbull Eamonn Browne Andrew Wright Werris Creek Coal Werris Creek Coal



# WERRIS CREEK COAL PTY LTD

# **QUARTERLY ENVIRONMENTAL MONITORING**

# REPORT

# May, June, July and August 2014

This Environmental Monitoring Report covers the period 1<sup>st</sup> May 2014 to 31<sup>st</sup> August 2014 for the Werris Creek No.2 Coal Mine Community Consultative Committee.

The report includes environmental monitoring results from the on-site Weather Station, Air Quality, Noise, Blasting, Surface Water, Groundwater and Discharge Water Quality together with any community complaints received and general details on site environmental matters.

**Note:** Elevated monitoring results above the relevant monitoring criteria are highlighted in **yellow**.

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1.1       WEATHER STATION.       3         2.0       AIR QUALITY       4         2.1       HVAS (PM10) and TEOM (PM10 & PM2.5).       4         2.1.1       Monitoring Data Results       4         2.1.2       Discussion - Compliance / Non Compliance       4         2.2       WERRIS CREEK MINE DEPOSITED DUST.       6         2.2.1       Monitoring Data Results       6         2.2.2       Discussion - Compliance / Non Compliance       6         2.3.1       Monitoring Data Results       6         2.3.2       Discussion - Compliance / Non Compliance       6         2.3.2       Discussion - Compliance / Non Compliance       6         2.3.4       AIR QUALITY COMPLAINTS       7         3.0       NOISE       7         3.1       Monitoring Data Results       7         3.1.1       Monitoring Data Results       7         3.1.2       Discussion - Compliance / Non Compliance       9         9.4.0       BLAST       10         4.1       BLAST       10         4.1       BLAST       10         4.1.1       Monitoring Data Results       10         4.1.2       Discussion - Compliance / Non Compliance       12 </th <th>1.0</th> <th>METEOROLOGY</th> <th>.3</th>	1.0	METEOROLOGY	.3
2.0       AIR QUALITY       4         2.1       HVAS (PM10) and TEOM (PM10 & PM2.5).       4         2.1.1       Monitoring Data Results.       4         2.1.2       Discussion - Compliance / Non Compliance       4         2.2       WERRIS CREEK MINE DEPOSITED DUST.       6         2.2.1       Monitoring Data Results       6         2.2.2       Discussion - Compliance / Non Compliance       6         2.3       QUIRINDI TRAIN DUST DEPOSITION       6         2.3.1       Monitoring Data Results       6         2.3.2       Discussion - Compliance / Non Compliance       6         2.4       AI QUALITY COMPLAINTS       7         3.0       NOISE       7         3.1       OPERATIONAL NOISE       7         3.1.1       Monitoring Data Results       7         3.1.2       Discussion - Compliance / Non Compliance       9         3.2       NOISE COMPLAINTS       9         4.0       BLAST       10         4.1.1       Monitoring Data Results       10         4.1.2       Discussion - Compliance / Non Compliance       12         4.2       NOISE       10         4.1.2       Discussion - Compliance / Non Compliance <td< th=""><th>1.1</th><th>WEATHER STATION</th><th> 3</th></td<>	1.1	WEATHER STATION	3
2.1       HVAS (PM10) and TEOM (PM10 & PM2.5)	2.0	AIR QUALITY	.4
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## **APPENDICES**

Appendix 1	.Dust Monitoring Results - PM10 and PM2.5
Appendix 2	Dust Monitoring Results – Deposited Dust
Appendix 3	Train Dust Deposition Monitoring
Appendix 4	.Noise Monitoring Results
Appendix 5	Blasting Monitoring Results
Appendix 6	.Groundwater Monitoring Results
Appendix 7	Surface Water Monitoring Results
Appendix 8	Discharge Monitoring Results

## 1.0 METEOROLOGY

## 1.1 WEATHER STATION

Werris Creek Coal (WCC) collects meteorological data from the onsite weather station located on the top level of the overburden emplacement and from the continuous noise monitoring units located at Quipolly and Werris Creek. The following table summarises temperature, inversion and rainfall data for the last three months and the wind data is presented below in windroses. For the last four months the prevailing wind direction has transitioned from the south-south east to a north westerly reflecting the change in seasons.

Month	Quipolly Temp (°C)			Werris Creek Temp (°C)			WCC Temp (°C) 10m			Lapse Rate (°C/100m)		Rainfall (mm)			
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Avg	90%	Onsite	Quip	WC	Annual*
May 2014	-0.9	12.4	24.8	2.7	14.6	24.6	4.1	15.0	24.4	+2.3	+8.5	25.4	12.4	29.8	57.8
June 2014	-2.2	9.4	19.5	1.2	11.2	19.3	1.9	11.4	18.8	+1.6	+7.5	46.4	33.8	50.8	104.2
July 2014	-5.3	7.9	20.9	-1.4	10.1	20.7	1.0	10.5	20.0	+2.2	+8.8	27.6	24.6	25.6	131.8
August 2014	-3.9	9.6	20.1	0.7	11.6	19.9	2.4	11.6	19.1	+1.8	+8.6	40.2	32.8	43.6	172.0

\* Annual cumulative total since July 2012 to June 2013 from a composite data set based on the onsite Weather Station at WCC.



Sentinex95 - M2, Werris Ck Mine - Wind Rose Date/Time range = 20140501-00:00 ill 20140531-23:59



Sentinex95 - M2, Werris Ck Mine - Wind Rose Date/Time range = 20140701-00:00 ill 20140731-23:59

July 2014

Sentinex95 - M2, Werris Ck Mine · Wind Rose Date/Time range = 20140601-00:00 till 20140630-23:59

#### June 2014



Sentinex95 - M2, Werris Ck Mine · Wind Rose Date/Time range = 20140801-00:00 till 20140831-23:59

August 2014

Werris Creek Coal

# 2.0 AIR QUALITY

## 2.1 HVAS (PM10) and TEOM (PM10 & PM2.5)

WCC operates five High Volume Air Sampler (HVAS) measuring particulate matter less than 10 micron (PM10) and total suspended particulate (TSP) matter at four sites. HVAS sampling is scheduled for 24 hours every 6 days in accordance with Environment Protection Authority (EPA) guidelines and results are reported as micro grams per cubic metre ( $\mu$ g/m<sup>3</sup>) of air sampled. In addition, WCC operates a Tapered Element Oscillating Microbalance (TEOM) monitor in Werris Creek measuring real time PM10 and PM2.5 (particulate matter less than 2.5 micron) dust levels. Dust monitoring locations are identified in **Figure 1**.

PM2.5 – TEOM92 "Werris Creek" PM10 – TEOM92 "Werris Creek" PM10 – HVP20 "Tonsley Park" PM10 – HVP1 "Escott" PM10 – HVP20 "Glenara" PM10 – HVP98 "Kyooma" TSP – HVT98 "Kyooma"

## 2.1.1 Monitoring Data Results

The average results for the last four months are provided in the table below; however see HVAS/TEOM monitoring data under **Appendix 1** for individual results.

	Daily	Mov 2014	Juno 2014	July	August	Criteria (µg/m <sup>3</sup> )	
Monitor Location	Maximum (µg/m <sup>3</sup> )	$(\mu g/m^3)$	$(\mu g/m^3)$	2014 (µg/m <sup>3</sup> )	2014 (µg/m <sup>3</sup> )	Annual	Daily
PM2.5 – TEOM92	19.4	<b>12.2</b>	<mark>9.7</mark>	<mark>8.3</mark>	6.7	8	25
"Werris Creek"							
PM10 – TEOM92 "Werris Creek"	34.7	16.9	13.1	11.6	10.2	30	50
PM10 – HVP20 "Tonsley Park"	23.6	13.0	6.6	13.3	11.0	30	50
PM10 - HVP1 "Escott"	11.2	6.5	4.1	7.4	6.0	30	50
PM10 – HVP20 "Glenara"	43.3	15.1	4.9	26.3	13.2	30	50
PM10 – HVP98 "Kyooma"	16.9	8.8	7.3	8.3	6.0	30	50
TSP – HVT98 "Kyooma"	28.7	14.1	9.9	13.0	11.4	90	-

Yellow Bold – Elevated dust level.

## 2.1.2 Discussion - Compliance / Non Compliance

The ambient PM10 dust levels monthly average and daily maximum levels were within the relevant air quality criteria. However the Werris Creek PM2.5 dust level was measured trending above the annual criteria for the months of May, June and July before the TEOM monitor had a routine service including cleaning of the chiller and for August 2014 the monthly average fell below the 8.0µg/m<sup>3</sup> annual average criteria.



Figure 1 – WCC Dust Monitoring Locations

## 2.2 WERRIS CREEK MINE DEPOSITED DUST

Deposited dust monitoring measures particulate matter greater than 30 micron in size that readily settles out of the air related to visual impact. Dust deposition is monitored at 19 locations around WCC. Sampling is scheduled monthly in accordance with EPA guidelines and results are reported as grams per metre squared per month (g/m<sup>2</sup>/month). Dust monitoring locations are identified in **Figure 1**.

## 2.2.1 Monitoring Data Results

The results for the last four months are provided in the table below; however **Appendix 2** has more information on Deposited Dust Monitoring Results.

Monitor Location	May 2014 (g/m <sup>2</sup> /month)	June 2014 (g/m <sup>2</sup> /month)	July 2014 (g/m <sup>2</sup> /month)	August 2014 (g/m <sup>2</sup> /month)	Annual Criteria (g/m <sup>2</sup> /month)
DG2 "Cintra"	2.0	3.8	1.9	3.8	4.0
DG5 "Railway View"	0.6	0.8	0.5	3.3*	4.0
DG20 "Tonsley Park"	3.3	3.5	1.1	1.3	4.0
DG15 "Plain View"	0.4	0.4*	0.6	<0.1	4.0
DG9 "Marengo"	0.1*	< 0.1	0.2	0.2*	4.0
DG22 "Mountain View"	0.8	1.5	0.6	3.5	4.0
DG11 "Glenara"	0.4	1.1	0.8	0.5	4.0
DG24 "Hazeldene"	0.9	0.3	0.8	0.2	4.0
DG17 "Woodlands"	0.4	<1.0*	0.5	0.7	4.0
DG96 "Talavera"	0.2*	0.5*	0.2*	1.0	4.0
DG98 "Kyooma"	0.1	0.2*	0.1*	< 0.1	4.0
DG14 "Greenslopes"	0.8	0.5*	0.3*	0.4*	4.0
DG62 Werris Creek South	0.2*	0.2*	0.1*	0.2*	4.0
DG92 Werris Creek Centre	0.3*	0.4	0.1*	0.6*	4.0
DG101 "Westfall"	1.0	0.8	0.7	0.5	4.0
DG103 West Street	0.3	0.5	2.5*	1.6	4.0
DG1 "Escott"	0.5	0.5	0.2*	0.1*	4.0
DG3 "Eurunderee"	0.7	0.5*	1.5	0.5*	4.0
DG34 8 Kurrara St	< 0.1	<mark>c22.1</mark>	3.8	0.8	4.0

\* - sample contaminated with excessive organic matter (>50%) from non-mining source (i.e. bird droppings and insects); c - indicates sample is contaminated from a Non-Werris Creek Coal dust source; Yellow Bold – Elevated dust level.

## 2.2.2 Discussion - Compliance / Non Compliance

All dust deposition gauge averages were below the annual criteria of 4.0g/m<sup>2</sup>/month except for DG34 (8 Kurrara St) which has previously been affected by localized non-mining related dust contamination.

## 2.3 QUIRINDI TRAIN DUST DEPOSITION

#### 2.3.1 Monitoring Data Results

The results for the last four months are provided in the table below; however **Appendix 3** has more information on the Train Dust Monitoring Results.

Monitor	May 2014		June 20	June 2014		July 2014		August 2014		
Location	g/m <sup>2</sup> /month	% Coal	(g/m <sup>2</sup> /month)							
DDW30	1.0	10%	2.2	15%	1.6	15%	0.4	10%	1.2	
DDW20	0.8	15%	1.5	15%	-	-	1.2	10%	1.1	
DDW13	0.7	20%	1.0	10%	0.8	10%	1.2	40%	0.9	
				Tra	in Line					
DDE13	0.4	15%	1.9	10%	0.9	5%	1.3	10%	0.9	
DDE20	0.6	10%	1.5	10%	0.6	5%	3.2	10%	1.3	
DDE30	2.0	<1%	2.7	10%	0.8	5%	0.7	10%	1.5	

## 2.3.2 Discussion - Compliance / Non Compliance

Overall the dust fallout levels adjacent to the train line are low (well below the impact assessment criteria nominated by the EPA of 4.0 g/m<sup>2</sup>/month) and comparable to the levels monitored around WCC. The dust levels are trending the highest at the gauges furthest from the train line.

### 2.4 AIR QUALITY COMPLAINTS

There were three dust complaints during the period. Two of the dust complaints did not have a specific event but rather expressing concern at the increase in dust levels allegedly from mining operations. Monitoring results demonstrate that dust levels had increased due to below average rainfall impacting on ambient dust levels rather than specifically as a result of mining operations. One dust complaint was related to dust haze sitting over the mine on the morning of the 3<sup>rd</sup> June 2014 that was trapped by a strong temperature inversion. Specific actions taken in relation to these complaints are outlined in **Section 6**.

## 3.0 NOISE

#### 3.1 OPERATIONAL NOISE

Monthly attended noise monitoring is undertaken representative of the following 16 properties from 12 monitoring points below. Attended noise monitoring was undertaken twice for either 60 minutes at privately owned properties or 15 minutes at properties with private agreements; representative of the day period and the evening/night period.

- A "Rosehill" R5;
- o B "Almawille" (private agreement) R8;
- o B 83 Wadwells Lane (private agreement) R7;
- B "Mountain View" (private agreement) R22;
- o B "Gedhurst" (private agreement) R9;
- C "Meadholme" (private agreement) R10;
- C "Glenara" (private agreement) R11;
- o D "Hazeldene" R24;
- o E "Railway Cottage" R12;
- o F "Talavera" R96;
- **G R97**;
- H "Kyooma" (private agreement) R98;
- o I Kurrara St, Werris Creek;
- J Coronation Ave, Werris Creek;
- o K "Alco Park" (private agreement) R21; and
- o L R103.

#### 3.1.1 Monitoring Data Results

The WCC operations only noise level (not ambient noise) results for the last four months are outlined below; however see Monthly Noise Monitoring Reports under **Appendix 4** for more detail. Noise monitoring locations are identified in **Figure 2**.

	Looption	Day dB(A)	Criteria dB(A)	<b>Evening/Night</b>	Criteria dB(A)
	Location	L <sub>eq 15min</sub>	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
Α	"Rosehill" R5	Inaudible	35	Inaudible	35
В	West Quipolly R7*, R8*, R9* & R22*	Inaudible	37/36 <sup>1</sup>	Faintly audible	37/36 <sup>1</sup>
С	Central Quipolly R10*, R11*	Inaudible	39	Faintly audible	39
D	"Hazeldene" R24	Inaudible	37	26	37
Е	"Railway Cottage" R12	Inaudible	38	Inaudible	38
F	"Talavera" R96	Inaudible#	38	20	37
G	R97	Faintly audible#	35	Inaudible#	35
Н	"Kyooma" R98*	Inaudible#	36	27	36
Ι	Kurrara St, WC	Faintly audible#	35	24#	35
J	Coronation Ave, WC	Inaudible#	35	Inaudible	35
K	South St, WC R21*	Inaudible	39	26	37
L	West St, WC R103	Inaudible	35	24#	35

Wednesday 21<sup>st</sup> May 2014

 $WC - Werris Creek; * - Private agreement in place with resident; \\ \frac{Yellow Bold}{2} - Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 - R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>$ </sub>



Figure 2 – WCC Noise Monitoring Locations

#### Tuesday 17<sup>th</sup> June 2014

	Location	Day dB(A)	Criteria dB(A)	<b>Evening/Night</b>	Criteria dB(A)
	Location	L <sub>eq 15min</sub>	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
Α	"Rosehill" R5	Inaudible#	35	Inaudible	35
В	West Quipolly R7*, R8*, R9* & R22*	Inaudible	37/36 <sup>1</sup>	27	37
С	Central Quipolly R10*,R11*	Inaudible	39	Inaudible	39
D	"Hazeldene" R24	Inaudible	37	30	37
E	"Railway Cottage" R12	Inaudible	38	25	38
F	"Talavera" R96	Inaudible	38	26	37
G	R97	Faintly audible	35	22	35
Η	"Kyooma" R98*	Faintly audible	36	29	36
Ι	Kurrara St, WC	Inaudible	35	Inaudible	35
J	Coronation Ave, WC	Inaudible	35	Inaudible	35
K	South St, WC R21*	29	39	Inaudible	37
L	West St, WC R103	25#	35	Inaudible	35

WC – Werris Creek; \* - Private agreement in place with resident; Yellow Bold – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>

#### Tuesday 8<sup>th</sup> July 2014

	Location	Day dB(A)	Criteria dB(A)	Evening/Night	Criteria dB(A)
	Location	L <sub>eq 15min</sub>	L <sub>eq 15min</sub>	dB(A) L <sub>eq 15min</sub>	L <sub>eq 15min</sub>
Α	"Rosehill" R5	Inaudible	35	Inaudible	35
В	West Quipolly R7*, R8*, R9* & R22*	Faintly audible	37/36 <sup>1</sup>	28	37
С	Central Quipolly R10*,R11*	Inaudible	39	28	39
D	"Hazeldene" R24	23	37	27	37
E	"Railway Cottage" R12	Inaudible	38	33	38
F	"Talavera" R96	Inaudible	38	28	37
G	R97	22	35	Inaudible	35
Н	"Kyooma" R98*	Inaudible	36	21	36
Ι	Kurrara St, WC	Inaudible	35	Inaudible	35
J	Coronation Ave, WC	Inaudible	35	Inaudible	35
K	South St, WC R21*	Inaudible	39	Inaudible	37
L	West St, WC R103	Inaudible	35	Inaudible	35

WC – Werris Creek; \* - Private agreement in place with resident; Yellow Bold – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions  $>+12^{\circ}$ C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>

## Thursday 7<sup>th</sup> August 2014

	Location	Day dB(A) L <sub>eq 15min</sub>	Criteria dB(A) L <sub>eq 15min</sub>	Evening/Night dB(A) L <sub>eq 15min</sub>	Criteria dB(A) L <sub>eq 15min</sub>
Α	"Rosehill" R5	Inaudible	35	Inaudible	35
В	West Quipolly R7*, R8*, R9* & R22*	19	37/36 <sup>1</sup>	Inaudible	37
С	Central Quipolly R10*, R11*	20	20 39 Inaudible		39
D	"Hazeldene" R24	Inaudible	37	25	37
E	"Railway Cottage" R12	Inaudible	38	Inaudible#	38
F	"Talavera" R96	Inaudible	38	24#	37
G	R97	Faintly audible	35	Inaudible	35
Η	"Kyooma" R98*	21	36	Inaudible#	36
Ι	Kurrara St, WC	Faintly audible	35	Inaudible	35
J	Coronation Ave, WC	Inaudible	35	Inaudible	35
Κ	South St, WC R20*, R21*	27	39	30	37
L	West St, WC R103	Inaudible	35	Inaudible#	35

WC – Werris Creek; \* - Private agreement in place with resident; Yellow Bold – Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 – R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>

## 3.1.2 Discussion - Compliance / Non Compliance

There were no noise exceedances during May to August 2014. The last recorded noise exceedance was in September 2013.

## 3.2 NOISE COMPLAINTS

There were two noise complaints during the period from two Werris Creek residents alleging noise impacts from the WCC Train Load Out facility and Open Cut mining operations but both were found to be due to rail

traffic in the Werris Creek rail yard. Specific actions taken in relation to these complaints are outlined in Section 6.

## 4.0 BLAST

During the period a total of forty four blasts were fired by WCC with monitoring of each blast undertaken at "Glenara", "Kyooma", "Werris Creek South" and "Werris Creek Mid". Compliance limits for blasting overpressure is 115dBL (and up to 120dBL for only 5% of blasts) and vibration is 5mm/s (and up to 10mm/s for only 5% of blasts). Blast monitoring locations are identified in **Figure 3**.

## 4.1 BLAST MONITORING

#### 4.1.1 Monitoring Data Results

The summary tables of blasting results over the last three months are provided below; however see the blasting results database under **Appendix 5** for more detail.

May 2014	"Glenara" R11		"Kyooma" R98		Werris Creek South R62		Werris Creek Mid R92	
•	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.21	98.8	1.27	96.6	0.46	94.3	0.30	91.2
Monthly Maximum	0.29	110.5	2.42	109.4	0.85	98.9	0.56	97.4
Annual Average	0.19	100.3	1.23	99.3	0.46	97.9	0.32	94.2
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%
# >0.5mm/s	8 out of 9 blasts							

June 2014	"Glenara" R11		"Kyooma" R98		Werris Creek South R62		Werris Creek Mid R92	
	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.15	100.4	0.86	100.1	0.33	94.7	0.22	95.1
Monthly Maximum	0.26	107.0	1.83	108.2	0.46	103.4	0.37	102.5
Annual Average	0.18	100.4	1.10	99.6	0.42	96.8	0.29	94.5
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%
# >0.5mm/s	7 out of 9 blasts							

July 2014	"Glenara" R11		"Kyooma" R98		Werris Creek South R62		Werris Creek Mid R92	
•	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.13	101.5	0.59	100.2	0.29	95.9	0.23	96.4
Monthly Maximum	0.27	108.3	1.26	110.8	0.68	108.7	0.49	105.1
Annual Average	0.17	100.6	0.98	99.7	0.39	96.6	0.27	95.0
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%
# >0.5mm/s	7 out of 11 blasts							

August 2014	"Glenara" R11		"Kyooma" R98		Werris Creek South R62		Werris Creek Mid R92	
8	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.15	96.8	0.51	98.1	0.31	94.9	0.21	95.2
Monthly Maximum	0.45	110.1	1.69	111.8	1.02	104.7	0.48	109.3
Annual Average	0.16	99.9	0.88	99.4	0.37	96.3	0.26	95.0
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%
# >0.5mm/s	7 out of 15 blasts							

Yellow – overpressure >115dB(L) or Werris Creek vibration >1mm/s.



Figure 3 – WCC Blast Monitoring Locations

#### 4.1.2 Discussion - Compliance / Non Compliance

All blasts over the period complied with maximum license limits (120d(B)L and 10mm/s) with no blast overpressure levels above 115dB(L) or vibration levels over 5mm/s for the four month period. Unfortunately during the period, there was one blast related non-compliance. A single blast event took place in the open cut area of the Werris Creek mine on Wednesday 2<sup>nd</sup> July 2014 as part of standard operational production activity. The blast event was located 3.7km away from Werris Creek town. The blast created a nitrous oxide plume approximately 50m off the ground that moved in a northwesterly direction across vacant land owned by Werris Creek mine and dissipated 500m north of the Train Load Out facility. Despite the plume being highly visible for a short duration, it did not pose any short term or long term health risks to the community. Given the height off the ground and distance from the community, there was no risk of exposure to the plume. A visual classification of the blast following its initiation confirmed that the intensity and extent of the plume was unexpected and unusual. Plumes from blasts dissipate after a relatively short time. Consistent with the mine's Environmental Protection Licence and Project Approval conditions, the company has reported the incident to the NSW Environmental Protection Authority (EPA).

## 4.2 BLAST COMPLAINTS

There were thirty blast complaints during the period from eight separate blast events. Twenty of the complaints were related to the blast on the 2<sup>nd</sup> July 2014 as discussed above. Subsequent to the incident, WCC have developed a blast fume management procedure which limits the sleep time (number of days from when explosives are first loaded into blast area and when the blast is detonated) to 5 days. Nitrous oxide plumes can occur from the incomplete detonation of explosive; so a reduced sleep time will minimise the potential deterioration and desensitization of explosives and mitigate future recurrence of the incident. Four blasting complaints were related to vibration impacts specifically from G Coal Interburden blasts that have caused community complaints in the past even though each shot was designed and achieved a vibration level less than 1mm/s. The other six blasting complaints were also in relation to vibration impacts from other areas of the mine. Specific actions taken in relation to these complaints are outlined in **Section 6**.

## 5.0 WATER

The groundwater monitoring program monitors groundwater levels bi-monthly and groundwater quality six monthly. Surface water monitoring is undertaken quarterly. There were no dirty water discharge events during the period. Groundwater and Surface Water monitoring locations are identified in **Figure 4**.

## 5.1 GROUND WATER

Groundwater monitoring is undertaken to identify if there are any impacts on groundwater quality and levels as a result of the mining operations. WCC monitors 29 groundwater bores and piezometers in the key aquifers surrounding WCC including Werrie Basalt (next to WCC and further afield) and Quipolly Creek Alluvium. Bi-monthly groundwater level and six monthly/annual groundwater quality monitoring was completed between the 20<sup>th</sup> to 23<sup>rd</sup> May and 2<sup>nd</sup> to 7<sup>th</sup> July 2014.

#### 5.1.1 Monitoring Data Results

A summary of groundwater monitoring results is provided below with the field sheets provided in Appendix 6.

	Site	May	May 2014*		014*	Comments
	MW1	57.11	-1%	57.58	-1%	No rainfall recharge, Level down
C alt	MW2	28.39	-2%	28.80	-1%	No rainfall recharge, Level down
VC 3as	MW3	16.69	-1%	16.93	-1%	No rainfall recharge, Level down
r v	MW4B	12.49	-3%	12.73	-2%	No rainfall recharge, Level down
ea	MW5	10.08	-2%	10.31	-2%	No rainfall recharge, Level down
ĕ <sup>Z</sup>	MW6	13.24	-1%	13.38	-1%	No rainfall recharge, Level down
	MW27	45.20	1%	47.49	-5%	No rainfall recharge
	MW8	17.48	-1%	17.66	-1%	No rainfall recharge, Level down
alt	<b>MW10</b>	17.05	0%	17.09	0%	No rainfall recharge
3as	MW14	18.16	0%	18.21	0%	No rainfall recharge
ie I	<b>MW17B</b>	11.51	-4%	11.47	0%	No rainfall recharge
err	MW19A	8.29	-1%	8.4	-2%	No rainfall recharge, Level down
Ň	MW20	20.29	-1%	20.39	0%	No rainfall recharge
	MW12	10.31	-3%	10.65	-3%	No rainfall recharge. Level down

	MW13	4.75	18%	5.86	-19%	Significant increase & decrease requires further
	MW13B	4.17	-1%	4.82	-13%	investigation i.e. running pump not documented
	MW13D	4.82	-1%	4.93	-2%	No rainfall recharge, Level down
e	MW15	5.25	-3%	5.37	-2%	No rainfall recharge, Level down
	MW16	6.13	-3%	6.25	-2%	No rainfall recharge, Level down
ivn	MW17A	5.23	-3%	5.41	-3%	No rainfall recharge, Level down
ЧI	MW18A	5.07	-4%	5.27	-4%	No rainfall recharge, Level down
lly	MW21A	8.73	-4%	8.96	-3%	No rainfall recharge, Level down
pod	MW22A	6.27	-3%	6.5	-3%	No rainfall recharge, Level down
,inč	MW22B	6.55	-4%	6.7	-3%	No rainfall recharge, Level down
$\cup$	MW23A	3.92	-1%	4.22	-7%	No rainfall recharge, Level down
	MW23B	4.4	-3%	4.63	-5%	No rainfall recharge, Level down
	MW28A	13.12	-2%	13.27	-1%	No rainfall recharge, Level down
	MW32	4.18	-2%	4.02	4%	No rainfall recharge

\* mbgl – meters below ground level is the distance in meters from top of bore to groundwater surface; **Red** – Greater than 15% change/potential compliance issue; Orange – Change decrease; Green – change increase or no change.

#### 5.1.2 Discussion - Compliance / Non Compliance

Continuing dry conditions resulting in no rainfall recharge to aquifers with the majority of monitoring bores groundwater levels declining over the period. Over twenty groundwater bores routinely monitored are at or close to record low groundwater levels since monitoring commenced. A cumulative sum (cusum) trend analysis was completed in the Annual Environment Management Report 2013-2014 to evaluate the effects of seasonal variation on background groundwater levels. The cusum analysis found only three bores located on the mining lease were outside of the calculated statistical range for normal seasonal conditions but this was considered to be within the predicted impacts given the close proximity to mining operations. The investigation found that no Quipolly Alluvium aquifer bores are being impacted by mining and that the current dry conditions and reduced rainfall recharge are the cause of the declining groundwater levels.

#### 5.2 SURFACE WATER

Surface water monitoring is undertaken from local creeks offsite as well as from discharge point dirty water dams to monitor for potential water quality issues. Quarterly surface water monitoring was undertaken on 22<sup>nd</sup> May and 7<sup>th</sup> August 2014.

#### 5.2.1 Monitoring Data Results

Summary of surface water quality monitoring results is provided below with the laboratory reports provided in **Appendix 7**.

Site	pН	EC	TSS	<b>O&amp;G</b>	Change from 25 <sup>th</sup> February to 22 <sup>nd</sup> May 2014					
					ONSITE					
SB2	9.63	1950	125	<5	pH increased 0.59, EC increased 160, TSS increased 78, O&G no change.					
SB9	8.34	804	166	<5	pH decreased 0.10, EC increased 134, TSS increased 149, O&G no change.					
SB10	7.85	199	197	<5	pH increased 0.12, EC increased 31, TSS decreased 833, O&G no change.					
					OFFSITE					
QCU	7.99	1690	63	<5	pH increased 0.39, EC increased 1227, TSS decreased 117, O&G no change.					
QCD	8.13	945	<5	<5	pH increased 0.24, EC decreased 135, TSS decreased 26, O&G no change.					
WCU	-	-	-	-	Dry.					
WCD	8.41	1350	16	<5	pH increased 0.03, EC no change, TSS decreased 11, O&G no change.					
Site	pН	EC	TSS	O&G	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014					
Site	pН	EC	TSS	O&G	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014 ONSITE					
Site SB2	<b>pH</b> 8.69	<b>EC</b> 2150	<b>TSS</b> 36	<b>0&amp;G</b>	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014 ONSITE pH decreased 0.94, EC increased 100, TSS decreased 89, O&G no change.					
Site SB2 SB9	<b>pH</b> 8.69 8.23	EC 2150 881	<b>TSS</b> 36 469	<b>O&amp;G</b> <5 <5	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014 ONSITE pH decreased 0.94, EC increased 100, TSS decreased 89, O&G no change. pH decreased 0.11, EC increased 77, TSS increased 303, O&G no change.					
Site SB2 SB9 SB10	<b>pH</b> 8.69 8.23	EC 2150 881	<b>TSS</b> 36 469 -	O&G <5 <5 -	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014 ONSITE pH decreased 0.94, EC increased 100, TSS decreased 89, O&G no change. pH decreased 0.11, EC increased 77, TSS increased 303, O&G no change. Dry					
Site SB2 SB9 SB10	<b>pH</b> 8.69 8.23 -	<b>EC</b> 2150 881 -	36         469         -	O&G <5 -	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014 ONSITE pH decreased 0.94, EC increased 100, TSS decreased 89, O&G no change. pH decreased 0.11, EC increased 77, TSS increased 303, O&G no change. Dry OFFSITE					
Site SB2 SB9 SB10 QCU	<b>pH</b> 8.69 8.23 - 7.89	EC 2150 881 - 1600	36         469         -         14	O&G <5 < -	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014 ONSITE pH decreased 0.94, EC increased 100, TSS decreased 89, O&G no change. pH decreased 0.11, EC increased 77, TSS increased 303, O&G no change. Dry OFFSITE pH decreased 0.10, EC decreased 90, TSS decreased 49, O&G no change.					
Site SB2 SB9 SB10 QCU QCD	<b>pH</b> 8.69 8.23 - 7.89 8.14	EC 2150 881 - 1600 911	TSS       36       469       -       14       5	<b>0&amp;G</b> <5 - <5 <5	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014 ONSITE pH decreased 0.94, EC increased 100, TSS decreased 89, O&G no change. pH decreased 0.11, EC increased 77, TSS increased 303, O&G no change. Dry OFFSITE pH decreased 0.10, EC decreased 90, TSS decreased 49, O&G no change. pH increased 0.01, EC decreased 34, TSS increased 5, O&G no change.					
Site SB2 SB9 SB10 QCU QCD WCU	<b>pH</b> 8.69 8.23 - 7.89 8.14 -	<b>EC</b> 2150 881 - 1600 911 -	36       469       -       14       5       -	<b>0&amp;</b> G <5 - <5 <5 -	Change from 22 <sup>nd</sup> May to 7 <sup>th</sup> August 2014 ONSITE pH decreased 0.94, EC increased 100, TSS decreased 89, O&G no change. pH decreased 0.11, EC increased 77, TSS increased 303, O&G no change. Dry OFFSITE pH decreased 0.10, EC decreased 90, TSS decreased 49, O&G no change. pH increased 0.01, EC decreased 34, TSS increased 5, O&G no change. Dry.					

pH – measure of acidity/alkalinity; EC – Electrical Conductivity measures salinity; TSS – Total Suspended Solids is a measure of suspended sediment in water (i.e.

similar to turbidity); O&G – Oil and Grease measures amount of hydrocarbons (oils and fuels) in water; Orange – Issue with water quality; Green – water quality OK.



Figure 4 – WCC Groundwater and Surface Water Monitoring Locations

#### 5.2.2 Discussion - Compliance / Non Compliance

The quarterly surface water monitoring undertaken on 7<sup>th</sup> August 2014 found all onsite and offsite water quality within longer term averages and the Site Water Management Plan trigger values except for some parameters due to the dry conditions evaporating the remaining water into small pools.

#### 5.3 SURFACE WATER DISCHARGES

#### 5.3.1 Monitoring Data Results

There were no discharge events during the period. No discharge monitoring results are provided below and no laboratory reports provided in **Appendix 8**.

Date	Dam	pН	EC	TSS	<b>0&amp;</b> G	Compliance	Туре	5 Day Rain
						No Discharges		
Criteria		8.5	N/A	50	10			

pH – measure of acidity/alkalinity; EC – Electrical Conductivity measures salinity; TSS – Total Suspended Solids is a measure of suspended sediment in water (i.e. similar to turbidity); O&G – Oil and Grease measures amount of hydrocarbons (oils and fuels) in water; **Yellow** – indicates results outside criteria due to 5 day rain >39.2mm.

#### 5.3.2 Discussion - Compliance / Non Compliance

There were no impacts on water quality monitored in Quipolly and Werris Creeks' catchments as a result of WCC activities.

#### 5.4 WATER COMPLAINTS

There was one groundwater complaint during the period due to declining groundwater levels. As the monitoring results demonstrate in **Section 5.1.1**; the decline is reflected across all the aquifers regionally including the Quipolly Alluvium aquifer. Specific action taken in relation to this complaint is outlined in **Section 6**.

## 6.0 COMPLAINTS SUMMARY

There were thirty six complaints received during the period with the details summarised below. There were thirty complaints related to blasting (including 20 complaints from the blast event on 2<sup>nd</sup> July 2014); three complaints related to dust; two complaints relating to noise and one complaint relating to groundwater. There were twenty different complainants during the period with thirty three complaints from Werris Creek residents and three complaints from Quipolly residents.

#	Date	Complainant	Complaint	Investigation	Action Taken		
382	16/05/2014 3:15pm	AZ Werris Creek	Blast caused significant ground movement and shaking of house.	WCC shot #30-2014 (S13_6-10_GSeam) was fired at 3:15pm on Friday 16 <sup>th</sup> May 2014 was in compliance. Blast in bottom of pit has previously caused complaints.	Written response provided to complainant.		
383	22/05/2014 11:14am	U Werris Creek	Blast caused significant ground movement and shaking of house.	WCC shot #31-2014 (S13_11-12_GSeam) was fired at 11:13pm on Thursday 22 <sup>nd</sup> May 2014 was in compliance. Blast in bottom of pit has previously caused complaints.	Written response provided to complainant.		
384- 386	29/05/2014 3:14pm	AL,AN,BD Werris Creek	Blast caused significant ground movement and shaking of houses.	WCC shot #31-2014 (S13_11-16_264) was fired at 3:13pm on Thursday 29 <sup>th</sup> May 2014 was in compliance. Blast in bottom of pit has previously caused complaints.	Written response provided to complainant.		
387	3/06/2014 2:00pm	Q Quipolly	Thick dust cloud over Werris Creek Road at 9:30am on Friday 30 <sup>th</sup> May 2014.	Temperature inversion trapping dust emissions; however no exceedance of dust criteria at the Werris Creek real time dust monitor. Regional dust event also recorded in Tamworth real time dust monitor.	Written response provided to complainant.		
388	15/06/2014 10:37pm	U Werris Creek	Excessive noise allegedly from mining operations on Sunday night 15 <sup>th</sup> June 2014.	Elevated noise levels were found to be due to rail yard maintenance activities and not related to WCC operations.	Written response provided to complainant.		
389	17/06/2014 12:26am	2014 A Loud noise from coal lo tonight Monday 16 <sup>th</sup> Ju 2014.		Elevated noise levels were found to be due to rail yard maintenance activities and not related to WCC operations.	Written response provided to complainant.		

#	Date	Complainant	Complaint	Investigation	Action Taken		
390	17/06/2014 1:13pm	U Werris Creek	Blast caused significant ground movement and shaking of house at 1:10pm Tuesday 17 <sup>th</sup> June 2014.	WCC did not blast on Tuesday 17 <sup>th</sup> June 2014 at 1:10pm.	Written response provided to complainant.		
391- 408, 410- 411	02/07/2014 Various	Various Werris Creek	Blast caused significant ground movement and shaking of houses at 1:05pm Wednesday 2 <sup>nd</sup> July 2014. The blast also generated excessive orange gas that was visible from Werris Creek town.	WCC shot #45-2014 (S15_B12-B16_RL330_EXT) was fired at 1:05pm on Wednesday 2 <sup>nd</sup> July 2014 and also generated an excessively large cloud of fume (Oxides of Nitrogen) that drifted north north west off the mine site and dispersed over vacant agricultural land owned by Whitehaven Coal resulting in 8 complaints. The other 12 complaints were in relation to the blast which had a longer than normal duration due to size of the blast which was one the larger blasts fired at WCC.	EPA was notified in accordance with the Pollution Incident Response notification process. EPA is investigating the incident with a preliminary report submitted 8 <sup>th</sup> July and ICAM investigation report submitted 31 <sup>st</sup> July 2014. Written response provided to complainants.		
409	03/07/2014 3pm	H Quipolly	Groundwater level in bore has been dropping recently.	The previous measurement on 20th May 2014 was 5.25m while the 2nd July 2014 measurement was 5.38m. This is following a consistent groundwater decline trend since May 2013 of between -1% to -6% fall which is due to a lack of rainfall recharge to the Quipolly alluvial aquifer since the last heavy rain in February 2013.	EO referred to expert Hydrogeologist for analysis. Written response provided to complainant.		
412	11/07/2014 2:43pm	BG Werris Creek	The complainant stated that since April 2014 when the mine started mining towards Tony Windsor's (referring to MIA construction) that her house now gets coated in black dust. The complainant has only recently started suffering from rashes/hives that only occur after showering.	Confirmed that the MIA relocation had occurred over 12 months ago (March 2013) and not consistent with the complainants timeline of recent symptoms. No further investigation was undertaken as no specific event identified by the complainant. Nearby Werris Creek TEOM and DG92 demonstrate dust levels well within criteria.	Environmental Officer met with the complainant and observed the alleged black dust on the roof of the house. The roof dust and water tank sludge sampled and tested for composition. Written response provided to complainant.		
413	24/07/2014 1:04pm	AL Werris Creek	Blast caused significant ground movement and rattled sun room at rear of house.	WCC shot #52-2014 (S15_B14-B16_RL330) was fired at 1:03pm on Thursday 25 <sup>th</sup> July 2014 was in compliance. Blast performed as expected and both Werris Creek blast monitor results below 0.5mm/s.	Written response provided to complainant.		
414	25/07/2014 9:50am	M Quipolly	Allegedly dust from WCC causing dust to deposit on the back deck and table. The complainant believes that the black dust wiped up daily from the table is coal dust.	HVAS results for the 27th June and 3rd July 2014 recorded 22µg/m3 and 15µg/m3 and were within criteria limits. Generally when the wind speeds are low on the 27th June and 3rd July, these not usually considered to dusty conditions. Based on this information, the ambient dust levels from all dust sources are not considered excessive and therefore any dust from mining operations on those days would not be considered to have impacted the "Glenara" property.	Environmental Officer met with the complainant and observed the alleged black dust on the back deck of the house. The roof dust and water tank sludge sampled and tested for chemistry composition. Written response provided to complainant.		
415	6/08/2014 1:06pm	U Werris Creek	Blast caused back shed to shake significantly and hum.	WCC shot #58-2014 (S15_B3-B5_RL330) was fired at 1:05pm on Wednesday 6th August 2014 was in compliance. Through seam blast was fired towards Werris Creek and duration of 5 seconds; both changes were required but outside the usual practice. Actual blast vibration marginally exceeded the predicted and target vibration of 1mm/s; however actual frequency was in the range of natural resonance of buildings. Weather conditions were a north westerly wind (3360) @ 3.7m/s with no inversion present.	Written response provided to complainant.		
416 & 417	11/08/2014 1:09pm	AL & AN Werris Creek	Blast shook house disturbing the resident.	WCC shot #61-2014 (S16_B12-B13_RL350) was fired at 1:08pm on Monday 11th August 2014 was in compliance. Actual blast vibration was below target vibration of 1mm/s; however actual frequency was in the range of natural resonance of buildings. Weather conditions were a west north westerly wind (294o) @	Written response provided to complainant.		

# 7.0 GENERAL

Please feel free to ask any questions in relation to the information contained within this document during Item 7 of the meeting agenda.

# Appendix 1 – Dust Monitoring Results – PM10

#### Werris Creek Coal HVAS TEOM Dust Monitoring 2014-2015

Site	2.5TEOM92	Monthly	Annual	10TEOM92 Worris	EPL#30	Annual	HVP20	Monthly	Rolling	HVP98	EPL#28	Rolling	HVP1	Monthly	Rolling	HVP11	EPL#29	Rolling	HVT98	Monthly	Rolling	PM10	PM10	TSP
Date	Creek	Summary	Average	Creek	Summary	Average	Park	Summary	Average	Kyooma	Summary	Average	Escott	Summary	Average	Glenara	Summary	Average	Kyooma	Summary	Average	Limit	Average	Average
04-Apr-14							-	8.4	#DIV/0!	6	2.5	6.2	8	3.9	8.3	14	7.0	13.7	13	5.5	12.6	50	30	90
10-Apr-14		4.5			7.3		19	14.4	18.8	10.7	7.2	8.5	12.4	8.8	10.4	18	18.2	15.8	16.2	12.3	14.4	50	30	90
16-Apr-14		9.7	9.7		15.1	15.1	10	14.2	14.2	5 12	6.2	7.3	6 14	8.3	8.8	31	17.8	20.7	21	12.6	11.9	50 50	30	90
22-Apr-14 28-Apr-14		9.0			23.5		8	20.7	14.4	3	11.5	7.2	4	14.0	8.8	7	30.5	18.2	6	20.5	12.3	50	30	90
04-May-14		6.1			8.4		3	2.6	12.0	2	2.1	6.4	2	2.3	7.8	1	1.3	15.4	4.5	4.5	11.0	50	30	90
10-May-14		12.2	11.0		16.9	16.0	12	13.0	11.9	12	8.8	7.1	9	6.5	7.9	16	15.1	15.4	15	14.1	11.6	50	30	90
16-May-14		12.3			16.5		15	13.2	12.3	4	8.0	6.8	4	6.6	7.5	18	16.9	15.7	7.7	11.6	11.2	50	30	90
22-May-14		19.4			34.7		23	22.9	13.7	17	16.9	7.9	11	10.7	7.8	25	25.1	16.8	29	28.7	13.1	50	30	90
03-Jun-14		4.0			5.3		7	3.5	12.4	7	2.5	8.3	4	2.2	7.5	4	2.3	15.1	9	3.8	13.7	50	30	90
09-Jun-14		9.7	10.5		13.1	15.0	8	6.6	12.0	9	7.3	8.4	4	4.1	7.2	4	4.9	14.2	6	9.9	13.0	50	30	90
15-Jun-14		9.8			13.5		4	6.6	11.3	3	6.6	8.0	2	3.9	6.8	2	4.0	13.3	4	6.9	12.3	50	30	90
21-Jun-14		14.1			19.1		6	8.3	10.9	4	14.2	7.7	3	7.8	6.5	3	11.0	12.5	7	24.6	11.9	50	30	90
03-Jul-14		1.5			3.8		21	7.2	12.0	10	5.2	8.0	9	5.3	6.7	15	12.0	13.2	12	7.1	12.0	50	30	90
09-Jul-14		8.3	10.0		11.6	14.1	13	13.3	12.0	8	8.3	8.0	9	7.4	6.8	43	26.3	15.1	20	13.0	12.4	50	30	90
15-Jul-14		8.4			11.9		10	12.7	11.9	8	8.3	8.0	6	7.0	6.8	39	22.1	16.4	14	12.4	12.5	50	30	90
21-Jul-14		14.7			21.0		7	20.8	11.6	5	10.2	7.8	5	9.4	6.7	12	43.3	16.1	7	19.5	12.2	50	30	90
27-Jui-14 02-Aug-14		07			19		4 11	43	11.2	6	0.6	7.5	4	10	6.3	∠ 10	22	15.4	22	19	12.2	50	30	90
08-Aug-14		6.7	9.3		10.2	13.3	24	11.0	11.8	11	6.0	7.6	10	6.0	6.5	33	13.2	16.0	16	11.4	12.3	50	30	90
14-Aug-14		4.0			7.7		10	9.5	11.7	5	6.4	7.5	4	3.9	6.4	11	10.2	15.8	8	9.4	12.2	50	30	90
20-Aug-14		18.1			28.3		7	23.6	11.5	7	11.3	7.5	11	11.2	6.6	10	32.7	15.5	9	21.6	12.0	50	30	90
26-Aug-14 01-Sep-14									11.5			7.5			6.6			15.5 15.5			12.0	50 50	30 30	90 90
07-Sep-14								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
13-Sep-14			8.3			11.8		#DIV/0!	11.5		#DIV/0!	7.5		#DIV/0!	6.6		#DIV/0!	15.5		#DIV/0!	12.0	50	30	90
19-Sep-14								#NUM!	11.5		#NUM!	7.5		#NUM!	6.6		#NUM!	15.5		#NUM!	12.0	50	30	90
25-Sep-14 01-Oct-14								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
07-Oct-14								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
13-Oct-14			8.3			11.8		#DIV/0!	11.5		#DIV/0!	7.5		#DIV/0!	6.6		#DIV/0!	15.5		#DIV/0!	12.0	50	30	90
19-Oct-14								#NUM!	11.5		#NUM!	7.5		#NUM!	6.6		#NUM!	15.5		#NUM!	12.0	50	30	90
25-Oct-14 31-Oct-14								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
06-Nov-14								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
12-Nov-14			8.3			11.8		#DIV/0!	11.5		#DIV/0!	7.5		#DIV/0!	6.6		#DIV/0!	15.5		#DIV/0!	12.0	50	30	90
18-Nov-14								#NUM!	11.5		#NUM!	7.5		#NUM!	6.6		#NUM!	15.5		#NUM!	12.0	50	30	90
30-Nov-14								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
06-Dec-14								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
12-Dec-14			8.3			11.8		#DIV/0!	11.5		#DIV/0!	7.5		#DIV/0!	6.6		#DIV/0!	15.5		#DIV/0!	12.0	50	30	90
18-Dec-14								#NUM!	11.5		#NUM!	7.5		#NUM!	6.6		#NUM!	15.5		#NUM!	12.0	50	30	90
30-Dec-14								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
05-Jan-15								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
11-Jan-15			8.3			11.8		#DIV/0!	11.5		#DIV/0!	7.5		#DIV/0!	6.6		#DIV/0!	15.5		#DIV/0!	12.0	50	30	90
17-Jan-15								#NUM!	11.5		#NUM!	7.5		#NUM!	6.6		#NUM!	15.5		#NUM!	12.0	50 50	30	90
29-Jan-15								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
04-Feb-15								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
10-Feb-15			8.3			11.8		#DIV/0!	11.5		#DIV/0!	7.5		#DIV/0!	6.6		#DIV/0!	15.5		#DIV/0!	12.0	50	30	90
16-Feb-15 22-Feb-15								#NUM!	11.5		#NUM!	7.5		#NUM!	6.6		#NUM!	15.5 15.5		#NUM!	12.0	50 50	30	90 an
28-Feb-15	1							0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
06-Mar-15									11.5			7.5			6.6			15.5			12.0	50	30	90
12-Mar-15						44.0		0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
18-Mar-15 24-Mar-15			8.3			11.8		#DIV/0!	11.5		#DIV/0!	7.5		#DIV/0!	6.6		#DIV/0!	15.5		#DIV/0! #NUM	12.0	50 50	30	90 an
30-Mar-15								0.0	11.5		0.0	7.5		0.0	6.6		0.0	15.5		0.0	12.0	50	30	90
Min					1.9		2.6			0.6			1.0			1.3			1.9					
Max					13.3 34.7		9.6 23.6			6.9 16.9			5.9 14.0			12.9			10.6 28.7					
Capture							38%			39%			39%	5		39%	•		39%					

<u>Appendix 2 – Dust Monitoring Results – Deposited Dust</u>

	Deposited Dust - Werris Creek Coal Mine 2014-2015																			
	M (a/m	ONTH 2/month)		April 2014	May 2014	June 2014	July 2014	August 2014	September 2014	October 2014	November 2014	December 2014	January 2015	February 2015	March 2015		AVERAGE -	MINIMUM	MAXIMUM	AQGHGMP Criteria
	(3		Total Matter	2.6	2.0	3.8	1.9	3.8					20.0	2010	2010					
-	DG2	Cintra	Ash Content	0.6	1.0	2.5	1.1	2.5								2.8	2.9	1.9	3.8	4.0
			Total Matter	0.1	0.6	0.8	0.5	3.3												
-	DG5	Railway View	Ash Content	<0.1	0.3	0.4	0.3	1.3								1.1	0.6	0.1	3.3	4.0
			Total Matter	3.1	3.3	3.5	1.1	1.3												
EPL #1	DG20	Tonsley Park	Ash	2.4	1.8	2.7	0.8	0.9								2.5	2.5	1.1	3.5	4.0
			Total Matter	0.3	0.4	0.4	0.6	<0.1												
-	DG15	Plain View	Ash Content	0.1	0.2	<0.1	0.3	<0.1								0.4	0.5	0.3	0.6	4.0
	5.00		Total Matter	0.5	0.1	<0.1	0.2	0.2												4.0
-	DG9	Marengo	Ash Content	0.1	<0.1	<0.1	0.1	<0.1								0.3	0.4	0.1	0.5	4.0
		Mountain	Total Matter	1.9	0.8	1.5	0.6	3.5												
-	DG22	View	Ash Content	1.0	0.5	0.9	0.3	2.4								1.7	1.7	0.6	3.5	4.0
EDI #00	Date	0	Total Matter	0.3	0.4	1.1	0.8	0.5												4.0
EPL#29	DG11	Glenara	Ash Content	0.2	0.2	0.7	0.5	0.5								0.6	0.6	0.3	1.1	4.0
	5004		Total Matter	0.6	0.9	0.3	0.8	0.2												4.0
-	DG24	Hazeidene	Ash Content	0.4	0.7	0.2	0.5	0.1								0.6	0.6	0.2	0.9	4.0
	DC17	Weedler de	Total Matter	0.9	0.4	<1	0.5	0.7									0.5			4.0
-	DG17	woodiands	Ash Content	0.4	0.2	<0.1	0.3	0.4								0.6	0.5	0.4	0.9	4.0
	<b>D</b> 000	<b>T</b>	Total Matter	0.4	0.2	0.5	0.2	1.0									4.0		4.0	4.0
-	DG96	Talavera	Ash Content	<0.1	<0.1	0.2	<0.1	0.5								0.5	1.0	0.2	1.0	
EDI #28	DG98	Kyooma	Total Matter	0.2	0.1	0.2	0.1	<0.1								0.2	0.2	0.1	0.2	4.0
LI L#20	2030	Rybonna	Ash Content	0.1	0.1	<0.1	<0.1	<0.1								0.2	0.2	0.1	0.2	
_	DG14	Groonslands	Total Matter	0.4	0.8	0.5	0.3	0.4								0.5	0.0	0.2	0.0	4.0
_	0014	Greensiopes	Ash Content	0.1	0.5	0.2	0.1	0.1								0.5	0.0	0.5	0.0	4.0
_	DG62	Werris Creek	Total Matter	0.2	0.2	0.2	0.1	0.2								0.2	#DIV/01	0.1	0.2	4.0
-	0002	South	Ash Content	<0.1	<0.1	<0.1	<0.1	<0.1								0.2	#DIV/0:	0.1	0.2	4.0
EDI #20	DC92	Werris Creek	Total Matter	0.2	0.3	0.4	0.1	0.6								0.2	0.4	0.1	0.6	4.0
EFE#30	0032	Centre	Ash Content	<0.1	0.1	0.2	<0.1	0.1								0.5	0.4	0.1	0.0	4.0
	DG101	Westfall	Total Matter	0.7	1.0	0.8	0.7	0.5								07	0.7	0.5	1.0	4.0
_	DOINT	Westian	Ash Content	0.4	0.5	0.5	0.4	0.4								0.7	0.7	0.5	1.0	4.0
	DG102	West Street	Total Matter	0.6	0.3	0.5	2.5	1.6								11	0.8	0.3	2.5	4.0
-	DG103	West Street	Ash Content	0.3	0.2	0.3	1.1	1.2								1.1	0.8	0.5	2.5	4.0
_	DG1	Eccott	Total Matter	0.3	0.5	0.5	0.2	0.1								0.2	0.5	0.1	0.5	4.0
	531	Lacon	Ash Content	0.1	0.4	0.3	<0.1	<0.1								0.5	0.5	0.1	0.5	4.0
-	DG3	Furunderec	Total Matter	2.4	0.7	0.5	1.5	0.5								1.1	15	0.5	2.4	4.0
	533	Lurunderee	Ash Content	1.9	0.4	0.2	0.8	0.2									1.5	0.5	2.4	4.0
_	DG34	8 Kurrara	Total Matter	0.3	<0.1	22.1	3.8	0.8								6.8	16	0.3	22.1	4.0
	5034	Street	Ash Content	0.1	<0.1	14.6	2.7	0.5								0.0	1.0	0.5	22.1	4.0
	DG106	Villamagna	Total Matter	0.5	-	-	-	-	-	-	-	-	-	-	-	- 0.5 0.5	0.5	0.5	0.5	4.0
	- DG106 Villamagna	Ash Content	0.4	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	4.0	

Note: All results are in the form of Insoluble Matter (g/m2/month); NS - Not sampled BROWN - indicates sample is contaminated from a Non-Werris Creek Coal dust source YELLOW - sample contaminated with excessive organic matter (>50%) from non-mining source (i.e bird droppings and insects)

RED - result above 4g/m2/month

# Appendix 3 – Train Dust Deposition Monitoring

						De	oosi	ted	Dus	st - C	Quir	indi	Tra	ins :	2014	<b>1-20</b>	15								
		DDW30			DDW20				DDW13			DDE13			DDE20				DDE30				line		
	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Guide
April 2014	0.6	10%	20%	70%	0.8	10%	30%	60%	0.7	30%	30%	40%	0.2	10%	40%	50%	0.6	20%	20%	60%	1.1	10%	60%	30%	4.0
May 2014	1.0	10%	20%	65%	0.8	15%	25%	60%	0.7	20%	10%	70%	0.4	15%	25%	60%	0.6	10%	<1%	90%	2.0	<1%	20%	10%	4.0
June 2014	2.2	15%	35%	40%	1.5	15%	35%	40%	1.0	10%	40%	40%	1.9	10%	30%	60%	1.5	10%	30%	60%	2.7	10%	40%	30%	4.0
July 2014	1.6	15%	10%	75%	-	-	-	-	0.8	10%	5%	85%	0.9	5%	20%	75%	0.6	5%	25%	65%	0.8	5%	25%	70%	4.0
August 2014	0.4	10%	30%	60%	1.2	10%	35%	55%	1.2	40%	15%	45%	1.3	10%	25%	65%	3.2	10%	<1%	90%	0.7	10%	40%	50%	4.0
September 2014																									4.0
October 2014																									4.0
November 2014																									4.0
December 2014																									4.0
January 2015																									4.0
February 2015																									4.0
March 2015																									4.0
ANNUAL AVERAGE	NNUAL AVERAGE 1.2 1.1					0	.9			0	.9			1	.3			1	.5		4.0				
Average Coal %		12	.0%			12.	5%			22	.0%		10.0%					11.	.0%			8.	8%		-
Average Coal g/m2		0.	14			0.	0.13			0.19			0.09			0.14				0.13				-	
MINIMUM		0.4 0.8			0.7 0.2					0.6				0.7				-							
MAXIMUM	(IMUM 2.2 1.5				1	.2			1	.9		3.2				2.7				4.0					

Note: All results are in the form of Insoluble Matter (g/m2/month)

# Appendix 4 – Noise Monitoring Results



3 June 2014

Ref: 04035/5202

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

#### RE: MAY 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Wednesday 21st May, 2014 as required by the Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

#### Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

			Table 1						
		WCC	Attended Noise Monitoring I	Program					
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements					
А	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ					
		R7	83 Wadwells Lane						
D	15 minutool	R8*	Almawillee	Private Agreement					
В	15 minutes	R9	Gedhurst	i indie Agreement					
		R22	Mountain View						
0	1E minute e1	R10*	Meadholme						
J	15 minutes	R11*	Glenara	Privale Agreement					
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290					
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290					
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290					
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ					
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement					
I	60 minutes <sup>2</sup>	R57	Kurrara Street@	60 minutes as per EPL 12290					
J	15 minutes <sup>1</sup>		Coronation Avenue@	PA10_0059 Private Property outside NMZ					
К	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement					
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ					

Notes accompanying the table are on the following page
\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### **Monitoring Equipment**

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

## **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Wednesday 21<sup>st</sup> May 2014 had the 5600 excavator and one 1900 excavator in Strip 13 centre at RL270m, 3600 excavator in Strip 17 west at RL370m and one 1900 excavator in Strip 16 west at RL370m. The Strip 13 overburden truck fleets were running to the in pit dump at RL390m on day and night shift with the Strip 16/17 truck fleets running to the Top Dump at RL445m on day shift and to the in pit dump on night shift. There were no production delays either day or night shift. The crushing plant and train load out operated to 3:30am with no trains loaded.

#### Noise Compliance Assessment

The results of the noise measurements are shown below in **Tables 2** and **3**.



Table 2										
	WCC Noise Monitoring Results – 21 May 2014 (Day)									
		dB(A),	Criterion	Inversion	Wind					
Location	Time	Leq	dB(A) Leq	<sup>o</sup> C/100m	speed	Identified Noise Sources				
					(m/s),dir <sup>o</sup>					
A R5 Rosehill	8:57 am	38	35	n/a	0.6,172	Traffic (35), birds (35), WCC inaudible				
B R7 83 Wadwells	9:18 am	40	40*	n/a	1.0,170	Birds (39), traffic (30), WCC inaudible				
Lane, R8 Almawillee,										
R9Gedhurst, R22										
Mountain View										
C R10 Meadholme/	9:39 am	34	40*	n/a	0.6,168	Traffic (31), birds (31), WCC inaudible				
R11 Glenara										
D R24 Hazeldene	10:01 am	34	37	n/a	1.7,199	Traffic (32), birds (30), WCC inaudible				
E R12 Railway Cottage	11:43 am	36	38	n/a	1.0,207	Traffic (36), birds (26), WCC inaudible				
F R96 Talavera	4:32 pm	42	38	n/a	3.5,160	Birds (41), traffic (34), WCC inaudible				
<b>G</b> R97	11:15 am	27	35	n/a	3.4,202	Traffic (25), birds (21), faintly audible				
H R98 Kyooma	4:07 pm	40	40*	n/a	3.8,167	Traffic (37), birds (36), WCC inaudible				
I R57 Kurrara St	2:33 pm	49	35	n/a	3.6,163	Traffic (49), birds (37), WCC faintly audible				
J R57 Coronation Ave	3:39 pm	54	35	n/a	4.1,167	Traffic (54), birds (32), WCC inaudible				
K R21 Alco Park	2:12 pm	35	40*	n/a	2.4,159	Traffic (34), bulldozer (28), WCC faintly audible				
L R103	1:50 pm	41	35	n/a	2.9,130	Bulldozer (38), traffic (38), WCC faintly audible				

Private Agreement in place – see Appendix II.

Table 3										
		WCC N	loise Moni	toring Results	– 21 May 2014 (Evening	ı/Night)				
		dB(A),	dB(A),	Criterion	Inversion <sup>o</sup> C/100m,					
Location	Time	L1	Leq	dB(A) Leq	Wind speed	Identified Noise Sources				
		(1min) <sup>1</sup>			(m/s),dir <sup>o</sup>					
A R5 Rosehill	9:11 pm	n/a	23	35	1.6,135,+8.7	Traffic (23), WCC inaudible				
B R7 83 Wadwells Lane,	9:30 pm	n/a	28	40*	1.4,164,+8.5	Traffic (28), WCC faintly audible				
R8 Almawillee,										
R9Gedhurst, R22										
Mountain View										
C R10 Meadholme/ R11	9:50 pm	n/a	38	40*	1.4,167,+8.5	Traffic (38), WCC faintly audible				
Glenara										
D R24 Hazeldene	10:10 pm	32	35	37	0.8,,106,+9.4	Traffic (34), WCC (26)				
E R12 Railway Cottage	8:04 pm	n/a	37	38	1.9,148,+9.0	Traffic (37), WCC inaudible				
F R96 Talavera	10:20 pm	23	26	37	0.5,124,+9.5	Traffic (24), WCC (20)				
<b>G</b> R97	7:38 pm	n/a	26	35	2.0,154,+8.1	Traffic (26), WCC inaudible				
H R98 Kyooma	9:54 pm	31	30	40*	1.4,155,+8.1	WCC (27), traffic (27)				
I R57 Kurrara St	8:20 pm	27	40	35	2.0,147,+9.1	Traffic (40), WCC (24)				
J R57 Coronation Ave	9:25 pm	n/a	42	35	1.4,164,+8.5	Trains (40), traffic (37), WCC inaudible				
K R21 Alco Park	7:58 pm	30	36	40*	1.8,138,+8.7	Traffic (34), trains (29), WCC (26)				
L R103	7:34 pm	27	34	35	2.1,148,+7.9	Traffic (34), WCC (24)				

1. L1 (1 min) from mine noise only \* Private Agreement in place – see Appendix II.

The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.





Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.





We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Cass

Ross Hodge Acoustical Consultant

Review:

Neil Port

Neil Pennington Acoustical Consultant



SPECTRUM COUSTICS

Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Location		Day	Evening/Night	Night	Long Term	Acquisition
	Location	L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

## LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

#### Table 21: Properties with Private Agreements Noise Criteria

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R7	83 Wadwells Lane	40	45
R8	"Almawillee"	40	45
R9	"Gedhurst"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R22	"Mountain View"	40	45
R98	"Kyooma"	40	45



# Appendix III

Plant Sound Power Levels

Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116.7	118	24/4/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (attenuated)	614	117.7	117.5	119	24/4/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (attenuated)	609	117.7	117.4	119	11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (attenuated)	612	117.7	117.8	120	24/4/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (attenuated)	613	117.7	117.9		24/4/14
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 785C (attenuated)	624	117.7	118.1		24/4/14
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	115		24/4/14
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13



Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13
Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Water Cart (Cat 773D)	869	113	117.5	119	24/4/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14
Water pump (Dam 4)			106		24/4/14
Evaporation fan (Dam 4)			105		24/4/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.





1 July 2014

Ref: 04035/5261

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

## RE: JUNE 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Tuesday 17<sup>th</sup> June, 2014 as required by the Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

## Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

Table 1										
WCC Attended Noise Monitoring Program										
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements						
А	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ						
		R7*	83 Wadwells Lane							
D	15 minutool	R8*	Almawillee	Private Agreement						
В	15 minutes	R9*	Gedhurst	i indie Agreement						
		R22*	Mountain View							
0	15 minutes <sup>1</sup>	R10*	Meadholme	Drivete Agreement						
J		R11*	Glenara	Privale Agreement						
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290						
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290						
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290						
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ						
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement						
I	60 minutes <sup>2</sup>	R57	Kurrara Street@	60 minutes as per EPL 12290						
J	15 minutes <sup>1</sup>		Coronation Avenue@	PA10_0059 Private Property outside NMZ						
К	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement						
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ						

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### **Monitoring Equipment**

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



## **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Tuesday 17<sup>th</sup> June 2014 had the 5600 excavator and one 1900 excavator in Strip 13 west at RL270m; 3600 excavator and one 1900 excavator in Strip 13 centre at RL260m. The Strip 13 overburden truck fleets were either running to the in pit dump at RL360m or out of pit RL410 dump on day and night shift. There were no production delays either day or night shift. The crushing plant and train load out operated to 3:30am with no trains loaded.

## Noise Compliance Assessment

The results of the noise measurements are shown below in Tables 2 and 3.

Table 2											
	WCC Noise Monitoring Results – 17 June 2014 (Day)										
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Inversion <sup>o</sup> C/100m	Wind speed (m/s),dir <sup>o</sup>	Identified Noise Sources					
A R5 Rosehill	1:43 pm	33	35	n/a	3.4,139	Traffic (31), birds (27), WCC inaudible					
B R7 83 Wadwells Lane, R8 Almawillee, R9Gedhurst, R22 Mountain View	2:04 pm	42	40*	n/a	2.4,151	Birds (42), traffic (29), WCC inaudible					
C R10 Meadholme/ R11 Glenara	2:28 pm	35	40*	n/a	2.8,164	Birds (35), traffic (23), WCC inaudible					
D R24 Hazeldene	2:50 pm	38	37	n/a	2.7,169	Birds (37), traffic (31), WCC inaudible					
E R12 Railway Cottage	4:26 pm	40	38	n/a	0.4,164	Birds (38), traffic (36), WCC inaudible					
F R96 Talavera	4:18 pm	41	38	n/a	0.6,167	Birds (41), traffic (30), WCC inaudible					
<b>G</b> R97	4:00 pm	30	35	n/a	1.7,163	Birds (29), traffic (22), WCC faintly audible					
H R98 Kyooma	3:56 pm	30	40*	n/a	1.7,163	Birds (29), traffic (23), WCC faintly audible					
I R57 Kurrara St	2:24 pm	50	35	n/a	2.7,168	Traffic (50), trains (28), birds (25), WCC inaudible					
J R57 Coronation Ave	3:30 pm	50	35	n/a	2.9,167	Traffic (50), trains (31), birds (28), WCC inaudible					
K R21 Alco Park	2:03 pm	33	40*	n/a	2.4,151	Traffic (31), WCC (29)					
L R103	1:43 pm	36	35	n/a	3.4,139	Trains (35), birds (28), WCC (25)					

Private Agreement in place – see Appendix II.

	dP(A) dP(A) Criterion Inversion 0C(100m											
		dB(A),	dB(A),	Criterion	Inversion <sup>o</sup> C/100m,							
Location	lime	L1	Leq	dB(A) Leq	Wind speed	Identified Noise Sources						
		(1min) <sup>1</sup>			(m/s),dir <sup>o</sup>							
A R5 Rosehill	6:45 pm	n/a	33	35	+8.8,1.6,344	Traffic (33), WCC inaudible						
B R7 83 Wadwells Lane,	7:06 pm	31	35	40*	+7.4,0.9,341	Traffic (34), WCC (27)						
R8 Almawillee,												
R9Gedhurst, R22												
Mountain View												
C R10 Meadholme/ R11	7:26 pm	n/a	35	40*	+8.6,0.9,337	Traffic (35), WCC inaudible						
Glenara												
D R24 Hazeldene	7:46 pm	34	47	37	+8.4,0.9,330	Traffic (47), WCC (30)						
E R12 Railway Cottage	9:31 pm	28	37	38	+9.8,0.9,336	Traffic (37), WCC (25)						
F R96 Talavera	9:17 pm	30	32	37	+9.6,1.0,334	Traffic (31), WCC (26)						
<b>G</b> R97	8:57 pm	26	27	35	+8.4,0.8,328	Traffic (25), WCC (22)						
H R98 Kyooma	8:53 pm	34	31	40*	+8.4,0.8,328	WCC (29), traffic (26)						
I R57 Kurrara St	7:27 pm	n/a	52	35	+8.6,0.9,333	Trains (52), traffic (36), WCC inaudible						
J R57 Coronation Ave	8:32 pm	n/a	52	35	+7.6,0.9,333	Trains (52), traffic (34), WCC inaudible						
K R21 Alco Park	7:06 pm	n/a	45	40*	+7.4,0.9,341	Trains (43), traffic (40), WCC inaudible						
L R103	6:46 pm	n/a	39	35	+8.8,1.6,344	Trains (37), traffic (34), WCC inaudible						

1. L1 (1 min) from mine noise only \* Private Agreement in place – see Appendix II.





The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.

Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-





minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Cass

Ross Hodge Acoustical Consultant

Review:

Neil Port

Neil Pennington Acoustical Consultant



SPECTRUM COUSTICS

Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Location		Day	Evening/Night	Night	Long Term	Acquisition
	Location	L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

## LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

#### Table 21: Properties with Private Agreements Noise Criteria

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R7	83 Wadwells Lane	40	45
R8	"Almawillee"	40	45
R9	"Gedhurst"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R22	"Mountain View"	40	45
R98	"Kyooma"	40	45



# Appendix III

Plant Sound Power Levels

Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116.7	118	24/4/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (attenuated)	614	117.7	117.5	119	24/4/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (attenuated)	609	117.7	117.4	119	11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (attenuated)	612	117.7	117.8	120	24/4/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (attenuated)	613	117.7	117.9		24/4/14
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 785C (attenuated)	624	117.7	118.1		24/4/14
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	115		24/4/14
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13



Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13
Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Water Cart (Cat 773D)	869	113	117.5	119	24/4/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14
Water pump (Dam 4)			106		24/4/14
Evaporation fan (Dam 4)			105		24/4/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.



17 July 2014

Ref: 04035/5272

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

## RE: JULY 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Tuesday 8<sup>th</sup> July, 2014 as required by the Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

## Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

Table 1									
WCC Attended Noise Monitoring Program									
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements					
А	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ					
		R7*	83 Wadwells Lane						
D	15 minutool	R8*	Almawillee	Private Agreement					
В	15 minutes	R9*	Gedhurst	i indie Agreement					
		R22*	Mountain View						
0	15 minute e1	R10*	Meadholme						
J	15 minutes	R11*	Glenara	Private Agreement					
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290					
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290					
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290					
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ					
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement					
I	60 minutes <sup>2</sup>	R57	Kurrara Street@	60 minutes as per EPL 12290					
J	15 minutes <sup>1</sup>		Coronation Avenue@	PA10_0059 Private Property outside NMZ					
К	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement					
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ					

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening or night period;
- For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 Note 2: minutes (per location) during the evening or night period.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- 2. Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



July 2014

## **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Tuesday 8<sup>th</sup> July 2014 had the 5600 excavator and two 1900 excavators in Strip 15 at RL370m and the 3600 excavator in Strip 13 west at RL290m. The Strip 13 overburden truck fleet was running to the in pit dump at RL360m while the Strip 15 overburden truck fleets were running to either the out of pit RL410 or RL430 dumps on day and night shift. There were no production delays either day or night shift but the OCE modified the night dump location from RL430m to RL410m to manage noise levels to Quipolly after midnight. The crushing plant and train load out operated to 2:30am with no trains loaded.

## Noise Compliance Assessment

#### The results of the noise measurements are shown below in Tables 2 and 3.

Table 2									
WCC Noise Monitoring Results – 8 July 2014 (Day)									
dB(A), Criterion Inversion Wind speed									
Location	Time	Leq	dB(A) Leq	<sup>o</sup> C/100m	(m/s),dir <sup>o</sup>	Identified Noise Sources			
A R5 Rosehill	1:08 pm	33	35	n/a	1.7,297	Traffic (30), birds (30), WCC inaudible			
B R7 83 Wadwells	1:30 pm	44	40*	n/a	1.9,313	Birds (44), WCC faintly audible			
Lane, R8 Almawillee,									
R9Gedhurst, R22									
Mountain View									
C R10 Meadholme/	1:52 pm	44	40*	n/a	1.5,300	Birds (44), traffic (27), WCC inaudible			
R11 Glenara									
D R24 Hazeldene	2:12 pm	36	37	n/a	1.3,317	Birds (35), traffic (29), WCC (23)			
E R12 Railway Cottage	3:49 pm	44	38	n/a	2.4,308	Traffic (44), birds (28), WCC inaudible			
F R96 Talavera	3:34 pm	31	38	n/a	2.1,319	Birds (29), domestic (25), traffic (24), WCC inaudible			
<b>G</b> R97	3:23 pm	27	35	n/a	1.3,329	Planes (25), WCC (22)			
H R98 Kyooma	3:11 pm	30	40*	n/a	1.1,342	Birds (27), traffic (24), wind (24), WCC inaudible			
I R57 Kurrara St	1:43 pm	44	35	n/a	1.5,297	Traffic (43), trains (34), birds (32), WCC inaudible			
J R57 Coronation Ave	2:47 pm	52	35	n/a	1.2,328	Traffic (52), birds (30), domestic (28), WCC inaudible			
K R21 Alco Park	1:22 pm	42	40*	n/a	1.8,302	Domestic power tools (41), traffic (35), WCC inaudible			
L R103	1:03 pm	35	35	n/a	1.8,305	Trains (34), traffic (28), WCC inaudible			

\* Private Agreement in place – see Appendix II.

Table 3										
WCC Noise Monitoring Results – 8 July 2014 (Evening/Night)										
		dB(A),	dB(A),	Criterion	Inversion					
Location	Time	L1	Leq	dB(A) Leq	<sup>o</sup> C/100m,	Identified Noise Sources				
		(1min) <sup>1</sup>			Wind speed					
					(m/s),dir <sup>o</sup>					
A R5 Rosehill	6:30 pm	n/a	35	35	+8.8,1.3,344	Traffic (35), WCC inaudible				
B R7 83 Wadwells	6:50 pm	31	36	40*	+10.0,1.3,332	Traffic (35), WCC (28)				
Lane, R8 Almawillee,										
R9Gedhurst, R22										
Mountain View										
C R10 Meadholme/	7:10 pm	n/a	33	40*	+10.3,0.5,50	Traffic (31), WCC (28)				
R11 Glenara										
D R24 Hazeldene	7:33 pm	34	51	37	+10.2,0.5,311	Traffic (51), WCC (27)				
E R12 Railway	9:12 pm	28	45	38	+10.4,1.4,328	Traffic (45), WCC (33)				
Cottage										
F R96 Talavera	9:07 pm	30	33	37	+10.5,1.4,324	Traffic (31), WCC (28)				
<b>G</b> R97	8:46 pm	26	25	35	+10.7,1.7,302	Trains (25), WCC inaudible				
H R98 Kyooma	8:40 pm	34	25	40*	+10.5,1.3,293	Traffic (23), WCC (21)				
I R57 Kurrara St	7:11 pm	n/a	44	35	+10.4,0.5,40	Traffic (42), trains (40), WCC inaudible				
J R57 Coronation Ave	8:15 pm	n/a	48	35	+10.0,0.5,303	Traffic (48), dogs (31), trains (30), WCC inaudible				
K R21 Alco Park	6:50 pm	n/a	51	40*	+10.0,1.3,332	Traffic (51), trains (38), WCC inaudible				
L R103	6:29 pm	n/a	42	35	+8.8,1.3,344	Traffic (41), trains (36), WCC inaudible				

1. L1 (1 min) from mine noise only \* Private Agreement in place – see Appendix II.





The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.

Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-





minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Cass

Ross Hodge Acoustical Consultant

Review:

Neil Port

Neil Pennington Acoustical Consultant



SPECTRUM COUSTICS

Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Location		Day	Evening/Night	Night	Long Term	Acquisition
		L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

## LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

#### Table 21: Properties with Private Agreements Noise Criteria

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R7	83 Wadwells Lane	40	45
R8	"Almawillee"	40	45
R9	"Gedhurst"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R22	"Mountain View"	40	45
R98	"Kyooma"	40	45



# Appendix III

Plant Sound Power Levels

Plant Item	NMP SWL	Actual	Actual	Date Measured	
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Bate medeal ea
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116.7	118	24/4/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (attenuated)	614	117.7	117.5	119	24/4/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (attenuated)	609	117.7	117.4	119	11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (attenuated)	612	117.7	117.8	120	24/4/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (attenuated)	613	117.7	117.9		24/4/14
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 785C (attenuated)	624	117.7	118.1		24/4/14
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	115		24/4/14
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13



Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	2400
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13
Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Water Cart (Cat 773D)	869	113	117.5	119	24/4/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14
Water pump (Dam 4)			106		24/4/14
Evaporation fan (Dam 4)			105		24/4/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.



13 August 2014

Ref: 04035/5330

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

## RE: AUGUST 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Thursday 7<sup>th</sup> August, 2014 as required by the Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

## Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

Table 1									
WCC Attended Noise Monitoring Program									
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements					
А	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ					
		R7*	83 Wadwells Lane						
D	15 minutes1	R8*	Almawillee	Private Agreement					
В	15 minutes	R9*	Gedhurst	i indie Agreement					
		R22*	Mountain View						
0	1 <b>5</b> minute e1	R10*	Meadholme	Drivete Assessment					
U	15 minutes <sup>1</sup>	R11*	Glenara	Privale Agreement					
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290					
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290					
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290					
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ					
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement					
I	60 minutes <sup>2</sup>	R57	Kurrara Street@	60 minutes as per EPL 12290					
J	15 minutes <sup>1</sup>		Coronation Avenue@	PA10_0059 Private Property outside NMZ					
K	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement					
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ					

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### **Monitoring Equipment**

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.



## **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where possible the significant audible noise sources from the mine are indicated in notes associated with the tables.

Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation.

#### WCC Operations

WCC operations on Thursday 7<sup>th</sup> August 2014 had the 5600 excavator in Strip 15 west at RL350m and the 3600 and 1900 excavators in Strip 13 centre at RL270m. The Strip 13 overburden truck fleet was running to the in pit dump at RL360m while the Strip 15 overburden truck fleet were running to either the out of pit RL430 dumps on day and night shift. There were no production delays either day or night shift. The crushing plant and train load out operated to 2:30am with no trains loaded.

## Noise Compliance Assessment

#### The results of the noise measurements are shown below in Tables 2 and 3.

Table 2										
WCC Noise Monitoring Results – 7 August 2014 (Day)										
	dB(A), Criterion Inversion Wind speed									
Location	Time	Leq	dB(A) Leq	<sup>o</sup> C/100m	(m/s),dir <sup>o</sup>	Identified Noise Sources				
A R5 Rosehill	1:22 pm	45	35	n/a	1.1,323	Traffic (45), birds (29), WCC inaudible				
B R7 83 Wadwells	1:42 pm	43	40*	n/a	0.9,187	Birds (43), traffic (26), WCC (19)				
Lane, R8 Almawillee,										
R9Gedhurst, R22										
Mountain View										
C R10 Meadholme/	2:02 pm	38	40*	n/a	1.3,311	Traffic (35), birds (35), WCC (20)				
R11 Glenara										
D R24 Hazeldene	2:23 pm	34	37	n/a	1.3,297	Traffic (33), birds (27), WCC inaudible				
E R12 Railway Cottage	4:06 pm	40	38	n/a	1.6,235	Traffic (40), birds (29), WCC inaudible				
F R96 Talavera	3:58 pm	37	38	n/a	1.6,235	Birds (36), traffic (29), WCC inaudible				
<b>G</b> R97	3:39 pm	37	35	n/a	2.5,233	Birds (37), traffic (25), WCC faintly audible				
H R98 Kyooma	3:36 pm	34	40*	n/a	1.7,260	Dogs (31), birds (29), traffic (27), WCC (21)				
I R57 Kurrara St	2:08 pm	45	35	n/a	1.4,297	Traffic (44), trains (35), birds (30), WCC faintly audible				
J R57 Coronation Ave	3:13 pm	52	35	n/a	1.0,339	Traffic (52), train (27), birds (26), WCC inaudible				
K R21 Alco Park	1:45 pm	53	40*	n/a	0.9,187	Traffic (53), WCC (27), birds (26)				
L R103	1:26 pm	30	35	n/a	1.0,306	Traffic (29), birds (23), WCC inaudible				

\* Private Agreement in place – see Appendix II.

Table 3										
WCC Noise Monitoring Results – 7 August 2014 (Evening/Night)										
Location	Time	dB(A), L1	dB(A), Leq	Criterion dB(A) Leq	Inversion <sup>o</sup> C/100m,	Identified Noise Sources				
		(1min) <sup>1</sup>			Wind speed					
					(m/s),dir <sup>o</sup>					
A R5 Rosehill	7:24 pm	n/a	35	35	+9.8,1.2,146	Traffic (34), train (27), WCC inaudible				
B R7 83 Wadwells Lane, R8 Almawillee, R9Gedhurst, R22 Mountain View	7:43 pm	n/a	34	40*	+9.7,0.9,106	Traffic (34), WCC inaudible				
C R10 Meadholme/ R11 Glenara	8:03 pm	n/a	37	40*	+10.2,0.9,97	Traffic (37), train (26), WCC inaudible				
D R24 Hazeldene	8:22 pm	29	44	37	+9.8,1.4,181	Traffic (44), WCC (25)				
E R12 Railway Cottage	9:59 pm	n/a	38	38	+10.3,2.3,172	Traffic (38), WCC inaudible				
F R96 Talavera	9:58 pm	29	28	37	+10.3,2.3,172	Traffic (26), WCC (24)				
<b>G</b> R97	9:34 pm	n/a	21	35	+9.7,1.9,183	Traffic (21), WCC inaudible				
H R98 Kyooma	9:37 pm	n/a	25	40*	+9.7,2.1,182	Traffic (25), WCC inaudible				
I R57 Kurrara St	8:07 pm	n/a	52	35	+9.9,1.2,161	Traffic (51), trains (46), WCC inaudible				
J R57 Coronation Ave	9:12 pm	n/a	39	35	+9.6,1.9,177	Traffic (37), train (33), dog (29), WCC inaudible				
K R21 Alco Park	7:44 pm	34	45	40*	+9.7,0.9,106	Traffic (44), train (35), WCC (30)				
L R103	7:25 pm	n/a	45	35	+9.8,1.2,142	Train (45), traffic (31), WCC inaudible				

1. L1 (1 min) from mine noise only \* Private Agreement in place – see Appendix II.



The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the measured noise levels did not exceed the relevant noise criteria at any location during any monitoring period.

The noise from WCC was inaudible at most locations and times. At Alco Park during the evening/night measurement noise from a dozer was the most significant contributor to the mine noise component.

At other times and locations when mine noise was audible it was as general mine hum with no readily identifiable noise sources.

Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

## Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.



For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Ross Hodge Acoustical Consultant

Review:

Neil Perit

Neil Pennington Acoustical Consultant



SPECTRUM COUSTICS

Appendix I



Attended Noise Monitoring Locations




### Appendix II

Noise Limits

	Location	Day	Evening/Night	Night	Long Term	Acquisition
	Location	L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All c	other privately-owned land	35	35	45	35	40

#### LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

#### Table 21: Properties with Private Agreements Noise Criteria

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R7	83 Wadwells Lane	40	45
R8	"Almawillee"	40	45
R9	"Gedhurst"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R22	"Mountain View"	40	45
R98	"Kyooma"	40	45



## Appendix III

Plant Sound Power Levels

Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116.7	118	24/4/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (attenuated)	614	117.7	117.5	119	24/4/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (attenuated)	609	117.7	117.4	119	11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (attenuated)	612	117.7	117.8	120	24/4/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (attenuated)	613	117.7	117.9		24/4/14
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 785C (attenuated)	624	117.7	118.1		24/4/14
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	115		24/4/14
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13



Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	2400
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13
Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Water Cart (Cat 773D)	869	113	117.5	119	24/4/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14
Water pump (Dam 4)			106		24/4/14
Evaporation fan (Dam 4)			105		24/4/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.

## Appendix 5 – Blasting Monitoring Results

#### Werris Creek Coal Blast Monitoring 2014-2015

				WC South												WERRIS CREEK CO	DAL BLASTING RES	SULTS										
Shot number	Date fired	Time Fired	Location	Predicted	Type	Olana	D44		- 000	Weede O	Oth Doo	Warda O	Mid Doo	COMPI		APTO Outwart	RIL 2014	TEMPEDATUDE			505	OUTNOV	0.00	FUNE				
				vibration K50		Giena Vib (mm/o)		Kyoom	OB (4P)	Werris Cr		Werris Ci		Vib (mm/o)		ARTC Cuivert	Vib (mm/o)	IEMPERATURE	Direction	IND m/o	FRE		T Un	PUME	DUST		Duot/Euroo	Other
2014.21	1/04/2014	15:09	E12 7 10 Coool TER Dort 1	0.4	TCD	VID (IIIII/S)	101.0	1 71	OF (UB)	0.75	07 (UB)	0.49	71.5	10.00	120.0	VID (IIIII/S) OF (UB)	VID (IIIII/S)	2.7	272	2.0	12.7	12.0	12.4	0105	Road	2	Dust/Fullie	Outer
2014-21	4/04/2014	13:14	Bomp 14	0.4	ID	0.23	09.5	0.27	07.5	0.75	06.0	0.40	101.0	10.00	120.0	Not Monitored	50.00	-2.1	200	2.0	13.7	12.0	13.4	0	OK	0	0	0
2014-22	8/04/2014	13:08	S15 10.12 350	0.5	IB	0.12	104 7	1.22	105.3	0.22	109.3	0.10	111.0	10.00	120.0	Not Monitored	50.00	-3.0	283	0.5		12.9		0	OK	2	0	0
2014-24	16/04/2014	15:13	S13 7-10 Gcoal TSB Part 2	0.7	TSB	0.10	101.5	1.70	108.8	0.83	109.0	0.45	103.1	10.00	120.0	Not Monitored	50.00	-2.4	152	6.4	9.8	9.8	9.8	0	Road	2	1	0
2014-25	17/04/2014	10:13	S15 8-10	0.5	IB	0.10	102.6	0.92	101.6	0.28	98.9	0.20	97.2	10.00	120.0	Not Monitored	50.00	-3.2	229	1.5	10.5	10.5		0	OK	0	0	0
TOTALS	APRIL 2014	# BLAST	5	TARGET	AVERAGE	0.17	101.8	1.18	102.0	0.46	101.4	0.34	97.1	5.00	115.0						1			I		I	-	
TOTALS	APRIL 2014	#>0.5mm	4	<1mm/s	HIGHEST	0.25	104.7	1.71	108.8	0.83	109.3	0.48	111.9	10.00	120.0	t												
TOTALS	ANNUAL	# BLAST	5	<115dBL	AVERAGE	0.17	101.8	1.18	102.0	0.46	101.4	0.34	97.1	5.00	115.0	Ī												
TOTALS	ANNUAL	MAX #	15	% >115dB(L	) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%													
				WC South												WERRIS CREEK CO	DAL BLASTING RES	SULTS										
Shot number	Date fired	Time Fired	Location	Predicted	Туре	Olana	D44		- 000	Warda O		Warda O	Mid Doo	0040		M.	AY 2014	TEMPERATURE			505	OUTNOV	0.00	FUNE	<u> </u>			
				vibration K50		Giena Vib (mm/o)		Kyoom	OR (4P)	Werris Cr		Werris Ci		Vib (mm/o)		Vib (mm/s) OD (dD)	Vib (mm/o)	IEMPERATURE	Direction	IND m/o	FRE		T LI-7	PUME	DUST		Duot/Euroo	Other
2014.26	E/0E/2014	0:05	C12 D10 D17 DI 264 TCD#1	0.6	IR	VID (mm/s)	07 (dB)	2 15	100 F	0.71	OP (dB)	VID (mm/s)	02 2	10.00	120.0	Vib (mm/s) OP (dB)	VID (mm/s)	Inversion oc/100m	Direction	m/s	L HZ	V HZ	1 HZ	10	OK	OP/VID	Dust/Fume	Other
2014-20	7/05/2014	9.05	S16 B0.B12 PI 370	0.6	OB	0.20	97.4	2.13	04.8	0.71	90.0	0.34	92.3	10.00	120.0	Not Monitored	50.00	-2.7	107	2.5	15.0	13.2	14.2	28	OK	0	0	0
2014-27	9/05/2014	12:08	S17 Blackseam	0.0	OB	0.16	97.6	0.02	93.6	0.20	95.5	0.13	92.4	10.00	120.0	Not Monitored	50.00	-3.2	134	1.7	11.5	11.2	11.2	3B	OK	0	0	0
2014-20	14/05/2014	15:08	S13 B10-B17 BI 264#2	0.3	IB	0.10	97.4	0.96	97.0	0.34	91.3	0.16	91.3	10.00	120.0	Not Monitored	50.00	-2.3	62	2.6	9.5	9.8	9.8	0	OK	0	0	0
2014-30	16/05/2014	15:15	S13 B7-B10 Gseam	0.9	IB	0.29	93.1	2.42	96.4	0.85	88.5	0.56	85.1	10.00	120.0	Not Monitored	50.00	-1.7	158	2.6	10.0.16.9	9.5	9.8.16.4	0	OK	1	0	0
2014-31	22/05/2014	11:13	S13 B11-B12 Gseam	0.8	IB	0.28	110.5	1.73	109.4	0.68	98.9	0.44	97.4	10.00	120.0	Not Monitored	50.00	-2.3	309	1.9	11.7.16.1	12.7	-	0	Road	1	0	0
2014-32	23/05/2014	15:09	S13 B10-B11 Gseam	0.5	IB	0.10	95.7	0.31	96.3	0.13	96.0	0.12	92.8	10.00	120.0	Not Monitored	50.00	-1.8	358	2.9		-		0	OK	0	0	0
2014-33	29/05/2014	15:13	S13_11-16_264 Presplit + S13_B10-B17_RL264#3	0.5	PS/IB	0.29	96.7	1.60	94.1	0.55	93.7	0.31	90.6	10.00	120.0	Not Monitored	50.00	-2.0	221	1.4	15.4	10.0,15.1	15.6	3B	Road	2	0	0
2014-34	30/05/2014	13:07	S13_16-21_264 Presplit	NA	PS	0.25	101.4	0.73	87.7	0.25	95.8	0.20	88.9	10.00	120.0	Not Monitored	50.00	-2.8	280	2.5	2.9	2.9	3.2	0	OK	0	0	0
TOTALS	MAY 2013	# BLAST	9	TARGET	AVERAGE	0.21	98.8	1.27	96.6	0.46	94.3	0.30	91.2	5.00	115.0									÷				
TOTALS	MAY 2013	#>0.5mm	8	<1mm/s	HIGHEST	0.29	110.5	2.42	109.4	0.85	98.9	0.56	97.4	10.00	120.0	I												
TOTALS	ANNUAL	# BLAST	14	<115dBL	AVERAGE	0.19	100.3	1.23	99.3	0.46	97.9	0.32	94.2	5.00	115.0													
TOTALS	ANNUAL	MAX #	15	% >115dB(L	) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%													
				WC South												WERRIS CREEK CO	DAL BLASTING RES	SULTS										
Shot number	Date fired	Time Fired	Location	Predicted	Type											JU	INE 2014											
				vibration K50		Glena	ra K11	Kyoom	a R98	Werris Ci	K Sth R62	Werris Ci	K Mid R92	COMPL		ARTC Culvert	COMPLIANCE	TEMPERATURE	W		FRE	QUENCY >	0.02	FUME	DUST	C	OMPLAINT	,
0044.05	0/00/0044	45:40	040 044 045 0444	1111/3	10	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	) OP (dB)	Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	LHZ	V HZ	I HZ	0 to 5	01/	OP/Vib	Dust/Fume	Other
2014-35	2/06/2014	15:13	513_B14-B15_Gseam	0.6	TCD	0.24	90.4	1.83	91.9	0.25	80.7	0.20	95.4	10.00	120.0	Not Monitored	50.00	-1.9	290	2.5	10.0	- 11	- 10.7	40	OK	0	0	0
2014-30	10/06/2014	16:00	S13_B11-B13_Ccoam#1	0.3	IB	0.20	100.9	1.11	104.1	0.40	08.4	0.27	94.0 01.7	10.00	120.0	Not Monitored	50.00	-1.8	143	5.0	11.7	13.4	10.7	0	OK	0	0	0
2014-37	11/06/2014	13:08	S16 B18-B20 370 Bamp	0.4	IB	0.10	103.0	0.45	103.0	0.33	98.2	0.17	97.6	10.00	120.0	Not Monitored	50.00	-1.5	139	3.2		13.4		0	OK	0	0	0
2014-39	16/06/2014	9:10	S13 B17-B23 RI 290 TSB#2	0.4	TSB	0.10	96.8	0.45	99.8	0.14	91.4	0.12	90.4	10.00	120.0	Not Monitored	50.00	-2.7	335	3.2				0	OK	0	0	0
2014-40	17/06/2014	11:03	S15 B9-B12 Boxcut RL330	0.6	IB	0.15	92.7	1.01	95.9	0.46	92.3	0.22	90.6	10.00	120.0	Not Monitored	50.00	-2.7	323	2.8	10	12.7		1A	OK	0	0	1
2014-41	19/06/2014	13:08	S13_B14-B15_Gseam#2	0.4	IB	0.17	98.5	0.97	95.5	0.33	91.8	0.24	91.0	10.00	120.0	Not Monitored	50.00	-2.6	311	4.3	-			0	OK	0	0	0
2014-42	20/06/2014	9:03	S15_B7-B8_RL350	0.6	IB	0.11	107.0	0.55	103.2	0.35	94.9	0.15	102.5	10.00	120.0	Not Monitored	50.00	-1.0	337	3.4	13.2	13.2	-	0	OK	0	0	0
2014-43	23/06/2014	13:04	S13_Fault_Gseam	0.4	IB	0.09	103.5	0.51	98.9	0.35	95.5	0.25	101.6	10.00	120.0	Not Monitored	50.00	-1.8	327	5.4	-	-		0	OK	0	0	0
TOTALS	JUNE 2013	# BLAST	9	TARGET	AVERAGE	0.15	100.4	0.86	100.1	0.33	94.7	0.22	95.1	5.00	115.0													
TOTALS	JUNE 2013	#>0.5mm	7	<1mm/s	HIGHEST	0.26	107.0	1.83	108.2	0.46	103.4	0.37	102.5	10.00	120.0	ļ												
TOTALS	ANNUAL	# BLAST	23	<115dBL	AVERAGE	0.18	100.4	1.10	99.6	0.42	96.8	0.29	94.5	5.00	115.0	ļ												
TOTALS	ANNUAL	MAX #	15	% >115dB(L	) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%													
				WC South												WERRIS CREEK CO	JAL BLASTING RES	SULIS										
Shot number	Date fired	Time Fired	Location	Vibration K50	Туре	Glena	ra R11	Kyoom	a R98	Werris Cl	sth R62	Werris C	k Mid R92	COMPL	LIANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	w	IND	FRE	QUENCY >	0.02	FUME	1	C	OMPLAINT	s
				mm/s		Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	L Hz	V Hz	THz	0 to 5	DUST	OP/Vib	Dust/Fume	Other
2014-44	1/07/2014	13:08	S15 B6-B7 UG1		UG	0.09	101.2	0.57	110.8	0.23	108.7	0.18	105.1	10.00	120.0	1.95 127.3	50.00	-1.8	8	1.4				1A	ОК	0	0	0
2014-45	2/07/2014	13:05	S15_B12-B16_330_EXT	0.7	IB	0.27	94.7	1.26	99.9	0.53	95.8	0.48	94.1	10.00	120.0	Not Monitored	50.00	-2.6	220	1.8	18.8,11	18.8,11	9.5,16.4	5C	OK	12	8	0
2014-46	4/07/2014	13:12	S15_B6-B7_UG2	-	UG	0.06	106.7	0.30	103.1	0.21	97.3	0.12	104.4	10.00	120.0	2.19 121.2	50.00	-2.7	306	5.5	-	-	-	3B	Road	0	0	0
2014-47	9/07/2014	11:03	S14_Ramp_RL350	0.3	IB	0.13	108.3	0.50	98.0	0.18	95.5	0.22	99.4	10.00	120.0	Not Monitored	50.00	-2.9	325	6.2	-	-	10	0	Offsite	0	0	0
2014-48	11/07/2014	13:04	S13_B11_B13_Gseam	0.7	IB	0.21	103.7	1.14	96.2	0.68	91.5	0.49	93.0	10.00	120.0	Not Monitored	50.00	-3.8	273	4.1	16.6	-	-	0	OK	0	0	0
2014-49	15/07/2014	13:05	S16_B16-B17_370	0.5	IB	0.13	107.4	0.39	103.3	0.2	95.6	0.16	95.3	10.00	120.0	Not Monitored	50.00	-2.1	334	3.1	16.1	3.4	16.8	0	OK	0	0	0
2014-50	17/07/2014	10:08	S13_B14-B15_Gseam#3	0.4	IB	0.13	98.1	0.63	99.3	0.26	91.6	0.17	90.6	10.00	120.0	Not Monitored	50.00	-2.9	318	5.2	10.3	11.0	10.7	1A	OK	0	0	0
2014-51	21/07/2014	13:23	S13_B16-B20_RL270_TSB	0.3	IB	0.17	93.3	0.36	96	0.27	91.4	0.21	89.3	10.00	120.0	Not Monitored	50.00	-2.8	283	1.6	12.2	12.2	12.2	0	OK	0	0	0
2014-52	24/07/2014	13:03	S15_B14-B16_RL330	0.7	IB	0.12	101.6	0.54	96.3	0.27	98.2	0.22	99.4	10.00	120.0	Not Monitored	50.00	-1.9	19	3.9	13.4	12.7		0	Onsite	1	0	0
2014-53	25/07/2014	13:06	S15_B6-B7_UG3	-	UG	0.06	98.9	0.31	96.3	0.14	93.8	0.09	92.8	10.00	120.0	<1 DNT	50.00	-2.1	22	4.6	-	-	-	2A	OK	0	0	0
2014-54	29/07/2014	13:18	S16_B8-B11_RL350	0.9	IB	0.10	102.3	0.51	102.6	0.21	96.0	0.16	97.3	10.00	120.0	Not Monitored	50.00	-2.8	336	4.9	3.2	3.4	2.7	0	OK	0	0	0
TOTALS	JULY 2014	# BLAST	11	TARGET	AVERAGE	0.13	101.5	0.59	100.2	0.29	95.9	0.23	96.4	5.00	115.0	DNT = Did not trigger												
TOTALS	JULY 2014	#>0.5mm	/	<1mm/s	HIGHEST	0.27	108.3	1.26	110.8	0.68	108.7	0.49	105.1	10.00	120.0	ł												
TUTALS	ANNUAL	# BLASI	34	<1150BL	AVERAGE	0.17	100.6	0.98	99.7	0.39	90.0	0.27	95.0	5.00	115.0	ł												

#### Werris Creek Coal Blast Monitoring 2014-2015

Oh et en ek er	Data (last	Time Fire d	I anation	WC South Predicted	Turne											WERRIS CRI	EEK COAI	L BLASTING RES ST 2014	ULTS									
Shot number	Date fired	Time Fired	Location	Vibration K50	Type	Glenar	a R11	Kyoon	na R98	Werris Ck	Sth R62	Werris Ck	Mid R92	COMPL	IANCE	ARTC Culv	/ert	COMPLIANCE	TEMPERATURE	W	IND	FREQ	UENCY	>0.02	FUME	DUCT	(	OMPLAINTS
				mm/s		Vib (mm/s)	OP (dB)	Vib (mm/s) O	P (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	L Hz	V Hz	T Hz	0 to 5	0031	OP/Vib	Dust/Fume Other								
2014-55	1/08/2014	12:24	S13_B19-B20_Gseam_TSB	0.7	TSB	0.30	103.9	0.99	102.5	0.63	103.3	0.48	109.3	10.00	120.0	Not Monito	red	50.00	-2.8	328	6.5	12.2	12.2	12.2	2A	OK	0	0 0
2014-56	4/08/2014	13:03	Big Rocks	-	Rocks	0.00	87.3	0.00	91.4	0.00	86.1	0.01	82.5	10.00	120.0	Not Monito	red	50.00	-2.8	232	0.9	-	-		0	OK	0	0 0
2014-57	5/08/2014	13:03	Big Rocks	-	Rocks	0.00	93.6	0.00	86.0	0.01	92.7	0.01	96.3	10.00	120.0	Not Monito	red	50.00	-2.1	209	1.8	-	-		0	OK	0	0 0
2014-58	6/08/2014	13:05	S15_B3-5_RL350_TSB	1.0	TSB	0.32	105.0	1.69	104.6	1.02	95.7	0.48	94.2	10.00	120.0	9.84 1	122.3	50.00	-3.1	336	3.7	12.9	12.9	12.9	0	Road	1	0 0
2014-59	7/08/2014	13:03	S16_B8-B9_RL350	0.7	IB	0.10	94.2	0.60	93.4	0.37	90.4	0.18	88.7	10.00	120.0	2.47 1	111.2	50.00	-1.2	342	0.6	13.2	-	9.3	0	OK	0	0 0
2014-60	8/08/2014	13:04	Big Rocks		Rocks	0.00	92.2	0.04	85.7	0.00	87.9	0.01	86.9	10.00	120.0	Not Monito	red	50.00	-2.6	358	2.6	-	-	-	0	OK	0	0 0
2014-61	11/08/2014	13:08	S16_B12-B13_RL350	1.0	IB	0.19	98.0	0.81	103.1	0.52	98.4	0.36	94.6	10.00	120.0	Not Monito	red	50.00	-3.3	294	2.9	9.8	10.3	9.5	0	OK	2	0 0
2014-62	12/08/2014	16:08	S13_B16-B18_Gseam	0.4	IB	0.13	96.1	0.41	91.3	0.19	90.8	0.14	89.1	10.00	120.0	Not Monito	red	50.00	-1.7	152	5.1	-	-	-	0	OK	0	0 0
2014-63	13/08/2014	13:08	S15_B16-B20_Presplit		PS	0.45	98.4	0.89	101.5	0.46	91.6	0.42	89.6	10.00	120.0	Not Monito	red	50.00	-3.1	169	3.9	3.2	2.9	2.9	2B	OK	0	0 0
2014-64	14/08/2014	16:08	Big Rocks		Rocks	0.00	85.5	0.04	98.3	0.01	93.6	0.00	94.4	10.00	120.0	Not Monito	red	50.00	-1.9	177	5.4	-	-	-	0	OK	0	0 0
2014-65	15/08/2014	13:04	S14_B16-B18_Aseam	0.3	IB	0.05	93.1	0.24	93.9	0.15	90.1	0.09	91.1	10.00	120.0	Not Monito	red	50.00	-2.0	106	3.5	-	-	-	0	OK	0	0 0
2014-66	22/08/2014	13:08	S13_B16-B18_Gseam	0.5	IB	0.22	95.9	0.50	111.8	0.29	94.5	0.24	104.4	10.00	120.0	Not Monito	red	50.00	-2.9	98	4.2	16.1	-	16.6	1A	Onsite	0	0 0
2014-67	25/08/2014	16:08	S14_B19-B21_RL330		TSB	0.26	110.1	0.75	104.9	0.47	102.4	0.28	98.8	10.00	120.0	Not Monito	red	50.00	-1.7	166	3.8	13.4	13.4	13.4	0	OK	0	0 0
2014-68	27/08/2014	9:35	S16_B15-B16_RL370	0.3	IB	0.11	97.9	0.28	97.7	0.23	104.7	0.15	106.0	10.00	120.0	Not Monito	red	50.00	-1.4	113	1.1	-	11.0	-	2A	OK	0	0 0
2014-69	29/08/2014	16:23	S17_B8-B13_RL370	0.5	IB	0.08	101.5	0.43	105.4	0.35	102.0	0.27	102.4	10.00	120.0	2.74 1	121.3	50.00	-1.7	165	5.5	16.4	3.4	2.9	2B	OK	0	0 0
TOTALS	AUGUST 2014	# BLAST	15	TARGET	AVERAGE	0.15	96.8	0.51	98.1	0.31	94.9	0.21	95.2	5.00	115.0													
TOTALS	AUGUST 2014	#>0.5mm	7	<1mm/s	HIGHEST	0.45	110.1	1.69	111.8	1.02	104.7	0.48	109.3	10.00	120.0	1												
TOTALS	ANNUAL	# BLAST	49	<115dBL	AVERAGE	0.16	99.9	0.88	99.4	0.37	96.3	0.26	95.0	5.00	115.0	Ī												
TOTALS	ANNUAL	MAX #	15	% >115dB(L) o	or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	I												

## Appendix 6 – Groundwater Monitoring Results

D SAMPLING SHEET	- SURFACE & GF	TOUND WATERS	- SCALL	and the state of the	Sec. Sec.				<u>ite din dia antisi statunikan</u>		QUOTATION No:	W0	#79	21		A
NT: WERHIS CREEK	COAL PTY LTD		14						Sec. 1		ACIRL LABORAT	ORY:				AA
RESS/OFFICE:			8 								Bi-Monthly Ground	d Waters - SWL (St	anding Water Leve	ol Only)		(ALS)
IECT ID: WERRIS CI	REEK COAL QUAF	RTERLY GROUND	WATERS			· · · ·						- N.		. • •		
	FILLOUI	<b>^</b>						<u>p</u> .								ACCIKL
WERRIS CREEK M	INE AND SURROU	JNDS					Semaline Data			Field Tents			Field Observations			Comments
Sample ID / Bore	Sample ID Informatio	m Time	Standing Water Level	Li de p ero	Stick up	urge Type	Purge	Pump Set Depth	EC - field	pH - field	Temp - field	Appearanc	-Odor	Colour		
		(24hr)	⊡mbgl ⊡mbtoc	⊡rnbgl ⊡mbtoc	• m	Pump / Baller	L	mbgl mbtoc	u\$/cm	pH units	°C					
NALA/4	-1-1-11	12 - 15		() m	0.15	l 1 manit i man - 1 filmen		1. Internet					÷		6 Monthly	Hilvien
MM/2	2115 14	12-13	28.29		0.10					15			-		6 Monthly	Cailway Vien
MW3	23 5 14	9:30	16.69		0.95					÷					6 Monthly	orundree
MW4	231514	11:00	0.30		BRO	KEN	STICK	UP-	SWL 30	ocm Be	elow Gr	ound			Mines	ite Front
MW4B	23/5/4	11:10	12-49		0.70								30 A		6 Monthly	Mine Site
.MW5	2315 14	9:55	10.08		1.15											Sile.
MW5B	23/5/14	9:45	9-63		0.70					1		1. 1. 19 Hill - Hand - H			6 Monthly	HI MORE CIERT P
MW6	21/5/14	12:45	13-24		1.05										Mine	Rail Loop
MW9	2315114	12:05	DA	MAC	FED	STIC	KNP	5 X 1							ESCOT	ANE SHED
MW10	21 5 14	11:45	1705		0.7										Fump C Escot	i Lane
MW11	21 5 14	1			at		1				-				Mine Ro	Loop
MW14	23/5/14	11:55	18.16		0.95										Mine R	al Loop
MW/14D	23 5 14	17.20	n.Si	-	0.65										Wad.	rell In Win
MW20	no s	12.65	20.29	(	0.55										lonsle	4 POIK
- MW24A	2015	9:10	1475		0.15				25 <sup>7</sup> 1 70 6	2				2	Maren	zo - pmp.
MW25A	72/5/14	12:15	PS	MP	OVE	RI	BOR	-								Taxin
MW25B	23 5 14	12:25	PU	MP	ON	ER	Bo	25								
P1							<u>6</u>									
P2			A second					,								
PUG	• /														Cintra	-Escottland
MW27	2115 14	11:30.	45-20		0.45		1.4.1		/.	L	>				Kin	ma - Winder
MW29	205	9:00	12-71	L.		1	-		(N	or runni	X	r.			110	rever - Windmid
MW31	<u> </u>		No	lana	pr moi	at upped~	2	<u> </u>						_		

AE	SS/OFFICE:	e			273										RATORY:			84	
DJEC	T ID: WERRIS	CREEK	COAL C	UARTERLY GROUP	NDWATERS									Di Mantel a					
IPLE	R NAME:				14 S									Bi-Monthly Gr	ound Waters - SWI	. (Standing Water L	evel Only)		(ALS
: Wł	RRIS CREEK	MINE A	ND SUR	ROUNDS	÷														dellor
		Sample	D Inform	nation		Bore Data	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		Sampling	Data			Flaid Tanta						ACIKL
1	Sample ID / Bor ID	e	Date	Time	Standing Water Level	Bore depth	Stick up	<sup>o</sup> urge Type	Purge		Depth Depth	EC - field	Pieg H	mp - field	bearanc e	Field Observation	aiour		Commenta
				(24hr)	⊡mbgl ⊡mbtoc ⊡m	⊡mbgl ⊡mbtoc ⊡m	m	Pump / Bailer	L.		mbgl nbtoc m	uS/cm	pH units	<u>م</u> ۳۵	4		<b>·</b> · · ·		
	MW8	20	5	10:00	17.49		0.2											5	
	MW12	26	5	13:55	0-31		0.5											H	zreath purp.
	MW13	20	5	11:05	4.75		0.4											14	zeldean - Sed
	MW13B	201-	5	10:45	4.17		0.3					ant.						1 No	duell. lanc - we
Ļ	MW13D	20	5	10:35	4.83		0.2											TCu.	las line - 1/3
-	MW15	20	5	11:20.	5-25		0.}											P	plans have - Wind
-	MW16	20	5	12:50	6.13		0.3											M	1. A.
	MW17A	201	5	12:10	5.23		0.5											100	had View.
	VIVV 18A	30	5	12:20	5.07		~			_								82	had all 1
		2015		10:15	8.78	з	0.15			_								Lid	12.
N	1W22A	20	5	13:40	8.73		0.2											QI	runa - pung.
•	W228	2010	5	13-20	6-21	(	5.55						1					304	had Han
N	1W23A	2015	-	13:05	6.22	(	145											-	t to T
M	iW23B	2015		11:35	3.92	0	2.2											# Peop	Easy - House y
N	W28A	2010		W-50	4-40		0.1												- Trick
M	W28B	215		7:45	13-12-	(	5.15	0										Way	Alar he - 1 HS L
COMN	IENTS: M	1015		4:50	-	C	.8	Imp	oner	Bare				2		2		tales	Lana Ruc

VERRIS C	REEK CO	AL PTY LTD			8		5					QUOTATION No	:					
ESS/OFFICE	:				2							ACIRL LABORA	TORY:					
ECT ID: WER	IRIS CREEK	K COAL QUAR	RTERLY GROUND	WATERS								Bi-Monthly Grour	nd Waters - SWL (S	tanding Water Leve	el Only)			(ALS)
PLER NAME:																		ACIRI
WERRIS CRE	EEK MINE	AND SURROL	JNDS													_		
	Samp	ole ID Informatio	n		Bore Data		ø	Sampling Data		-	Field Tests	<u>u</u>	2	Field Observations			Com	ments
Sample ID / ID	/ Bore	Date	Time	Standing Water Level	Bore dept	Stick up	Purge Typ	Purge Volume	Pump Se Depth	EC - fiek	pH - fiek	Temp - 14	Appeara	Odor	Colour		n A ga	
			(24hr)	⊡mbgl ⊡mbtoc ⊡m	⊡mbgl ⊡mbtoc ⊡m	m	Pump / Bailer	L.	⊡mbgl ⊡mbtoc ⊡m	uS/cm	pH units	°C						
MW	7															24	yrs An	derears-we
MW7	'B															2	r i	1 - Wire
MW3	32 7	2 S	10:20	4.15		5.45										"Naran	iji" - Pump She	ed - 3 Johns Lane
mw	368 2	115/14	9:30	23.31		5.95										Near	Escott,	opposite Tu
MW3	6B 2	1514	9:45	22.46		0.95						-				Near	Escott,	opposite Tu
MW3	5 2	315/14	11:20	VNI	ABL	E TO	Loc	ATE		. int						Past	t Kyoon	na
MW3	4 21	15/14	11:05	11:45		0-15									1000 00 00 00 00 00 00 00 00 00 00 00 00	off	Gap Roo	nd-In town
muls	2	3 5 14	10:05	12.24	•	0.68										Mine	e site	
MW	C 2	3 5 14	10:15	9-89		0-93			-							Mir	ne site	200
MINS	EZ	3 5 14	10:25	10146		0.76										IV IV	re site	
MWS	F 23	5514	10:35	15-11		1.2		2					8			M.,	10 SITE	
IVIWS	5 G- Z.	2214	10:45	1101		0.02							· · · · · · · · · · · · · · · · · · ·			M	ne site	p
								4		а. 					2111	1.10		<u> </u>
												2						
		1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	· · · · · · · · · · · · · · · · · · ·															
			2															
																	9	
CIAL COMMENTS	S: M																	
		3																
																5	Sheet: 0	f

	WWI DTVITD														all a last
INRESS/OFFICE										ACIRL LABORAT	ÔRY:				
COLIECT ID: WERRIS CR	EEK COAL QUAF	ITERLY GROUND	NATERS							Bi-Monthly Groun	d Waters - SWL (	Standing Water Le	vel Only)		(Ars)
	•									Wo -	# 61-	9			ZAR
TE: WERRIS CREEK MIN	NE AND SURROU	NDS								0	1	1	N. 21. 1. 200	292 	Comments
nalytes Sample ID / Rore	<u>sample ID Informatio</u> Date	n Time	anding Vater .evel	e depth	ge Type	Purge folume Date	Imp Set Depth	C - field	H - field	mp - field	ppearanc e	Odor	Colour		
eportèbles		(24hr)	imbgl rnbloc	mbgl mbtoc m	Pump / Bailer	F	mbtoc	uS/cm	pH units	ć					
a MW1	1-	<del>کر</del> : <del>ک</del> ا	27.57	1.9	5				×					6 Monthly	HILVIOLI
MW2	+11-10-	10	¢. €	0.1	~		<u>x</u>							6 Monthly	Kallview
MW3	21714	9.40	16.93	0.9	5 S	8								6 Monthly	Eurundree
MW4	21-114	12:05	0-30 F	SROKE	N STI	CK VI	1	SWL	30cm G	ELOW	GROUN	5		mines	teFront
MW4B	217/14	12:15	12.73	6.	70							C		6 Monthly	Wine Site
MW5	2/7/14	11:15	10:31	1.1	Ś									M	5:10
MW5B	2 7.14	11:05	4.86	0.	10									111110	
MW6	케디디	13:50	25.50	1.0	Š						2			6 Monthly	D I WENS LE
6 MW	217/14	13:00	5	3.0	1 BRO	LEN ST	JOK UT	- 0-00	Krilse I	C 4.0 1	UOWN			ESCOT	LANE (SHE
CLANIAL	41114	12,30	11.0		P	n on	5	Ser						RScott	In Empl
MW14	217114	17:45	18.21	ò	S	-								Mine	Rail Loop
MW14B	21-14	12:55	18.04	0.	15				_					Mine	Kail Loop
MW17B	1-1-1	21:21	11:47	9-6	<u>પ્</u>									Theme	11 In- Wid
MW20	2 7 14	54:41	20.34	0.	SS SS			1						IGNSL	ET FHRE
MW24A	7/7/14	9:20	14-15	ò	5			4 (4)					-	Manau	to- pup
MW25A					1										
PI					1								e troj		
P2			-						-						
PUG	1	1	-											E	
MW27	211/14	13:15	47.49	0.1	5				1.1			-		K	ane o Cim
MW29	オコレト	8 <sup>1</sup> %	12-82	-		-			(100	I A DATA				A	
MW31		1	'Ze		iven	teres				0				VG VAN	

FIELD SAMPLING SHEET - SURFACE & GROUND WATERS	QUOTATION No:	
ADDRESS/OFFICE:	ACIRL LABORATORY:	
PROJECT ID: WERRIS CREEK COAL QUARTERLY GROUNDWATERS	Bi-Monthly Ground Waters - SWL (Standing Water Level Only)	(ALS)
SAMPLER NAME:		ACIRL
SITE: WERRIS CREEK MINE AND SURROUNDS	Field Observitions	Comments
Analytes       / Analytes     Sample       Cample     D       D     D       Stick up     D       Purge     Purge       Volume     D       Purge     D       Purge     D       Purge     D       EC - field     D       pH - field     D	Temp - field Appearanc e Odor Colour	
Reportable (24hr) Imbgl Imbg Imbgl Imbgl	S. C	
MW8 7(14 10:00 A). T.a a). T.a		osevet - pup
MW12 7 7 H 13:30 10.65 0.5	Ha	azeldene - shed.
MW13 7/7/14 10:35 5-86 0.4		Jodwell In - well
MW13B 7 7 10,45 4.81 0.3		your In - 11 seal
MW130 7/7/14 1035 4493 0.2		ylars In - Windent H
MW15 7/14 12:05 5:37 0:2		ignes In - Window W
MW16 7 7 4 12:43 6.25 0.3		Pountain view
MW17A 7 7 11 12:35 5.41 0.5 Pmp	Sumilar to S	5 Wadwell In
MW18A 77 14 17.75 5277 -		2 Nadrell M
MW19A 7/7/ 14 10:15 8:44 0:15	5 2	and - bring
MW21A 7 7 14 13:20 9.96 0.3		lenara - mill
MW22A 7/14 13:05 6:45 0:55		08 Kning In - Hayse
MW22B 7 7 14 12:55 674 045	*	r - Jrnigation
MW23A 7/7/14 11:30 4:12 0.2		egg Easy - Hove yind
MW23B 7/7/14 11:45 4.63 0-1		1 1 - miger Han
MW28A 7/7/14 4175 13.27 075	- 5	Jaidlan - LHS Window /1
MW28B 7 7 14 9:40 - O.g Comp over bare		60 law . ~ Kt/5.
SPECIAL COMMENTS: M V		

Sheet:

of

															5									12					1	-
	SPECIA																						Reportabl	es / Analytes		SITE: W	SAMPL	PROJE	ADDRE	CLIENT
	L COMMENTS:				, i						MWEG	MWSF	MWSE	MWC	MW5 D	MW34	MW35	MW36B	MW36A	MW32	MW7B	MW7		Sample ID / Bore ID		VERRIS CREEK M	ER NAME:	CT ID: WERRIS C	SS/OFFICE:	WERRIS CREEK
	2									91 1 17	1110	214	7 1 4	2/1/14	7114	エー	1	2/11/14	11/14	オイト	1	l		Date	Sumple ID Informat	INE AND SURRO		REEK COAL QUA		COAL PTY LTD
											11: 55		55:11	11:25	10:30	\$145	~	12:25	12:35	11:10			(24hr)	Time	lon	UNDS		ARTERLY GROUN		ROUND WATERS
											2	13.41	10.77	10.09	12.49	16.31		22.80	23.41	4.07			Imbgl Imbtoc	Standing Water Level	B			DWATERS		
				î		2					0.8		0.1	0.0	0.6	1.0		0.0	0.9	Ŏ			⊡mbgl ⊐mbtoc m ⊡m	Bore depth Stick up	ore Data					
	_	-									זנ		16	5	6	S		15	n	3			Pump / Bailer	Purge Typ	0					and the state of the
				2			14		2														F	Purge Volume	Sampling Data					
																							nmbgl mbtoc	Pump Sel Depth						
		2	2														3	2					uS/cm	EC - field						
																							pH units	pH - field	Field Tests					
							-																റ്	Temp - fie	Id			Bi-Monthly Grou	ACIRL LABOR/	QUOTATION N
															1									Appearan e	c			und Waters - SW	ATORY:	0
																								Odor	Field Observ			/L (Standing Wat		
																								Colour	ations			er Level Only)		
														-	0			7	2											
Sheet:			8								nine	Dine	Nine	nine !	Nine S	In to	1	Jean Es	ear Esc	Jaranji" - Pu	۲	Mr An								
of				×							s.te.	Site	Site	Site	ite	· · ·		xett -c	oft-op	Imp Shed -	6	dosens			Commen			0		
															C	off app at		apposite Two	posite Tho	3 Johns Lane	W.w.	- well			6		TAR	ALS)		

## Appendix 7 – Surface Water Monitoring Results



	CERTIFICATE OF ANALYSIS						
Work Order	ES1411467	Page	: 1 of 5				
Client		Laboratory	: Environmental Division Sydney				
Contact	: GUNNEDAH LAB	Contact	: Client Services				
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164				
	TALBOT RD						
	GUNNEDAH NSW 2380						
E-mail	: gunnedah.lab@alsglobal.com	E-mail	: sydney@alsglobal.com				
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555				
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500				
Project	: WERRIS CREEK SURFACE-WATER	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement				
Order number	: 7939						
C-O-C number	:	Date Samples Received	: 23-MAY-2014				
Sampler	: CE	Issue Date	: 29-MAY-2014				
Site	:						
		No. of samples received	: 10				
Quote number	: EP/047/12 BQ	No. of samples analysed	: 10				

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Descriptive Results

	NATA Accredited Laboratory 825	Signatories This document has been carried out in compliance with	electronically signed by the authorized procedures specified in 21 CFR Part 11.	signatories indicated below. Electronic signing	has been
NAIA	ISO/IEC 17025.	Signatories	Position	Accreditation Category	
				ACIRL Sampling	
WORLD RECOGNISED		Ankit Joshi	Inorganic Chemist	Sydney Inorganics	
ACCREDITATION		Ashesh Patel	Inorganic Chemist	Sydney Inorganics	

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 PHONE +61-2-8784 8555 Facsimile +61-2-8784 8500 Environmental Division Sydney ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company





#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

## Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

# Page : 3 of 5 Work Order : ES1411467 Client : ACIRL PTY LTD Project : WERRIS CREEK SURFACE-WATER



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	SB2	SB9	SD4	VWD1	VWD2
	Cl	lient sampli	ing date / time	22-MAY-2014 15:00				
Compound	CAS Number	LOR	Unit	ES1411467-001	ES1411467-002	ES1411467-003	ES1411467-004	ES1411467-005
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	µS/cm	1820	750	380	993	912
pH		0.01	pH Unit	10.4	8.60	8.80	9.00	8.50
Temperature		0.1	°C	16.8	20.5	18.0	17.6	19.0
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	9.63	8.34	8.56	8.50	8.37
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	1950	804	398	1070	979
EA025: Suspended Solids								
Suspended Solids (SS)		5	mg/L	125	166	15	<5	7
EK057G: Nitrite as N by Discrete Anal	yser							
Nitrite as N		0.01	mg/L	<0.01	<0.01	<0.01	0.01	0.01
EK058G: Nitrate as N by Discrete Ana	lyser							
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	0.48	0.89
EK059G: Nitrite plus Nitrate as N (NO)	() by Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	<0.01	<0.01	<0.01	0.49	0.90
EK061G: Total Kjeldahl Nitrogen By Di	screte Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	2.4	0.3	0.8	0.3	0.4
EK062G: Total Nitrogen as N (TKN + N	Ox) by Discrete Ar	nalyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	2.4	0.3	0.8	0.8	1.3
EK067G: Total Phosphorus as P by Dis	screte Analyser							
Total Phosphorus as P		0.01	mg/L	0.39	0.03	0.06	<0.01	<0.01
EK071G: Reactive Phosphorus as P by	v discrete analyser							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	<0.01	0.01	<0.01	<0.01
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5	<5	<5

# Page : 4 of 5 Work Order : ES1411467 Client : ACIRL PTY LTD Project : WERRIS CREEK SURFACE-WATER



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	QCU	QCD	WCD	VWD3	VWD4
	Cli	ient sampl	ing date / time	22-MAY-2014 15:00				
Compound	CAS Number	LOR	Unit	ES1411467-006	ES1411467-007	ES1411467-008	ES1411467-009	ES1411467-010
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	µS/cm	1580	882	1280	1020	1010
pH		0.01	pH Unit	8.00	8.10	8.10	8.50	8.60
Temperature		0.1	°C	14.6	14.4	12.5	18.2	18.2
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	7.99	8.13	8.41	8.40	8.44
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	1690	945	1350	1090	1090
EA025: Suspended Solids								
Suspended Solids (SS)		5	mg/L	63	<5	16	15	<5
EK057G: Nitrite as N by Discrete Analys	ser							
Nitrite as N		0.01	mg/L	<0.01	<0.01	<0.01	0.02	<0.01
EK058G: Nitrate as N by Discrete Analy	ser							
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	0.90	0.32
EK059G: Nitrite plus Nitrate as N (NOx)	by Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	<0.01	<0.01	<0.01	0.92	0.32
EK061G: Total Kjeldahl Nitrogen By Dis	crete Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	1.9	0.1	0.3	0.5	0.4
EK062G: Total Nitrogen as N (TKN + NO	x) by Discrete An	nalyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	1.9	0.1	0.3	1.4	0.7
EK067G: Total Phosphorus as P by Disc	crete Analyser							
Total Phosphorus as P		0.01	mg/L	0.37	0.05	0.13	<0.01	<0.01
EK071G: Reactive Phosphorus as P by	discrete analyser							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	0.05	0.10	<0.01	<0.01
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5	<5	<5



#### Analytical Results

#### **Descriptive Results**

#### Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Field Observations		
AC04: Appearance	SB2 - 22-MAY-2014 15:00	Slight Turbid
AC04: Appearance	SB9 - 22-MAY-2014 15:00	Slight Turbid
AC04: Appearance	SD4 - 22-MAY-2014 15:00	Clear
AC04: Appearance	VWD1 - 22-MAY-2014 15:00	Clear
AC04: Appearance	VWD2 - 22-MAY-2014 15:00	Clear
AC04: Appearance	QCU - 22-MAY-2014 15:00	Clear
AC04: Appearance	QCD - 22-MAY-2014 15:00	Clear
AC04: Appearance	WCD - 22-MAY-2014 15:00	Clear
AC04: Appearance	VWD3 - 22-MAY-2014 15:00	Clear
AC04: Appearance	VWD4 - 22-MAY-2014 15:00	Clear
AC04: Odour	SB2 - 22-MAY-2014 15:00	Nil
AC04: Odour	SB9 - 22-MAY-2014 15:00	Nil
AC04: Odour	SD4 - 22-MAY-2014 15:00	Nil
AC04: Odour	VWD1 - 22-MAY-2014 15:00	Nil
AC04: Odour	VWD2 - 22-MAY-2014 15:00	Nil
AC04: Odour	QCU - 22-MAY-2014 15:00	Nil
AC04: Odour	QCD - 22-MAY-2014 15:00	Nil
AC04: Odour	WCD - 22-MAY-2014 15:00	Nil
AC04: Odour	VWD3 - 22-MAY-2014 15:00	Nil
AC04: Odour	VWD4 - 22-MAY-2014 15:00	Nil
AC04: Colour	SB2 - 22-MAY-2014 15:00	Greenish
AC04: Colour	SB9 - 22-MAY-2014 15:00	Brown
AC04: Colour	SD4 - 22-MAY-2014 15:00	Clear
AC04: Colour	VWD1 - 22-MAY-2014 15:00	Clear
AC04: Colour	VWD2 - 22-MAY-2014 15:00	Clear
AC04: Colour	QCU - 22-MAY-2014 15:00	Clear
AC04: Colour	QCD - 22-MAY-2014 15:00	Clear
AC04: Colour	WCD - 22-MAY-2014 15:00	Clear
AC04: Colour	VWD3 - 22-MAY-2014 15:00	Clear
AC04: Colour	VWD4 - 22-MAY-2014 15:00	Clear



	CERTIFICATE OF ANALYSIS						
Work Order	<sup>:</sup> ES1417515	Page	: 1 of 5				
Client		Laboratory	: Environmental Division Sydney				
Contact	: A WRIGHT	Contact	Client Services				
Address	: 5-7	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164				
	TALBOT RD						
	GUNNEDAH NSW 2380						
E-mail	: awright@whitehavencoal.com.au	E-mail	: sydney@alsglobal.com				
Telephone	: 02 6742 0058	Telephone	: +61-2-8784 8555				
Facsimile	: 02 6742 0068	Facsimile	: +61-2-8784 8500				
Project	: WERRIS CREEK SURFACE-WATER	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement				
Order number	: 8413						
C-O-C number	:	Date Samples Received	: 08-AUG-2014				
Sampler	:	Issue Date	: 15-AUG-2014				
Site	:						
		No. of samples received	: 10				
Quote number	: EP/047/12 BQ	No. of samples analysed	: 10				

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results

WORLD RECOGNISED

7 (11(1) 000111	- <b>J</b>	Oyuncy morganico
Helen Simpson	Inorganic Chemist	ACIRL Sampling

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 PHONE +61-2-8784 8555 Facsimile +61-2-8784 8500 Environmental Division Svdney ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



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#### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

#### Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

\* = This result is computed from individual analyte detections at or above the level of reporting

- AC03: Field tests supplied by ALS ACIRL. NATA Accreditation No.15784.
- AC04: Field observations supplied by ALS ACIRL.
- EK067G:LOR raised for Total P analysis on sample ID(VWD2) due to sample matrix.

# Page : 3 of 5 Work Order : ES1417515 Client : ACIRL PTY LTD Project : WERRIS CREEK SURFACE-WATER



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	SB2	SB9	SD4	VWD1	VWD2
	Cl	lient sampl	ing date / time	07-AUG-2014 11:45	07-AUG-2014 10:20	07-AUG-2014 11:10	07-AUG-2014 11:30	07-AUG-2014 10:40
Compound	CAS Number	LOR	Unit	ES1417515-001	ES1417515-002	ES1417515-003	ES1417515-004	ES1417515-005
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	µS/cm	2040	857	352	1030	916
pH		0.01	pH Unit	8.70	7.40	8.90	8.60	8.00
Temperature		0.1	°C	12.4	12.6	13.7	13.8	15.7
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	8.69	8.23	8.80	8.38	8.14
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	2150	881	362	1060	962
EA025: Suspended Solids								
Suspended Solids (SS)		5	mg/L	36	469	44	10	141
EK057G: Nitrite as N by Discrete Analy	ser							
Nitrite as N		0.01	mg/L	<0.01	<0.01	<0.01	0.03	0.49
EK058G: Nitrate as N by Discrete Analy	yser							
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.02	0.03	2.75	7.67
EK059G: Nitrite plus Nitrate as N (NOx	) by Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	<0.01	0.02	0.03	2.78	8.16
EK061G: Total Kjeldahl Nitrogen By Dis	crete Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	1.2	2.7	1.4	0.7	2.6
EK062G: Total Nitrogen as N (TKN + NC	Dx) by Discrete Ar	nalyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	1.2	2.7	1.4	3.5	10.8
EK067G: Total Phosphorus as P by Dis	crete Analyser							
Total Phosphorus as P		0.01	mg/L	0.06	0.68	0.08	<0.01	<0.10
EK071G: Reactive Phosphorus as P by	discrete analyser							
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	14	<5	<5

# Page : 4 of 5 Work Order : ES1417515 Client : ACIRL PTY LTD Project : WERRIS CREEK SURFACE-WATER



#### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	QCU	QCD	WCD	VWD3	VWD4
	Cl	lient sampl	ing date / time	07-AUG-2014 12:50	07-AUG-2014 13:20	07-AUG-2014 14:00	07-AUG-2014 12:00	07-AUG-2014 12:15
Compound	CAS Number	LOR	Unit	ES1417515-006	ES1417515-007	ES1417515-008	ES1417515-009	ES1417515-010
AC03: Field Tests								
Electrical Conductivity (Non Compensated)		1	µS/cm	1500	873	1280	1020	1010
pH		0.01	pH Unit	7.40	8.20	8.60	8.50	8.40
Temperature		0.1	°C	20.9	11.6	11.6	13.9	15.1
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	7.89	8.14	8.52	8.29	8.25
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	µS/cm	1600	911	1320	1060	1060
EA025: Suspended Solids								
Suspended Solids (SS)		5	mg/L	14	5	10	7	6
EK057G: Nitrite as N by Discrete Analy	vser							
Nitrite as N		0.01	mg/L	<0.01	<0.01	<0.01	0.52	0.52
EK058G: Nitrate as N by Discrete Anal	yser							
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.02	<0.01	3.26	10.9
EK059G: Nitrite plus Nitrate as N (NOx	) by Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	<0.01	0.02	<0.01	3.78	11.4
EK061G: Total Kjeldahl Nitrogen By Dis	screte Analyser							
Total Kjeldahl Nitrogen as N		0.1	mg/L	0.3	<0.1	0.3	1.1	1.8
EK062G: Total Nitrogen as N (TKN + NO	Dx) by Discrete Ar	nalyser						
<sup>^</sup> Total Nitrogen as N		0.1	mg/L	0.3	<0.1	0.3	4.9	13.2
EK067G: Total Phosphorus as P by Dis	crete Analyser							
Total Phosphorus as P		0.01	mg/L	0.17	0.04	0.10	<0.01	0.02
EK071G: Reactive Phosphorus as P by	discrete analyser	•						
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.03	0.06	<0.01	<0.01
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5	<5	<5



#### Analytical Results

#### **Descriptive Results**

#### Sub-Matrix: WATER

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
AC04: Field Observations		
AC04: Appearance	SB2 - 07-AUG-2014 11:45	Clear
AC04: Appearance	SB9 - 07-AUG-2014 10:20	Slight Turbid
AC04: Appearance	SD4 - 07-AUG-2014 11:10	Clear
AC04: Appearance	VWD1 - 07-AUG-2014 11:30	Clear
AC04: Appearance	VWD2 - 07-AUG-2014 10:40	Turbid
AC04: Appearance	QCU - 07-AUG-2014 12:50	Clear
AC04: Appearance	QCD - 07-AUG-2014 13:20	Clear
AC04: Appearance	WCD - 07-AUG-2014 14:00	Clear
AC04: Appearance	VWD3 - 07-AUG-2014 12:00	Clear
AC04: Appearance	VWD4 - 07-AUG-2014 12:15	Clear
AC04: Odour	SB2 - 07-AUG-2014 11:45	Nil
AC04: Odour	SB9 - 07-AUG-2014 10:20	Nil
AC04: Odour	SD4 - 07-AUG-2014 11:10	Nil
AC04: Odour	VWD1 - 07-AUG-2014 11:30	Nil
AC04: Odour	VWD2 - 07-AUG-2014 10:40	Nil
AC04: Odour	QCU - 07-AUG-2014 12:50	Nil
AC04: Odour	QCD - 07-AUG-2014 13:20	Nil
AC04: Odour	WCD - 07-AUG-2014 14:00	Nil
AC04: Odour	VWD3 - 07-AUG-2014 12:00	Nil
AC04: Odour	VWD4 - 07-AUG-2014 12:15	Nil
AC04: Colour	SB2 - 07-AUG-2014 11:45	Clear
AC04: Colour	SB9 - 07-AUG-2014 10:20	Brown
AC04: Colour	SD4 - 07-AUG-2014 11:10	Clear
AC04: Colour	VWD1 - 07-AUG-2014 11:30	Clear
AC04: Colour	VWD2 - 07-AUG-2014 10:40	Grey
AC04: Colour	QCU - 07-AUG-2014 12:50	Greenish
AC04: Colour	QCD - 07-AUG-2014 13:20	Clear
AC04: Colour	WCD - 07-AUG-2014 14:00	Clear
AC04: Colour	VWD3 - 07-AUG-2014 12:00	Clear
AC04: Colour	VWD4 - 07-AUG-2014 12:15	Clear

## Appendix 8 – Discharge Monitoring Results

## Werris Creek Coal Community Consultative Committee

## <u>Thirty Third Meeting of the Committee</u> <u>Training Room, Werris Creek Coal</u> <u>9:30am Thursday 4<sup>th</sup> December 2014</u> <u>MINUTES</u>

Werris Creek Coal (WCC) Community Consultative Committee (CCC) met at 9:30am and had a pit tour of the mine site inspecting operations from the eastern and southern lookouts before the meeting.

#### 1. Record of Attendance:

Present: Gae Swain (Independent Chairperson); Noel Taylor (Community Representative); Lindsay Bridge (Community Representative); Col Stewart (Liverpool Plains Shire Council - Councilor); Ron Van Katwyk (Liverpool Plains Shire Council – Director Environmental Services); Eamonn Browne (WCC Operations Manager) and Andrew Wright (WCC Environmental Officer and Minute Taker).

Apologies: Geoff Dunn (Community Representative).

#### 2. Declaration of Pecuniary or Other Interests

Noel Taylor declared that his son works for Whitehaven Coal at Werris Creek Coal. Gae Swain declared that her son-in-law works for Whitehaven Coal.

#### 3. New Matters for Discussion under General Business

None.

#### 4. Minutes of Previous Meeting

Minutes of the previous meeting on the 25<sup>th</sup> September 2014 were reviewed by the committee.

Motion moved to accept the meeting minutes on the 25<sup>th</sup> September 2014 as a true and accurate representation of business conducted on that day.

Moved: Col Stewart. Seconded: Noel Taylor. Motion carried.

#### 5. Matters Arising

#### a) Actions from Previous Meeting

A Letter of Support for WCC to investigate modification of existing Environmental Approvals to allow the return of mine (void) water to the environment is no longer required. The EPA has discussed with WCC that the EPA had been approached by local farmers wanting access to WCC water. If WCC wanted to pursue the offsite transfer of water, the EPA will review any application that demonstrates minimal environmental impacts to soil and water from the agricultural reuse of mine (void) water.

#### b) Other Matters Arising

The committee supported the idea that WCC should produce a factsheet on Water Use by WCC to attempt to dispel myths in the community regarding the source of water, the quantity of water onsite in comparison to the alleged impacts on local groundwater resources.

#### 6. Environmental Monitoring Report: September and October 2014

**Meteorology** – The rainfall during the period was below average, with the prevailing wind directions from both the north west and south-south east.

**Air Quality** – The ambient PM10 dust levels monthly average and daily maximum levels were within the relevant air quality criteria despite October 2014 being dustier than the annual average due to the drier and warmer weather. The Werris Creek PM2.5 dust level annual average is still elevated but is improving and is expected to be below 8.0µg/m<sup>3</sup> annual average criteria by the end of the year.

All dust deposition gauge annual averages were below the annual criteria of 4.0g/m<sup>2</sup>/month except for DG34 (8 Kurrara St) which has previously been affected by localized non-mining related dust contamination. A number of elevated monthly results at DG5 "Railway View", DG98 "Kyooma" and DG62 Werris Creek South were due to organic matter contamination and not related to mining operations. The elevated monthly results at DG20 "Tonsley Park" were due to agricultural and harvesting operations adjacent to the property and not due to Werris Creek Coal evidenced by the lower dust level measured at the closer dust gauge to the mine (DG2 "Cintra").

There were eight dust complaints during the period. Three of the dust complaints were related to a localized dust haze visible over the mine in the early mornings trapped under a strong temperature inversion before dispersing by 9am. WCC has provided additional instruction to the OCE and crews on using water carts to wet down excavator load faces under these conditions. Another three dust complaints were received on 30<sup>th</sup> October 2014 when an excavator unexpected encountered hot material affected by spontaneous combustion adjacent to the former underground area. WCC has provided additional instruction to the OCE and crews on ceasing operations and relocating away from hot ground areas on dayshift and using water carts to soak these areas when hot ground is encountered. Another dust complaint was specific to a windy day during a regional dust event on 27<sup>th</sup> October 2014; while another complaint was in relation to general dust perceived to be from WCC and not specific to a particular event.

**Noise** – There was one noise exceedance each in September and October 2014. During September 2014, R96 ("Talavera") recorded a mining related noise of 38dB(A) located 2.5km east of the closest active mining area at WCC. The resulting exceedance at R96 was +1dB(A) above the evening/night period noise criteria of 37dB(A). The weather conditions were noise enhancing with a source to receiver north westerly wind 3280 @ 1.8m/s with a temperature inversion (+10.5oC/100m). During October 2014, R97 (vacant land) recorded a mining related noise of 38dB(A) located 1.5km east of the closest active mining area at WCC. The weather conditions were noise enhancing with a light south easterly wind (153°) @ 2.0m/s with a temperature inversion (+7.9oC/100m). Both exceedance events occurred under near worse case complying weather conditions of strong temperature inversions and light winds. Due to the two noise exceedances recorded during Spring, WCC will hire a third real time noise monitor for a 3 month period to be located to the east of mine and will be monitored and managed using the same Noise Control Operator procedure used for Quipolly and Werris Creek real time noise monitoring that is currently undertaken every night shift. There were no noise complaints during the period.

**Blasting** – During the period a total of thirty one blasts were fired by WCC. All blasts over the period complied with maximum license limits (120d(B)L and 10mm/s) with one overpressure result above 115dB(L) and no vibration levels over 5mm/s for the two month period. A blast on Friday 5th September 2014 recorded 118.3dBL at "Kyooma" which was above the 115dBL criteria but below the limit of 120dBL. This blast overpressure was likely to have been affected by air blast reinforcement due to the strong winds at the time of the blast. There were fifteen blast complaints during the period from eight separate blast events. Fourteen blasting complaints were related to vibration impacts from blasts that are close to and/or just above 0.5mm/s (but well below the vibration criteria of 5mm/s). One complaint was in relation to fume generated by the blast, however on investigation found that no fume was generated by the blast.

**Groundwater** – Continuing dry conditions have resulted in no rainfall recharge to aquifers with the majority of monitoring bores groundwater levels declining over the period. The majority of groundwater bores routinely monitored are at or close to record low groundwater levels since

monitoring commenced. Previous investigations have found that no Quipolly Alluvium aguifer bores are being impacted by mining and that the current dry conditions and reduced rainfall recharge are the cause of the declining groundwater levels. There were two groundwater complaints during the period due to declining groundwater levels.

Surface Water – Quarterly surface water monitoring found onsite and offsite water quality to be within longer term averages and the Site Water Management Plan trigger values.

Surface Water Discharges - There were no discharge events during the period. There were no impacts on water quality monitored in Quipolly and Werris Creeks' catchments as a result of the dirty water discharge events.

**Complaints** – There were twenty five complaints received during the period. There were fourteen complaints related to blasting vibration and one for blast fume; eight complaints related to dust and two complaints relating to groundwater. There were fourteen different complainants during the period with sixteen complaints from Werris Creek residents and two complaints from Quipolly residents.

Motion moved to accept the Environmental Monitoring Report for September and October 2014.

Moved: Col Stewart. Seconded: Lindsay Bridge. Motion Carried.

#### 7. General Business

#### a. Community Enhancement Fund (CEF) Update

On behalf of the CCC, Gae Swain was going to approach LPSC requesting LPSC to provide in writing a plan for the 2015 Werris Creek Playground project and for the installation of two public seats in Werris Creek as per the CEF program.

#### b. CCC Community Representative Vacancy

Andrew Wright advised the CCC that a Quipolly land owner and Werris Creek resident were approached to see if there were interested in being a community representative; but unfortunately both residents declined. Noel Taylor was going to approach a Werris Creek land owner as to their interest in joining the committee. The CCC still has the minimum three community representatives but will continue to look to fill the two vacancies.

#### Meeting Closed 11:00am.

#### Next Meeting scheduled for Thursday 26<sup>th</sup> February 2014.

Copy to:

Gae Swain	Independent Chairperson
Noel Taylor	Community Representative
Lindsay Bridge	Community Representative
Geoff Dunn	Community Representative

LPSC

DPE

DRE

EPA

Ron Van Katwyk Cr Col Stewart Steve O'Donoghue John Trotter Kharl Turnbull

LPSC

Eamonn Browne Andrew Wright

Werris Creek Coal Werris Creek Coal



## WERRIS CREEK COAL PTY LTD

## **QUARTERLY ENVIRONMENTAL MONITORING**

## REPORT

## September and October 2014

This Environmental Monitoring Report covers the period 1<sup>st</sup> September 2014 to 31<sup>st</sup> October 2014 for the Werris Creek No.2 Coal Mine Community Consultative Committee.

The report includes environmental monitoring results from the on-site Weather Station, Air Quality, Noise, Blasting, Surface Water, Groundwater and Discharge Water Quality together with any community complaints received and general details on site environmental matters.

**Note:** Elevated monitoring results above the relevant monitoring criteria are highlighted in **yellow**.

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### **APPENDICES**

Appendix 1	.Dust Monitoring Results - PM10 and PM2.5
Appendix 2	.Dust Monitoring Results – Deposited Dust
Appendix 3	.Train Dust Deposition Monitoring
Appendix 4	Noise Monitoring Results
Appendix 5	Blasting Monitoring Results
Appendix 6	.Groundwater Monitoring Results
Appendix 7	Surface Water Monitoring Results
Appendix 8	Discharge Monitoring Results

### 1.0 METEOROLOGY

#### 1.1 WEATHER STATION

Werris Creek Coal (WCC) collects meteorological data from the onsite weather station located on the top level of the overburden emplacement and from the continuous noise monitoring units located at Quipolly and Werris Creek. The following table summarises temperature, inversion and rainfall data for the last three months and the wind data is presented below in windroses. For the last two months the prevailing wind direction has been a combination of from the south-south east to a north westerly reflecting the change in seasons.

Month	Quipolly Temp (°C)		Werris Creek Temp (°C)		WCC Temp (°C) 10m		Lapse Rate (°C/100m)		Rainfall (mm)						
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Avg	90%	Onsite	Quip	WC	Annual*
September 2014	-2.1	13.3	29.1	2.6	15.2	29.4	5.0	15.1	28.2	+1.7	+8.6	38.8	23.2	24.6	203.4
October 2014	0.8	18.8	36.9	5.2	20.4	37.2	5.6	20.4	35.5	+1.5	+9.6	7.6	8.2	3.4	211.0

\* Annual cumulative total since July 2012 to June 2013 from a composite data set based on the onsite Weather Station at WCC.



September 2014

2.0 AIR QUALITY



#### 2.1 HVAS (PM10) and TEOM (PM10 & PM2.5)

WCC operates five High Volume Air Sampler (HVAS) measuring particulate matter less than 10 micron (PM10) and total suspended particulate (TSP) matter at four sites. HVAS sampling is scheduled for 24 hours every 6 days in accordance with Environment Protection Authority (EPA) guidelines and results are reported as micro grams per cubic metre ( $\mu$ g/m<sup>3</sup>) of air sampled. In addition, WCC operates a Tapered Element Oscillating Microbalance (TEOM) monitor in Werris Creek measuring real time PM10 and PM2.5 (particulate matter less than 2.5 micron) dust levels. Dust monitoring locations are identified in **Figure 1**.

PM2.5 – TEOM92 "Werris Creek" PM10 – TEOM92 "Werris Creek" PM10 – HVP20 "Tonsley Park" PM10 – HVP1 "Escott" PM10 – HVP20 "Glenara" PM10 – HVP98 "Kyooma" TSP – HVT98 "Kyooma"

#### 2.1.1 Monitoring Data Results

The average results for the last two months are provided in the table below; however see HVAS/TEOM monitoring data under **Appendix 1** for individual results.

<u> </u>	Daily	September	October	Annual	Criteria (µg/m <sup>3</sup> )	
Monitor Location	Maximum (µg/m <sup>3</sup> )	2014 (µg/m <sup>3</sup> )	2014 (μg/m <sup>3</sup> )	Average (µg/m <sup>3</sup> )	Annual	Daily
PM2.5 – TEOM92 "Werris Creek"	13.1	4.5	7.7	8.4	8	25
PM10 – TEOM92 "Werris Creek"	33.0	9.2	16.1	13.1	30	50
PM10 – HVP20 "Tonsley Park"	30.4	13.2	23.4	13.2	30	50
PM10 - HVP1 "Escott"	21.3	5.6	14.1	7.3	30	50
PM10 – HVP20 "Glenara"	29.6	17.0	22.5	16.6	30	50
PM10 – HVP98 "Kyooma"	22.4	5.6	13.6	7.9	30	50
TSP – HVT98 "Kyooma"	38.9	11.1	24.9	13.4	90	-
		Yellow Bold – Eleva	ted dust level.			

#### 2.1.2 Discussion - Compliance / Non Compliance

The ambient PM10 dust levels monthly average and daily maximum levels were within the relevant air quality criteria despite October 2014 being dustier than the annual average due to the drier and warmer weather. The Werris Creek PM2.5 dust level annual average is still elevated but is improving and is expected to be below 8.0µg/m<sup>3</sup> annual average criteria by the end of the year.

#### 2.2 WERRIS CREEK MINE DEPOSITED DUST

Deposited dust monitoring measures particulate matter greater than 30 micron in size that readily settles out of the air related to visual impact. Dust deposition is monitored at 19 locations around WCC. Sampling is scheduled monthly in accordance with EPA guidelines and results are reported as grams per metre squared per month (g/m<sup>2</sup>/month). Dust monitoring locations are identified in **Figure 1**.

#### 2.2.1 Monitoring Data Results

The results for the last two months are provided in the table below; however **Appendix 2** has more information on Deposited Dust Monitoring Results.

Monitor Location	September 2014 (µg/m <sup>3</sup> )	October 2014 (µg/m <sup>3</sup> )	Annual Average (µg/m³)	Annual Criteria (g/m <sup>2</sup> /month)
DG2 "Cintra"	2.0	3.1	2.7	4.0
DG5 "Railway View"	5.7*	1.0	1.8	4.0
DG20 "Tonsley Park"	4.3	5.9	2.8	4.0
DG15 "Plain View"	0.6*	0.6*	0.5	4.0
DG9 "Marengo"	0.8*	0.5*	0.4	4.0
DG22 "Mountain View"	0.2	2.0	1.4	4.0
DG11 "Glenara"	0.6	1.3*	0.6	4.0
DG24 "Hazeldene"	0.5	1.2	0.6	4.0
DG17 "Woodlands"	0.7	1.3	0.6	4.0
DG96 "Talavera"	1.3*	0.5*	0.6	4.0
DG98 "Kyooma"	0.1	27.3*	0.1	4.0
DG14 "Greenslopes"	1.9	1.7*	0.7	4.0
DG62 Werris Creek South	1.1*	7.5*	0.3	4.0
DG92 Werris Creek Centre	0.1	0.8*	0.3	4.0
DG101 "Westfall"	0.6	0.7*	0.7	4.0
DG103 West Street	0.6*	2.1*	1.0	4.0
DG1 "Escott"	<0.1	0.4	0.3	4.0
DG3 "Eurunderee"	2.6*	0.8	1.4	4.0
DG34 8 Kurrara St	0.3*	0.7*	5.5	4.0

\* - sample contaminated with excessive organic matter (>50%) from non-mining source (i.e. bird droppings and insects); c - indicates sample is contaminated from a Non-Werris Creek Coal dust source; Yellow Bold – Elevated dust level.



Figure 1 – WCC Dust Monitoring Locations

#### 2.2.2 Discussion - Compliance / Non Compliance

All dust deposition gauge annual averages were below the annual criteria of 4.0g/m<sup>2</sup>/month except for DG34 (8 Kurrara St) which has previously been affected by localized non-mining related dust contamination. A number of elevated monthly results at DG5 "Railway View", DG98 "Kyooma" and DG62 Werris Creek South were due to organic matter contamination and not related to mining operations. The elevated monthly results at DG20 "Tonsley Park" were due to agricultural and harvesting operations adjacent to the property and not due to Werris Creek Coal evidenced by the lower dust level measured at the closer dust gauge to the mine (DG2 "Cintra").

#### 2.3 QUIRINDI TRAIN DUST DEPOSITION

#### 2.3.1 Monitoring Data Results

The results for the last two months are provided in the table below; however **Appendix 3** has more information on the Train Dust Monitoring Results.

Monitor	September	2014	October 2	2014	Annual		
Location	g/m <sup>2</sup> /month	% Coal	g/m <sup>2</sup> /month	% Coal	Average (g/m <sup>2</sup> /month)		
DDW30	1.9	30%	1.6	15	1.3		
DDW20	2.2	40%	1.7	20	1.4		
DDW13	3.0	50%	1.3	20	1.2		
Train Line							
DDE13	2.4	15%	1.6	25	1.2		
DDE20	1.0	20%	1.3	20	1.3		
DDE30	2.5	15%	1.2	20	1.6		

#### 2.3.2 Discussion - Compliance / Non Compliance

Overall the dust fallout levels adjacent to the train line are low (well below the impact assessment criteria nominated by the EPA of 4.0 g/m<sup>2</sup>/month) and comparable to the levels monitored around WCC. October 2014 results were higher than the annual average and is trending higher than the previous year due to the prevailing dry conditions experienced in the NSW North West.

#### 2.4 AIR QUALITY COMPLAINTS

There were eight dust complaints during the period. Three of the dust complaints were related to a localized dust haze visible over the mine in the early mornings trapped under a strong temperature inversion before dispersing by 9am. WCC has provided additional instruction to the OCE and crews on using water carts to wet down excavator load faces under these conditions. Another three dust complaints were received on 30<sup>th</sup> October 2014 when an excavator unexpected encountered hot material affected by spontaneous combustion adjacent to the former underground area. WCC has provided additional instruction to the OCE and crews on ceasing operations and relocating away from hot ground areas on dayshift and using water carts soak these areas when hot ground is encountered. Another dust complaint was specific to a windy day on 27<sup>th</sup> October 2014; while another complaints was in relation to general dust perceived to be from WCC and not specific to a particular event. Specific actions taken in relation to these complaints are outlined in **Section 6**.

#### 3.0 NOISE

#### 3.1 OPERATIONAL NOISE

Monthly attended noise monitoring is undertaken representative of the following 16 properties from 12 monitoring points below. Attended noise monitoring was undertaken twice for either 60 minutes at privately owned properties or 15 minutes at properties with private agreements; representative of the day period and the evening/night period.

- o A "Rosehill" R5;
- o B "Almawille" (private agreement) R8;
- o B 83 Wadwells Lane (private agreement) R7;
- B "Mountain View" (private agreement) R22;
- o B "Gedhurst" (private agreement) R9;

- o C "Meadholme" (private agreement) R10;
- C "Glenara" (private agreement) R11;
- o D "Hazeldene" R24;
- o E "Railway Cottage" R12;
- o F "Talavera" R96;
- o G-R97;
- H "Kyooma" (private agreement) R98;
- o I Kurrara St, Werris Creek;
- J Coronation Ave, Werris Creek;
- o K "Alco Park" (private agreement) R21; and
- o L R103.

#### 3.1.1 Monitoring Data Results

The WCC operations only noise level (not ambient noise) results for the last two months are outlined below; however see Monthly Noise Monitoring Reports under **Appendix 4** for more detail. Noise monitoring locations are identified in **Figure 2**.

Monday	$729^{\text{th}}$	Septemb	ber 2014
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	Location	Day dB(A)	Criteria dB(A)	Evening/Night dB(A) Least 5 min	Criteria dB(A)
Α	"Rosehill" R5	Inaudible	35	24	35
В	West Quipolly R7*, R8*, R9* & R22*	Faintly audible	37/36 <sup>1</sup>	28	37/36 <sup>1</sup>
С	Central Quipolly R10*,R11*	25	39	31#	39
D	"Hazeldene" R24	27	37	34	37
E	"Railway Cottage" R12	Inaudible	38	33	38
F	"Talavera" R96	Faintly audible	38	<mark>38</mark>	37
G	R97	Inaudible	35	Faintly audible	35
Н	"Kyooma" R98*	Inaudible	36	36	36
Ι	Kurrara St, WC	Inaudible	35	Inaudible#	35
J	Coronation Ave, WC	Inaudible	35	Inaudible	35
K	South St, WC R21*	Inaudible	39	Inaudible#	37
L	West St, WC R103	Inaudible	35	Inaudible	35

#### Thursday 16<sup>th</sup> October 2014

	Location	Day dB(A) Leg 15min	Criteria dB(A) Leg 15min	Evening/Night dB(A) Leg 15min	Criteria dB(A)
Α	"Rosehill" R5	Inaudible#	35	Inaudible#	35
В	West Quipolly R7*, R8*, R9* & R22*	Inaudible#	37/36 <sup>1</sup>	Inaudible#	37
С	Central Quipolly R10*,R11*	Faintly audible#	39	Inaudible#	39
D	"Hazeldene" R24	24#	37	Inaudible#	37
E	"Railway Cottage" R12	Inaudible#	38	Inaudible#	38
F	"Talavera" R96	26#	38	29#	37
G	R97	28#	35	<mark>38</mark>	35
Н	"Kyooma" R98*	Inaudible#	36	35#	36
Ι	Kurrara St, WC	Inaudible#	35	27	35
J	Coronation Ave, WC	Inaudible#	35	27#	35
Κ	South St, WC R21*	28	39	31#	37
L	West St, WC R103	24	35	26#	35

 $WC - Werris Creek; * - Private agreement in place with resident; \\ <u>Yellow Bold</u> - Elevated noise; # Adverse weather with wind >3m/s, temperature inversions >+12°C/100m or >2m/s and >0°C/100m; 1 - R22 criteria is 36 dB(A) L<sub>eq 15min</sub> while R9 is 37 dB(A) L<sub>eq 15min</sub>$ 



Figure 2 – WCC Noise Monitoring Locations
#### 3.1.2 Discussion - Compliance / Non Compliance

There was one noise exceedance each in September and October 2014. During September 2014, R96 ("Talavera") recorded a mining related noise of 38dB(A) located 2.5km east of the closest active mining area at WCC. The resulting exceedance at R96 was +1dB(A) above the evening/night period noise criteria of 37dB(A). The weather conditions were noise enhancing with a source to receiver north westerly wind 3280 @ 1.8m/s with a temperature inversion (+10.5oC/100m). During October 2014, R97 (vacant land) recorded a mining related noise of 38dB(A) located 1.5km east of the closest active mining area at WCC. The weather conditions were noise enhancing with a source to receiver north westerly wind 3280 @ 1.8m/s with a temperature inversion (+10.5oC/100m). During October 2014, R97 (vacant land) recorded a mining related noise of 38dB(A) located 1.5km east of the closest active mining area at WCC. The weather conditions were noise enhancing with a light south easterly wind (153°) @ 2.0m/s with a temperature inversion (+7.9oC/100m). Both exceedance events occurred under near worse case complying weather conditions of strong temperature inversions and light winds. Due to the two noise exceedances recorded during Spring, WCC will hire a third real time noise monitor for a 3 month period to be located to the east of mine and will be monitored and managed using the same Noise Control Operator procedure used for Quipolly and Werris Creek real time noise monitoring that is currently undertaken every night shift.

#### 3.2 NOISE COMPLAINTS

There were no noise complaints during the period.

## 4.0 BLAST

During the period a total of thirty one blast events were fired by WCC with monitoring of each blast undertaken at "Glenara", "Kyooma", "Werris Creek South" and "Werris Creek Mid". Compliance limits for blasting overpressure is 115dBL (and up to 120dBL for only 5% of blasts) and vibration is 5mm/s (and up to 10mm/s for only 5% of blasts). Blast monitoring locations are identified in **Figure 3**.

#### 4.1 BLAST MONITORING

#### 4.1.1 Monitoring Data Results

The summary tables of blasting results over the last two months are provided below; however see the blasting results database under **Appendix 5** for more detail.

September 2014	"Gle R	nara" 11	"Kyoo	ma" R98	Werris Sout	s Creek h R62	Werris Mid	s Creek R92
-	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.13	100.4	0.58	102.5	0.34	98.7	0.24	98.7
Monthly Maximum	0.22	105.7	0.96	118.3	0.53	107.7	0.45	113.5
Annual Average	0.16	100.0	0.83	99.9	0.37	96.7	0.26	95.6
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	1.6%	0%	0%	0%	0%
# >0.5mm/s				9 out of 15	blast ever	nts		

October 2014	"Gle R	nara" 11	"Kyoo	ma" R98	Werris Soutl	s Creek 1 R62	Werris Mid	Creek R92
	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)	mm/s	dB(L)
Monthly Average	0.15	94.9	0.67	97.3	0.35	94.5	0.22	96.2
Monthly Maximum	0.34	106.4	2.15	118.3	0.63	110.8	0.45	113.5
Annual Average	0.16	99.2	0.81	99.5	0.37	96.4	0.25	95.6
Criteria	5	115	5	115	5	115	5	115
% >115dB(L) or 5mm/s	0%	0%	0%	1.2%	0%	0%	0%	0%
# >0.5mm/s			12 out o	f 16 blast ev	vents (20 s	shot areas)		



Figure 3 – WCC Blast Monitoring Locations

#### 4.1.2 Discussion - Compliance / Non Compliance

All blasts over the period complied with maximum license limits (120d(B)L and 10mm/s) with one overpressure result above 115dB(L) and no vibration levels over 5mm/s for the two month period. A blast on Friday 5th September 2014 recorded 118.3dBL at "Kyooma" which was above the 115dBL criteria but below the limit of 120dBL. This blast overpressure was likely to have been affected by air blast reinforcement due to the strong winds at the time of the blast.

#### 4.2 BLAST COMPLAINTS

There were fifteen blast complaints during the period from eight separate blast events. Fourteen blasting complaints were related to vibration impacts for blast that are close to and above 0.5mm/s (but well below the vibration criteria of 5mm/s). One complaint was in relation to fume generated by the blast, however on investigation found that no fume was generated by the blast. Specific actions taken in relation to these complaints are outlined in **Section 6**.

### 5.0 WATER

The groundwater monitoring program monitors groundwater levels bi-monthly and groundwater quality six monthly. Surface water monitoring is undertaken quarterly. There were no dirty water discharge events during the period. Groundwater and Surface Water monitoring locations are identified in **Figure 4**.

#### 5.1 GROUND WATER

Groundwater monitoring is undertaken to identify if there are any impacts on groundwater quality and levels as a result of the mining operations. WCC monitors 29 groundwater bores and piezometers in the key aquifers surrounding WCC including Werrie Basalt (next to WCC and further afield) and Quipolly Creek Alluvium. Bi-monthly groundwater level monitoring was completed between the 22nd, 23rd, and 24th September 2014.

#### 5.1.1 Monitoring Data Results

A summary of groundwater monitoring results is provided below with the field sheets provided in Appendix 6.

	Site	Sept 2	2014*	Comments
	MW1	58.52	-2%	No rainfall recharge, Level down
C alt	MW2	29.61	-3%	No rainfall recharge, Level down
Sas /C	MW3	17.34	-2%	No rainfall recharge, Level down
ie F V	MW4B	13.46	-5%	No rainfall recharge, Level down
eal	MW5	10.73	-4%	No rainfall recharge, Level down
₿ Z	MW6	13.62	-2%	No rainfall recharge, Level down
	MW27	52.4	-9%	No rainfall recharge, Level down
	MW8	18.07	-2%	No rainfall recharge, Level down
alt	<b>MW10</b>	17.16	0%	No rainfall recharge
3as	<b>MW14</b>	18.57	-2%	No rainfall recharge, Level down
ie I	<b>MW17B</b>	11.83	-3%	No rainfall recharge, Level down
erri	MW19A	8.97	-6%	No rainfall recharge, Level down
Ň	MW20	20.61	-1%	No rainfall recharge, Level down
	MW12	11.15	-4%	No rainfall recharge, Level down
	MW13	6.1	-4%	No rainfall recharge, Level down
	MW13B	4.51	7%	No rainfall recharge
	MW13D	4.94	0%	No rainfall recharge
e	MW15	5.61	-4%	No rainfall recharge, Level down
in.	MW16	6.63	-6%	No rainfall recharge, Level down
nn	MW17A	5.7	-5%	No rainfall recharge, Level down
ΠA	MW18A	4.32	22%	To be retested
lly	MW21A	9.32	-4%	No rainfall recharge, Level down
lod	MW22A	6.78	-5%	No rainfall recharge, Level down
Qui	MW22B	7.0	-4%	No rainfall recharge, Level down
	MW23A	4.32	-2%	No rainfall recharge, Level down
	MW23B	5.37	14%	No rainfall recharge, Level down
	MW28A	13.54	-2%	No rainfall recharge, Level down
	MW32	4.10	-2%	No rainfall recharge

\* mbgl – meters below ground level is the distance in meters from top of bore to groundwater surface; **Red** – Greater than 15% change/potential compliance issue; Orange – Change decrease; Green – change increase or no change.



Figure 4 – WCC Groundwater and Surface Water Monitoring Locations

#### 5.1.2 Discussion - Compliance / Non Compliance

Continuing dry conditions resulting in no rainfall recharge to aquifers with the majority of monitoring bores groundwater levels declining over the period. The majority of groundwater bores routinely monitored are at or close to record low groundwater levels since monitoring commenced. Previous investigations have found that no Quipolly Alluvium aquifer bores are being impacted by mining and that the current dry conditions and reduced rainfall recharge are the cause of the declining groundwater levels.

#### 5.2 SURFACE WATER

Surface water monitoring is undertaken from local creeks offsite as well as from discharge point dirty water dams to monitor for potential water quality issues. No quarterly surface water monitoring was undertaken during the period.

#### 5.2.1 Monitoring Data Results

No surface water quality monitoring results are provided in **Appendix 7**.

#### 5.2.2 Discussion - Compliance / Non Compliance

The last quarterly surface water monitoring undertaken on 7<sup>th</sup> August 2014 found all onsite and offsite water quality within longer term averages and the Site Water Management Plan trigger values.

#### 5.3 SURFACE WATER DISCHARGES

#### 5.3.1 Monitoring Data Results

There were no discharge events during the period. No discharge monitoring results are provided below and no laboratory reports provided in **Appendix 8**.

Date	Dam	pН	EC	TSS	<b>0&amp;</b> G	Compliance	Туре	5 Day Rain
						No Discharges		
Crite	ria	8.5	N/A	50	10			

pH – measure of acidity/alkalinity; EC – Electrical Conductivity measures salinity; TSS – Total Suspended Solids is a measure of suspended sediment in water (i.e. similar to turbidity); O&G – Oil and Grease measures amount of hydrocarbons (oils and fuels) in water; **Yellow** – indicates results outside criteria due to 5 day rain >39.2mm.

#### 5.3.2 Discussion - Compliance / Non Compliance

There were no impacts on water quality monitored in Quipolly and Werris Creeks' catchments as a result of WCC activities.

#### 5.4 WATER COMPLAINTS

There were two groundwater complaints during the period due to declining groundwater levels. As the monitoring results demonstrate in **Section 5.1.1**; the decline is reflected across all local aquifers regionally including the Quipolly Alluvium aquifer and is due to a lack of rainfall recharging the aquifers from the below average rainfall over the last 18 months. Specific action taken in relation to this complaint is outlined in **Section 6**.

### 6.0 COMPLAINTS SUMMARY

There were twenty five complaints received during the period with the details summarised below. There were sixteen complaints related to blasting vibration and one for blast fume; eight complaints related to dust and two complaints relating to groundwater. There were fourteen different complainants during the period with sixteen complaints from Werris Creek residents and two complaints from Quipolly residents.

#	Date	Complainant	Complaint	Investigation	Action Taken
418	5/09/2014 1:08pm	Anonomyous/EPA Werris Creek	Blast caused whole house to shake significantly and woke up night shift worker.	WCC blast #72-2014 (S17_B13_B16_RL350) was fired at 1:08pm on Friday 5th September 2014 was in compliance however the overpressure result recorded at Kyooma was above 115dBL but below the limit of 120dBL. The actual vibration levels were below the predicted vibration. Analysis of the waveform frequency indicates that the peak frequencies were 10.7-13.9Hz which is in the natural resonance range of buildings. The cause of the complaint could have been either overpressure or vibration. Weather conditions were a south easterly wind (1350) @ 6.9m/s with no inversion present.	Written response provided to complainant.
419	18/09/2014 8:17am	Z Quipolly	Complainant indicated that the mine was dusty this morning and enquired what was going on.	Dump locations on Thursday dayshift 18th September 2014 were RL445m dump and eastern in pit haul road. Visual inspection by Environmental Officer from 8:30am to 9am did not identify any excessive dust or dust haze from WCC. As the air quality in Werris Creek would be classed as good and well below the daily criteria of 50µg/m3; with no visible dust impact from WCC operations, it was unlikely that there was any dust impact offsite on Thursday morning. Weather conditions were a north westerly wind (326o) @ 2.0m/s with no inversion present.	Verbal response provided immediately to the complainant. Complainant requested no written response.
420	18/09/2014 1:19pm	U Werris Creek	Blast caused back shed to shake but not as bad as previously.	WCC blast #80-2014 (S16_B20_B22_RL370) fired at 1:13pm on Thursday 18th September 2014 was in compliance. The actual vibration levels were above the predicted vibration and above the anecdotal threshold for vibration complaints of 0.5mm/s. Analysis of the waveform frequency indicates that the peak frequencies were 11.0-12.2Hz which is in the natural resonance range of buildings. Weather conditions were a westerly wind (2780) @ 3.6m/s with no inversion present.	Written response provided to complainant.
421	18/09/2014 2:04pm	Anonymous/EPA Unknown Location	Blast cause large reddish dust plume to travel towards Werris Creek town visible from Kamilaroi Highway.	WCC blast #80-2014 (S16_B20_B22_RL370) fired at 1:13pm on Thursday 18th September 2014 was in compliance and no fume was generated (Level 0) by the blast. The majority of the dust from the blast settled in pit along Strip 17. Weather conditions were a westerly wind (2780) @ 3.6m/s with no inversion present.	Written response provided to the EPA.
422	23/09/2014 4:16pm	AL Werris Creek	Blast shook house disturbing the resident.	WCC shot #82-2014 (S17_B21-B23_RL370) fired at 4:13pm on Tuesday 23rd September 2014 was in compliance. Actual blast vibration was below the predicted vibration but close to the anecdotal threshold for vibration complaints of 0.5mm/s. Analysis of the waveform frequency indicates that the peak frequencies were 11.5-12.9Hz which is in the natural resonance range of buildings. Weather conditions were a north easterly wind (310) @ 2.0m/s with no inversion present.	Written response provided to complainant.
423	24/09/2014 4:03pm	BH Werris Creek	WCC is allegedly the cause of the complainants' heart problems and emphysema because of the black dust that is constantly depositing in the house since the mine started.	A review of the PM10 dust data for Werris Creek since 2012 found that there has been no exceedance of dust limits in Werris Creek and that Werris Creek air quality is rated as very good and consistently lower than Tamworth, Muswellbrook, Singleton and Sydney dust levels. No further investigation is required as no specific event was identified by the complainant.	Written response provided to complainant.
424 to 427	3/10/2014 1:19pm	Various Werris Creek	Blast caused house to shake significantly.	<ul> <li>WCC blast #87-2014 (S16_B13_B16_RL350) was fired at</li> <li>1:18pm on Friday 3<sup>rd</sup> October 2014 was in compliance. The actual vibration levels were at the anecdotal</li> <li>vibration complaint threshold of 0.5mm/s. Analysis of</li> <li>the waveform frequency indicates that a single</li> <li>frequency of 18Hz was generated but not normally in</li> <li>the natural resonance range of buildings. Weather</li> <li>conditions were a light north north westerly wind</li> <li>(3360) @ 1.9m/s with no inversion present.</li> </ul>	Written response provided to complainant.
428 to 431	8/10/2014 1:10pm	Various Werris Creek	Blast caused house to shake significantly.	WCC blast #88-2014 (S14_B12-B15_Cseam) was fired at 1:08pm on Wednesday 8 <sup>th</sup> October 2014 was in compliance. The actual vibration levels were close to the anecdotal vibration complaint threshold of 0.5mm/s. Analysis of the waveform frequency indicates that a single frequency of 13Hz was generated in the natural resonance range of buildings. Weather conditions were a moderate south westerly wind (2140) @ 4.1m/s with no inversion present.	Written response provided to complainant.
432	10/10/2014 11:05am	BI Quipolly	Groundwater in Quipolly has alarming dropped allegedly because of the mine.	The previous measurement on 25th March 2014 was 4.60m which was a decrease of -9% from the previous year; however the groundwater level was still within the historical range of results measured at MW7 since 2005 indicating that there has been no impact to the Quipolly alluvial aquifer over that time. The decline reflects the below average rainfall and reduce rainfall recharge to Quipolly Alluvium Aquifer	Written response provided to complainant.

#	Date	Complainant	Complaint	Investigation	Action Taken
		p		The last measurement on 19th January 2012 was	
433	16/10/2014 2:23pm	AG Quipolly	Concerned about water as well level dropped requiring sensor to be lowered.	5.15m with a recent measurement taken when a groundwater logger was installed on 25th September 2014 at 8.68m - a decrease of 3.53m. This is consistent with other Quipolly Alluvium Aquifer bores which had shown a decline of 4m since 2012 due to below average rainfall resulting in limited rainfall recharge to the aquifer.	Written response including the four weeks of groundwater level data provided to the complainant.
434 & 435	17/10/2014 2:01pm & 2:05pm	U & AH Werris Creek	Blast caused house to shake.	WCC blast #94-2014 (S15_B4_B6_RL335_TSB) was fired at 13:58 on Friday 17th October 2014 was in compliance. The actual vibration levels were at the anecdotal vibration complaint threshold of 0.5mm/s. The actual Werris Creek South vibration level of 0.63mm/s was 50% higher than the predicted vibration and above the anecdotal threshold for vibration complaints of 0.5mm/s. Analysis of the waveform frequency did not indicate a dominant frequency but did have peaks in the natural resonance range of buildings. The weather conditions were a moderate south south easterly wind 1670 @ 4.1m/s with no temperature inversion (-4.40C/100m).	Written response provided to complainant.
436	20/10/2014 8:22am	U Werris Creek	Complainant asked if water carts were broken given the dust haze over the mine.	The weather conditions on Monday morning 20th October 2014 averaged a light east south easterly wind 1220 @ 0.8m/s with a peak temperature inversion of +6.2oC/100m resulting in dust emissions being trapped under the temperature inversion, concentrating the particles so that they were visible over the mine. When the wind speed increased after 9am, the dust haze dispersed onsite and was no longer visible.	Written response provided to complainant.
437	20/10/2014 1:37pm	l Werris Creek	Blast caused house to shake.	WCC blast #95-2014 (S16_B19_B21_RL350_TSB) was fired at 13:33 on Monday 20th October 2014 was in compliance. The actual Werris Creek South vibration level of 0.40mm/s was equal to the predicted vibration and below the anecdotal 0.5mm/s threshold for receiving community blast complaints. Analysis of the waveform frequency indicates a dominant frequency only in the Vertical direction of 24Hz which is not normally considered to be in the natural resonance range of buildings. The weather conditions were a strong southerly wind 1770 @ 7.7m/s with no temperature inversion (-4.40C/100m).	Written response provided to complainant.
438	27/10/2014 8:00am	U Werris Creek	Complainant indicated more dust today and not good that it is starting to smell like the Hunter Valley.	The instantaneous TEOM PM10 dust levels measured in Werris Creek between 7am and 9am averaged 21.5µg/m3 with a peak of 24.5µg/m3 demonstrating that the dust haze was only localised to the mine site not impacting Werris Creek. When the wind speed increased after 9am, the dust haze dispersed onsite and was no longer visible.	Written response provided to complainant.
439	27/10/2014 4:00pm	EPA/Anonymous Unknown	A lot of dust coming from WCC on 20 <sup>th</sup> October at 1:50pm on a windy and very dry day. Complainant indicated it is an ongoing issue.	The weather conditions on Monday afternoon 20th October 2014 between 1pm and 2pm averaged a strong southerly wind 1770 @ 7.2m/s. To minimise dust emissions during adverse weather, WCC were using either low sheltered dumps at surface or in pit dumps and during inspections on the day found mining operations to not be visual dusty. The instantaneous TEOM PM10 dust levels measured in Werris Creek between 1pm and 2pm averaged 20.3µg/m3 with a peak of 24.3µg/m3; well below the daily PM10 limit of 50µg/m3 despite the TEOM location being almost downwind on this particular day. All water carts were operating with haul roads in pit sufficiently watered preventing trafficable dust and crushing plant/train load out water carts also used to manage trafficable dust and suppress dust from stockpiles.	Written response provided to complainant.
440 to 442	30/10/2014 10:30pm	Various Werris Creek	Excessive smoke and dust seen coming from the mine.	The 3600 excavator was digging in overburden in the eastern area of Strip 16 when suddenly excessive dust was generated from hot material. To minimise dust emissions, the OCE relocated the 3600 away from the hot dusty material and set up a water cart to saturate the heat affected area with no further dust visible after 15 minutes. Dust was localised to the pit but because of the thermals generated by the heat and dry material, the dust cloud travelled upwards. The instantaneous TEOM PM10 dust levels measured in Werris Creek between 10am and 11am averaged 31.8µg/m3 with a peak of 34.3µg/m3; well below the daily PM10 limit of 50µg/m2	Written response provided to complainant.

## 7.0 GENERAL

Please feel free to ask any questions in relation to the information contained within this document during Item 7 of the meeting agenda.

## Appendix 1 – Dust Monitoring Results – PM10

#### Werris Creek Coal HVAS TEOM Dust Monitoring 2014-2015

Site	2.5TEOM92	Monthly	Annual	10TEOM92	EPL#30	Annual	HVP20	Monthly	Rolling	HVP98	EPL#28	Rolling	HVP1	Monthly	Rolling	HVP11	EPL#29	Rolling	HVT98	Monthly	Rolling	PM10	PM10	TSP
Date	Creek	Summary	Average	Creek	Summary	Average	Park	Summary	Average	Kyooma	Summary	Average	Escott	Summary	Average	Glenara	Summary	Average	Kyooma	Summary	Average	Limit	Average	Average
04-Apr-14							-	8.4	#DIV/0!	6	2.5	6.2	8	3.9	8.3	14	7.0	13.7	13	5.5	12.6	50	30	90
10-Apr-14		4.5			7.3		19	14.4	18.8	10.7	7.2	8.5	12.4	8.8	10.4	18	18.2	15.8	16.2	12.3	14.4	50	30	90
16-Apr-14		9.7	9.7		15.1	15.1	10	14.2	14.2	5	6.2	7.3	6	8.3	8.8	31	17.8	20.7	7	12.6	11.9	50	30	90
22-Api-14 28-Apr-14		9.6			23.5		21	20.7	14.4	3	11.5	0.4	14	14.0	8.8	7	30.5	18.2	6	20.5	12.3	50	30	90
04-Mav-14		6.1			8.4		3	2.6	12.0	2	2.1	6.4	2	2.3	7.8	1	1.3	15.4	4.5	4.5	11.0	50	30	90
10-May-14		12.2	11.0		16.9	16.0	12	13.0	11.9	12	8.8	7.1	9	6.5	7.9	16	15.1	15.4	15	14.1	11.6	50	30	90
16-May-14		12.3			16.5		15	13.2	12.3	4	8.0	6.8	4	6.6	7.5	18	16.9	15.7	7.7	11.6	11.2	50	30	90
22-May-14		19.4			34.7		23	22.9	13.7	17	16.9	7.9	11	10.7	7.8	25	25.1	16.8	29	28.7	13.1	50	30	90
28-May-14 03- Jun-14		4.0			53		8	35	13.1	14	2.5	8.5	8	22	7.8	4	23	16.2	25	3.8	14.3	50 50	30 30	90
09-Jun-14		9.7	10.5		13.1	15.0	8	6.6	12.0	9	7.3	8.4	4	4.1	7.2	4	4.9	14.2	6	9.9	13.0	50	30	90
15-Jun-14		9.8			13.5		4	6.6	11.3	3	6.6	8.0	2	3.9	6.8	2	4.0	13.3	4	6.9	12.3	50	30	90
21-Jun-14		14.1			19.1		6	8.3	10.9	4	14.2	7.7	3	7.8	6.5	3	11.0	12.5	7	24.6	11.9	50	30	90
27-Jun-14		1 5			2.0		16	70	11.3	10	5.2	7.8	7	5.2	6.5	22	12.0	13.2	12	7.1	12.0	50	30	90
03-Jul-14 09-Jul-14		8.3	10.0		11.6	14.1	13	13.3	12.0	8	5.2 8.3	8.0	9	5.5 7.4	6.8	43	26.3	15.1	20	13.0	12.0	50	30 30	90
15-Jul-14		8.4			11.9		10	12.7	11.9	8	8.3	8.0	6	7.0	6.8	39	22.1	16.4	14	12.4	12.5	50	30	90
21-Jul-14		14.7			21.0		7	20.8	11.6	5	10.2	7.8	5	9.4	6.7	12	43.3	16.1	7	19.5	12.2	50	30	90
27-Jul-14		0.7			1.0		4	4.2	11.2	1	0.0	7.5	1	1.0	6.4	2	2.2	15.4	2	1.0	11.7	50	30	90
02-Aug-14		0.7 67	93		1.9	13.3	11 24	4.3	11.2	6 11	0.6	7.4	4 10	1.0	6.3	10	13.2	15.2	22	1.9	12.2	50	30	90
14-Aug-14		4.0	5.5		7.7	10.0	10	9.5	11.7	5	6.4	7.5	4	3.9	6.4	11	10.2	15.8	8	9.4	12.0	50	30	90
20-Aug-14		18.1			28.3		7	23.6	11.5	7	11.3	7.5	11	11.2	6.6	10	32.7	15.5	9	21.6	12.0	50	30	90
26-Aug-14							8		11.3	4		7.3	5		6.5	5		15.1	4		11.7	50	30	90
01-Sep-14		0.0			0.0		12	7.0	11.3	6	2.0	7.3	3	2.4	6.4	17	5.4	15.2	8	4.4	11.6	50	30	90
13-Sep-14		4.5	8.5		9.2	12.7	, 16	13.2	11.2	10	5.6	7.2	6	5.6	6.4	16	17.0	15.1	17	11.1	11.7	50	30	90
19-Sep-14		4.8			10.5		18	13.9	11.6	6	5.0	7.2	8	5.7	6.4	40	14.7	16.0	20	8.8	12.0	50	30	90
25-Sep-14		9.0			17.3		18	18.3	11.8	4	9.6	7.1	5	8.1	6.4	11	39.7	15.8	8	19.7	11.8	50	30	90
01-Oct-14		4.6			6.8		28	16.4	12.3	13	8.5	7.3	17	7.4	6.7	30	14.6	16.3	25	13.4	12.3	50	30	90
07-Oct-14 13-Oct-14		7.8 77	84		16.6	13.1	30	23.4	12.9	10	13.6 11.8	7.8	21	14.1	7.2	10	22.5	16.0	39	24.9	13.1	50 50	30	90
19-Oct-14		13.1	0.4		33.0	10.1	16	30.4	13.2	9	22.4	7.9	7	21.3	7.3	15	29.6	16.6	13	38.9	13.4	50	30	90
25-Oct-14									13.2			7.9			7.3			16.6			13.4	50	30	90
31-Oct-14									13.2			7.9			7.3			16.6			13.4	50	30	90
06-Nov-14			7.6			12.0		0.0 #DIV/01	13.2		0.0 #DIV/01	7.9		0.0 #DIV/01	7.3		0.0	16.6			13.4	50	30	90
12-Nov-14 18-Nov-14			7.0			12.0		#NUM!	13.2		#DIV/0:	7.9		#NUM!	7.3		#DIV/0:	16.6		#DIV/0: #NUM!	13.4	50	30 30	90 90
24-Nov-14								0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
30-Nov-14									13.2			7.9			7.3			16.6			13.4	50	30	90
06-Dec-14			7.6			12.0		0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
12-Dec-14 18-Dec-14			7.0			12.0		#DIV/0:	13.2		#DIV/0	7.9		#DIV/0:	7.3		#DIV/0:	16.6		#DIV/0: #NI IMI	13.4	50 50	30	90
24-Dec-14								0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
30-Dec-14									13.2			7.9			7.3			16.6			13.4	50	30	90
05-Jan-15			7.6			12.0		0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
11-Jan-15 17-Jan-15			7.0			12.0		#DIV/0!	13.2		#DIV/0!	7.9		#DIV/0!	7.3		#DIV/0!	16.6		#DIV/0!	13.4	50 50	30 30	90 90
23-Jan-15								0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
29-Jan-15									13.2			7.9			7.3			16.6			13.4	50	30	90
04-Feb-15			7.0			40.0		0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
10-Feb-15 16-Feb-15			7.6			12.0		#DIV/0!	13.2		#DIV/0! #NILIMI	7.9		#DIV/0!	7.3		#DIV/0!	16.6		#DIV/0!	13.4	50 50	30 30	90
22-Feb-15								0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
28-Feb-15	Ī								13.2			7.9			7.3			16.6			13.4	50	30	90
06-Mar-15								0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
1∠-Mar-15			7.6			12.0		0.0 #DIV/01	13.2		#DIV/01	7.9		#DIV/01	7.3		#DIV/01	16.6		#DIV/0	13.4	50	30	90
24-Mar-15						.2.0		#NUM!	13.2		#NUM!	7.9		#NUM!	7.3		#NUM!	16.6		#NUM!	13.4	50	30	90
30-Mar-15								0.0	13.2		0.0	7.9		0.0	7.3		0.0	16.6		0.0	13.4	50	30	90
Min Median					0.0		2.6			0.6			1.0	)		1.3			1.9					
Max					34.7		30.4			22.4			21.3	-		43.3			38.9					
Capture							54%			56%			56%	, D		56%	5		56%					

<u>Appendix 2 – Dust Monitoring Results – Deposited Dust</u>

	Deposited Dust - Werris Creek Coal Mine 2014-2015																			
	M (a/m	ONTH 2/month)		April 2014	May 2014	June 2014	July 2014	August 2014	September 2014	October 2014	November 2014	December 2014	January 2015	February 2015	March 2015		AVERAGE -	MINIMUM	MAXIMUM	AQGHGMP Criteria
	(9/		Total Matter	2.6	2.0	3.8	1.9	3.8	2.0	3.1	2014	2014	2013	2013	2013	AVENAGE	EXCLUDED			onteria
-	DG2	Cintra	Ash Content	0.6	1.0	2.5	1.1	2.5	1.1	1.8						2.7	2.8	1.9	3.8	4.0
			Total Matter	0.1	0.6	0.8	0.5	3.3	5.7	1.0										
-	DG5	Railway View	Ash Content	<0.1	0.3	0.4	0.3	1.3	2.9	0.6						1.7	0.7	0.1	5.7	4.0
			Total	3.1	3.3	3.5	1.1	1.3	4.3	5.9										
EPL #1	DG20	Tonsley Park	Ash	2.4	1.8	2.7	0.8	0.9	2.6	3.8						3.2	3.2	1.1	5.9	4.0
			Total Matter	0.3	0.4	0.4	0.6	<0.1	0.6	0.6										
-	DG15	Plain View	Ash Content	0.1	0.2	<0.1	0.3	<0.1	0.2	0.2						0.5	0.5	0.3	0.6	4.0
			Total Matter	0.5	0.1	<0.1	0.2	0.2	0.8	0.5										
-	DG9	Marengo	Ash Content	0.1	<0.1	<0.1	0.1	<0.1	0.3	0.2						0.4	0.4	0.1	0.8	4.0
		Mountain	Total Matter	1.9	0.8	1.5	0.6	3.5	0.2	2.0										
-	DG22	View	Ash Content	1.0	0.5	0.9	0.3	2.4	0.1	1.3						1.5	1.5	0.2	3.5	4.0
			Total Matter	0.3	0.4	1.1	0.8	0.5	0.6	1.3										
EPL#29	DG11	Glenara	Ash Content	0.2	0.2	0.7	0.5	0.5	0.6	0.6						0.7	0.6	0.3	1.3	4.0
			Total Matter	0.6	0.9	0.3	0.8	0.2	0.5	1.2										
-	DG24	Hazeldene	Ash Content	0.4	0.7	0.2	0.5	0.1	0.3	0.7						0.6	0.6	0.2	1.2	4.0
			Total Matter	0.9	0.4	<1	0.5	0.7	0.7	1.3										
-	DG17	Woodlands	Ash Content	0.4	0.2	<0.1	0.3	0.4	0.4	0.7						0.8	0.7	0.4	1.3	4.0
	5000	<b>T</b>	Total Matter	0.4	0.2	0.5	0.2	1.0	1.3	0.5									4.0	4.0
-	DG96	Talavera	Ash Content	<0.1	<0.1	0.2	<0.1	0.5	0.5	0.2						0.6	1.0	0.2	1.3	4.0
EDI #29	DC09	Kyooma	Total Matter	0.2	0.1	0.2	0.1	<0.1	0.1	27.3						47	0.1	0.1	27.2	4.0
EFL#20	DG98	Ryooma	Ash Content	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1						4.7	0.1	0.1	27.5	4.0
	DC14	Creenelenee	Total Matter	0.4	0.8	0.5	0.3	0.4	1.9	1.7						0.0	14	0.2	1.0	4.0
-	DG14	Greensiopes	Ash Content	0.1	0.5	0.2	0.1	0.1	1.2	0.6						0.9	1.4	0.3	1.9	4.0
	DC62	Werris Creek	Total Matter	0.2	0.2	0.2	0.1	0.2	1.1	7.5						1.4	2.0	0.1	7.5	4.0
-	0002	South	Ash Content	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	4.0						1.4	3.0	0.1	7.5	4.0
EDI #20	DC02	Werris Creek	Total Matter	0.2	0.3	0.4	0.1	0.6	0.1	0.8						0.4	0.2	0.1	0.8	4.0
EFL#30	DG92	Centre	Ash Content	<0.1	0.1	0.2	<0.1	0.1	<0.1	<0.1						0.4	0.5	0.1	0.8	4.0
	DC101	Weetfell	Total Matter	0.7	1.0	0.8	0.7	0.5	0.6	0.7						0.7	0.7	0.5	1.0	4.0
-	DGIUI	westian	Ash Content	0.4	0.5	0.5	0.4	0.4	0.5	0.3						0.7	0.7	0.5	1.0	4.0
	DC103	West Street	Total Matter	0.6	0.3	0.5	2.5	1.6	0.6	2.1						10	0.8	0.2	25	4.0
-	DG103	west Street	Ash Content	0.3	0.2	0.3	1.1	1.2	0.2	1.0						1.2	0.8	0.3	2.5	4.0
	DC1	Ecco#	Total Matter	0.3	0.5	0.5	0.2	0.1	<0.1	0.4						0.3	0.5	0.1	0.5	4.0
-	DGI	Escoli	Ash Content	0.1	0.4	0.3	<0.1	<0.1	<0.1	0.2						0.5	0.5	0.1	0.5	4.0
	DC3	Eurupdoroa	Total Matter	2.4	0.7	0.5	1.5	0.5	2.6	0.8						13	1.4	0.5	26	4.0
	003		Ash Content	1.9	0.4	0.2	0.8	0.2	<0.1	0.4						1.5	1.4	0.5	2.0	4.0
	DC14	8 Kurrara	Total Matter	0.3	<0.1	22.1	3.8	0.8	0.3	0.7						47	4.0	0.2	22.4	4.0
	0634	Street	Ash Content	0.1	<0.1	14.6	2.7	0.5	<0.1	0.1						4./	1.0	0.3	22.1	4.0
	DC106	Villamagna	Total Matter	0.5	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	4.0
	00100	villamagna	Ash Content	0.4	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	4.0

Note: All results are in the form of Insoluble Matter (g/m2/month); NS - Not sampled BROWN - indicates sample is contaminated from a Non-Werris Creek Coal dust source YELLOW - sample contaminated with excessive organic matter (>50%) from non-mining source (i.e bird droppings and insects)

RED - result above 4g/m2/month

## Appendix 3 – Train Dust Deposition Monitoring

						De	posi	ited	Dus	st - (	Quir	indi	Tra	ins	2014	4-20	15								
		DD	W30			DD	W20			DD	W13			DD	E13			DD	E20			DD	E30		line
	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Total Matter	% Coal	% Vegetation/ Insects	% Dirt	Guidel
April 2014	0.6	10%	20%	70%	0.8	10%	30%	60%	0.7	30%	30%	40%	0.2	10%	40%	50%	0.6	20%	20%	60%	1.1	10%	60%	30%	4.0
May 2014	1.0	10%	20%	65%	0.8	15%	25%	60%	0.7	20%	10%	70%	0.4	15%	25%	60%	0.6	10%	<1%	90%	2.0	<1%	20%	10%	4.0
June 2014	2.2	15%	35%	40%	1.5	15%	35%	40%	1.0	10%	40%	40%	1.9	10%	30%	60%	1.5	10%	30%	60%	2.7	10%	40%	30%	4.0
July 2014	1.6	15%	10%	75%	-	-	-	-	0.8	10%	5%	85%	0.9	5%	20%	75%	0.6	5%	25%	65%	0.8	5%	25%	70%	4.0
August 2014	0.4	10%	30%	60%	1.2	10%	35%	55%	1.2	40%	15%	45%	1.3	10%	25%	65%	3.2	10%	<1%	90%	0.7	10%	40%	50%	4.0
September 2014	1.9	30%	25%	40%	2.2	40%	15%	45%	3.0	50%	15%	35%	2.4	15%	35%	40%	1.0	20%	30%	50%	2.5	15%	30%	45%	4.0
October 2014	1.6	15%	20%	50%	1.7	20%	20%	45%	1.3	20%	25%	40%	1.6	25%	20%	40%	1.6	20%	25%	40%	1.2	20%	20%	45%	4.0
November 2014																									4.0
December 2014																									4.0
January 2015																									4.0
February 2015																									4.0
March 2015																									4.0
ANNUAL AVERAGE		1	.3			1.4				1	.2			1	.2			1	.3			1	.6		4.0
Average Coal %		15	.0%			18.3%				25	.7%			12	.9%		13.6%					11	.7%		-
Average Coal g/m2		0.	20		0.25			0.32			0.16		0.18				0.18				-				
MINIMUM		0	.4			0.8			0.7			0.2		0.6			0.7		-						
MAXIMUM		2	.2			2.2				3	.0		2.4				3.2				2.7				4.0

Note: All results are in the form of Insoluble Matter (g/m2/month)

# Appendix 4 – Noise Monitoring Results



1 October 2014

Ref: 04035/5415

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

#### RE: SEPTEMBER 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Monday 29<sup>th</sup> September, 2014 as required by the Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

#### Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

			Table 1	
	-	WCC	Attended Noise Monitoring I	Program
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements
А	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ
		R7*	83 Wadwells Lane	
D	15 minutool	R8*	Almawillee	Private Agreement
В	15 minutes	R9*	Gedhurst	i indie Agreement
		R22*	Mountain View	
0	15 minute e1	R10*	Meadholme	
J	15 minutes	R11*	Glenara	Privale Agreement
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement
I	60 minutes <sup>2</sup>	R57	Kurrara Street@	60 minutes as per EPL 12290
J	15 minutes <sup>1</sup>		Coronation Avenue@	PA10_0059 Private Property outside NMZ
К	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### **Monitoring Equipment**

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

#### **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where possible the significant audible noise sources from the mine are indicated in notes associated with the tables.

Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation. The wind speed and inversion strength shown in the tables is the average over the one hour monitoring period.

#### WCC Operations

WCC operations on Monday 29<sup>th</sup> September 2014 had the 5600 excavator in Strip 17 west at RL390m; the 3600 excavator in Strip 16 centre at RL330m and a 1900 excavator in Strip 16 west at RL330m. All overburden truck fleets were running to the in pit dump at RL350m on day and night shift. There were no production delays either day or night shift. The crushing plant and train load out operated to 2:30am with no trains loaded.



## Noise Compliance Assessment

#### The results of the noise measurements are shown below in Tables 2 and 3.

				Table	2	
	1	W	CC Noise Moni	toring Results	– 29 September	r 2014 (Day)
		dB(A),	Criterion	Inversion	Wind speed	
Location	Time	Leq	dB(A) Leq	<sup>o</sup> C/100m	(m/s),dir <sup>o</sup>	Identified Noise Sources
A R5 Rosehill	1:27 pm	39	35	n/a	2.1,7	Birds (39), traffic (25) WCC inaudible
B R7 83 Wadwells	1:47 pm	56	40*	n/a	1.9,306	Birds (56), traffic (27), WCC faintly audible
Lane, R8 Almawillee,						
R9Gedhurst, R22						
Mountain View						
C R10 Meadholme/	2:53 pm	41	40*	n/a	1.9,300	Wind in trees (39), birds (37), WCC (25), traffic (24)
R11 Glenara						
D R24 Hazeldene	3:12 pm	48	37	n/a	1.8,290	Birds (47), traffic (42), WCC (27)
E R12 Railway Cottage	4:47 pm	42	38	n/a	1.6,301	Traffic (42), birds (28), WCC inaudible
F R96 Talavera	4:07 pm	38	38	n/a	1.8,289	Birds & insects (38), traffic (25), WCC faintly audible
<b>G</b> R97	4:22 pm	29	35	n/a	2.1,289	Birds & insects (28), traffic (21), WCC inaudible
H R98 Kyooma	3:45 pm	43	40*	n/a	2.0,286	Birds (43), train yard (25), traffic (23), WCC inaudible
I R57 Kurrara St	2:16 pm	50	35	n/a	2.2,310	Traffic (48), birds & insects (45), train yard (36), WCC
						inaudible
J R57 Coronation Ave	3:22 pm	38	35	n/a	2.0,291	Traffic (35), birds (32), dog (32), WCC inaudible
K R21 Alco Park	1:53 pm	49	40*	n/a	1.9,306	Traffic (49), train yard (30), construction noise (28), birds
						(26), WCC inaudible
L R103	1:29 pm	39	35	n/a	2.1,7	Birds & insects (35), construction noise (34), train yard
						(30), wind (29), WCC inaudible

\* Private Agreement in place – see Appendix II.

				Table	3	
		WCC Noi	se Monitoring	g Results – 29	September 2014	(Evening/Night)
Location	Time	dB(A), L1 (1min) <sup>1</sup>	dB(A), Leq	Criterion dB(A) Leq	Inversion <sup>o</sup> C/100m, Wind speed (m/s),dir <sup>0</sup>	Identified Noise Sources
A R5 Rosehill	7:00 pm	28	37	35	+6.5,1.5,327	Tractor (34), traffic (31), frogs & insects (30), WCC (24)
B R7 83 Wadwells Lane, R8 Almawillee, R9Gedhurst, R22 Mountain View	7:20 pm	33	41	40*	+7.4,1.8,335	Birds & insects (41), traffic (28), WCC (28)
C R10 Meadholme/ R11 Glenara	8:25 pm	37	36	40*	+10.5,2.1,340	Traffic (34), WCC (31), frogs & insects (25)
D R24 Hazeldene	8:45 pm	40	43	37	+10.1,0.9,335	Traffic (42), WCC (34), frogs & insects (27)
E R12 Railway Cottage	10:18 pm	36	40	38	+10.1,1.6,330	Traffic (39), WCC (33), frogs & insects (24)
F R96 Talavera	9:57 pm	42	39	37	+10.5,1.8,328	WCC (38), traffic (29), birds & insects (26)
<b>G</b> R97	9:54 pm	26	37	35	+10.6,1.7,337	Frogs & insects (37), traffic (22), WCC faintly audible
H R98 Kyooma	9:33 pm	40	37	40*	+9.5,0.4,314	WCC (36), traffic (29), insects (25)
I R57 Kurrara St	8:00 pm	n/a	38	35	+9.9,2.1,344	Traffic (36), frogs & insects (35), train yard (29), WCC inaudible
J R57 Coronation Ave	9:05 pm	n/a	35	35	+9.8,1.2,357	Traffic (33), dog (31), WCC inaudible
K R21 Alco Park	7:38 pm	n/a	42	40*	+8,2.0,356	Traffic (41), train yard (32), insects (27), WCC inaudible
L R103	7:15 pm	n/a	48	35	+6.8,1.8,328	Traffic (47), train yard (40), insects (35), WCC inaudible

1. L1 (1 min) from mine noise only \* Private Agreement in place – see Appendix II.

The results in Tables 2 and 3 indicate that, under the operational and atmospheric conditions at the time, the mine noise was greater than the applicable operational noise criterion at night at the Talavera monitoring location. At all other receiver locations the measured noise levels did not exceed the relevant noise criteria.

Section 11.1.3 of the EPA's NSW Industrial Noise Policy (INP) defines non-compliance as follows:

"A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition."

The 2 dB 'tolerance' is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

"A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified."

These statements mean that a breach only occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.





The measured mine noise level at Talavera on the evening/night of 29 September was 1 dB above the relevant criterion for this location and, based on the discussion above, is not considered to be a non-compliance.

The night time measurement at Talavera was made at a time when there was a strong temperature inversion (+10.5  $^{\circ}$ C/100m) and a light source to receiver wind. This would represent highly noise enhancing atmospheric conditions for this receiver.

The noise from WCC was audible at most locations that are situated to the south and to the east of the mine site, particularly during the evening/night survey. General mine hum was the most significant contributor to the mine noise component, with distinguishable truck revs and dozer tracks also audible on occasions.

Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the evening/night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest





EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

Author:

Ross Hodge Acoustical Consultant

Review:

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Neil Pennington Acoustical Consultant



SPECTRUM COUSTICS

Appendix I



Attended Noise Monitoring Locations





### Appendix II

Noise Limits

Location		Day Evening/Nigh		Night	Long Term	Acquisition
		L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All other privately-owned land		35	35	45	35	40

#### LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

#### Table 21: Properties with Private Agreements Noise Criteria

Location		Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R7	83 Wadwells Lane	40	45
R8	"Almawillee"	40	45
R9	"Gedhurst"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R22	"Mountain View"	40	45
R98	"Kyooma"	40	45



## Appendix III

Plant Sound Power Levels

Plant Item	NMP SWL	Actual	Actual	Date Measured	
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116.7	118	24/4/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (attenuated)	614	117.7	117.5	119	24/4/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (attenuated)	609	117.7	117.4	119	11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (attenuated)	612	117.7	117.8	120	24/4/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (attenuated)	613	117.7	117.9		24/4/14
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 785C (attenuated)	624	117.7	118.1		24/4/14
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	115		24/4/14
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13



Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	2400
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13
Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Water Cart (Cat 773D)	869	113	117.5	119	24/4/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14
Water pump (Dam 4)			106		24/4/14
Evaporation fan (Dam 4)			105		24/4/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.



22 October 2014

Ref: 04035/5431

Werris Creek Coal 1435 Werris Creek – Quirindi Road Werris Creek NSW 2341

#### RE: OCTOBER 2014 NOISE MONITORING RESULTS - WERRIS CREEK MINE

This letter report presents the results of noise compliance monitoring conducted for the Werris Creek Coal Mine (WCC) on Thursday 16<sup>th</sup> October, 2014 as required by the Noise Management Plan (NMP), Project Approval 10\_0059 and the Environmental Protection Licence (EPL) 12290 and must be submitted to the Environment Protection Authority within 30 days of the completion of monitoring.

#### Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the WCC Noise Monitoring Programme as detailed below in **Table 1** (as adapted from the NMP). The monitoring locations and noise criteria for each are detailed in **Appendices I** and **II**.

Table 1									
WCC Attended Noise Monitoring Program									
Monitoring Point	Duration	ID	Receiver	Relevant Monitoring Requirements					
А	15 minutes <sup>1</sup>	R5	Rosehill	PA10_0059 Private Property outside NMZ					
		R7*	83 Wadwells Lane						
D	15 minutool	R8*	Almawillee	Private Agreement					
В	15 minutes	R9*	Gedhurst	i indie Agreement					
		R22*	Mountain View						
0	15 minutes <sup>1</sup>	R10*	Meadholme						
J		R11*	Glenara	Privale Agreement					
D	60 minutes <sup>2</sup>	R24	Hazeldene	60 minutes as per EPL 12290					
E	60 minutes <sup>2</sup>	R12	Quipolly Railway Cottage	60 minutes as per EPL 12290					
F	60 minutes <sup>2</sup>	R96	Talavera	60 minutes as per EPL 12290					
G	15 minutes <sup>1</sup>	R97		PA10_0059 Private Property outside NMZ					
Н	15 minutes <sup>1</sup>	R98*	Kyooma	Private Agreement					
I	60 minutes <sup>2</sup>	R57	Kurrara Street@	60 minutes as per EPL 12290					
J	15 minutes <sup>1</sup>		Coronation Avenue@	PA10_0059 Private Property outside NMZ					
К	15 minutes <sup>1</sup>	R21*	Alco Park	Private Agreement					
L	15 minutes <sup>1</sup>	R103		PA10_0059 Private Property outside NMZ					

Notes accompanying the table are on the following page

\* - WCC has a private agreement for noise impacts with these property owners

@ - Kurrara Street is representative of sensitive receptors in southern Werris Creek while Coronation Avenue is representative of sensitive receptors in central Werris Creek.

NMZ - Noise Management Zone of properties with project specific noise criteria between 35dB(A) and 40dB(A);

- Note 1: For each monthly monitoring event a total of 15 minutes (per location) during the day period, and 15 (per location) during the evening <u>or</u> night period;
- Note 2: For each monthly monitoring event a total of 60 minutes (per location) during the day period, and 60 minutes (per location) during the evening <u>or</u> night period.

EPL 12290 Condition L4.6 indicates that noise monitoring be conducted;

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

EPL 12290 Condition L4.3 indicates that the relevant noise limits apply under all meteorological conditions except for the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- Temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Temperature inversion conditions greater than 12°/100m.

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

#### **Monitoring Equipment**

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (15 or 60 minutes) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

#### **Measurement Analysis**

The operational noise criteria for compliance with Condition L4.1 of EPL 12290 are based on a 15 minute Leq noise level. The procedures detailed in Condition M8.2 of EPL 12290 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Condition L4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from WCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from WCC is shown in the tables in bold type. Where possible the significant audible noise sources from the mine are indicated in notes associated with the tables.

Where noise from WCC is listed as faintly audible, this means the noise levels from the mine were at least 10 dB below the ambient level during the measurement and not measurable.

All noise levels shown are in dB(A) Leq (15 min) unless otherwise shown.

When no mine noise was audible at a monitoring location during a one hour survey, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

Meteorological data used in this report were supplied by the mine from their automatic weather station M2 which is located on top of the overburden emplacement. Temperature inversion strength is extrapolated from gauges with 80m vertical separation. The wind speed and inversion strength shown in the tables is the average over the one hour monitoring period.

#### WCC Operations

WCC operations on Thursday 16<sup>th</sup> October 2014 had the 5600 excavator in Strip 16 centre at RL350m; the 3600 excavator in Strip 14 centre at RL330m; a 1900 excavator in Strip 16 west at RL350m and a 1900 excavator in Strip 16 centre at RL350m. The 3600 and 1900 overburden truck fleets were running to the MIA dump at RL390m on day and to the Ramp 6 in pit dump at RL370m on night shift. The 5600 and the other 1900 overburden truck fleets were running to the in pit eastern ramp dump at RL290m on both day and night shift. There were no production delays either day or night shift. The crushing plant and train load out operated to 11:30pm with two trains loaded; first arriving at 18:23 and leaving at 20:20 and second arriving at 23:44 and leaving at 01:57.



## Noise Compliance Assessment

#### The results of the noise measurements are shown below in Tables 2 and 3.

Table 2										
WCC Noise Monitoring Results – 16 October 2014 (Day)										
		dB(A),	Criterion	Inversion	Wind speed					
Location	Time	Leq	dB(A) Leq	<sup>o</sup> C/100m	(m/s),dir <sup>o</sup>	Identified Noise Sources				
A R5 Rosehill	10:10 am	35	35	n/a	2.6,268	Birds (34), traffic (27), WCC inaudible				
B R7 83 Wadwells	10:30 am	47	40*	n/a	3.3,278	Birds (47), lawn mower (32), wind in trees (29), WCC				
Lane, R8 Almawillee,						inaudible				
R9Gedhurst, R22										
Mountain View										
C R10 Meadholme/	10:56 am	40	40*	n/a	3.4,294	Wind in trees (40), birds (28), traffic (23), WCC faintly				
R11 Glenara						audible				
D R24 Hazeldene	11:16 am	43	37	n/a	3.8,290	Birds (43), traffic (30), wind (25), WCC (24)				
E R12 Railway Cottage	12:57 pm	38	38	n/a	4.8,282	Traffic (37), birds (31), WCC inaudible				
F R96 Talavera	1:30 pm	40	38	n/a	4.1,270	Wind (38), birds (35), WCC (26)				
<b>G</b> R97	12:28 pm	35	35	n/a	4.2,265	Wind (34), WCC (28)				
H R98 Kyooma	2:37 pm	42	40*	n/a	3.7,280	Wind in trees (41), birds (36), WCC inaudible				
I R57 Kurrara St	3:20 pm	47	35	n/a	4.1,282	Traffic (44), birds (43), train yard (34), wind (32), WCC				
						inaudible				
J R57 Coronation Ave	3:01 pm	44	35	n/a	3.6,284	Traffic (42), birds (37), train yard (35), WCC inaudible				
K R21 Alco Park	4:49 pm	41	40*	n/a	4.7,260	Train yard (35), traffic (35), wind (34), birds (33), WCC				
						(28), domestic (27)				
L R103	4:27 pm	41	35	n/a	4.9,256	Train yard (39), birds (34), traffic (28), wind (28), WCC				
						(24)				

\* Private Agreement in place – see Appendix II.

Table 3											
	WCC Noise Monitoring Results – 16 October 2014 (Evening/Night)										
		dB(A),	dB(A),	Criterion	Inversion						
Location	Time	L1	Leq	dB(A) Leq	<sup>o</sup> C/100m,	Identified Noise Sources					
		(1min) <sup>1</sup>			Wind speed						
					(m/s),dir <sup>o</sup>						
A R5 Rosehill	7:16 pm	n/a	38	35	+2.1,3.6,255	Cattle (35), traffic (34), birds (30), WCC inaudible					
B R7 83 Wadwells	7:36 pm	n/a	35	40*	+1.8,4.8,248	Domestic noise (34), traffic (27), insects (23), WCC					
Lane, R8 Almawillee,						inaudible					
R9Gedhurst, R22											
Mountain View											
C R10 Meadholme/	7:55 pm	n/a	29	40*	+0.8,4.4,229	Traffic (28), insects (21), WCC inaudible					
R11 Glenara											
D R24 Hazeldene	8:15 pm	n/a	35	37	+4.8,3.3,188	Traffic (35), insects (20), WCC inaudible					
E R12 Railway	9:52 pm	n/a	47	38	+9.5,2.3,152	Traffic (47), WCC inaudible					
Cottage											
F R96 Talavera	7:14 pm	33	48	37	+1.6,4.4,245	Birds (48), traffic (33), WCC (29)					
<b>G</b> R97	9:25 pm	44	39	35	+7.9,2.0,153	WCC (38), traffic (29), insects (20)					
H R98 Kyooma	8:21 pm	42	36	40*	+3.5,4.3,211	WCC (35), wind in trees (28), insects (24)					
I R57 Kurrara St 9:13		36	42	35	+8.2,2.0,148	Traffic (41), train yard (34), WCC (27)					
J R57 Coronation Ave	8:52 pm	30	37	35	+6.2,2.4,166	Traffic (36), train yard (28), WCC (27)					
K R21 Alco Park	10:48 pm	35	45	40*	+10.2,2.5,147	Train yard (43), traffic (40), WCC (31)					
L R103	10:24 pm	22	45	35	+9.5,2.3,155	Train yard (44), traffic (38), WCC (26)					

1. L1 (1 min) from mine noise only

\* Private Agreement in place - see Appendix II.

The results in Tables 2 and 3 show that, under the operational and atmospheric conditions at the time, the mine noise exceeded the operational noise criterion during the night at the R97 monitoring location. Noise emissions from WCC were measured at 38 dB(A) Leq (15 min) which is 3 dB(A) over the operational noise criterion at this location.

Receiver R97 is unoccupied land and, as there is no residence, no noise levels were predicted in the noise modelling undertaken for the environmental assessments for the operation of WCC. As a result of this R97 is considered a "private property outside of the noise management zone" as defined in Project Approval 10\_0059 with an adopted noise criterion of 35 dB(A) Leq (15 min). Had this location been assessed in the LOM EA, then a criterion of 38 dB(A) would have resulted based on a review of worst case predicted noise levels over 25% of this vacant land and no criterion exceedance would have occurred.

Condition L4.3 of EPL 12290 L4.3 indicates that noise limits for WCC do not apply under temperature inversion conditions of up to 12°/100m and wind speeds greater than 2m/s at 10m above ground level. The night time measurement at R97 was made at a time when there was a strong temperature inversion (+8.2°C/100m) and a 2m/s wind. This would represent highly noise enhancing atmospheric conditions for this receiver.

The noise from WCC was audible at most locations that are situated to the north and to the east of the mine site, particularly during the evening/night survey. General mine hum was the most significant contributor to the mine noise component, with distinguishable truck revs and dozer tracks also audible on occasions.





Data from those times where WCC operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from WCC must not exceed **45 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

As shown in Table 3, during the evening/night time measurement circuit the L1 (1 min) noise from WCC did not exceed 45 dB(A) at any monitoring location.

#### Plant Sound Power Levels

In keeping with the NMP, the sound power levels of the major noise producing plant and equipment operating on the WCC site is to be determined from sound pressure level measurements. The measurement programme is to be undertaken progressively to capture noise levels from all plant over the period of a year.

The results of the sound power level calculations to date are shown in **Appendix III**. The table in Appendix III lists SWL's for plant items as taken from those used in the noise modelling for the latest EA for WCM. The SWL's from the EA, therefore, represent a calculated Leq (15 minute) noise level. For mobile plant this calculation is based on the length of time each noise source representing a plant item(s) is at a particular location on the mine site.

For example the noise model includes a number of noise sources located at intervals along the various haul roads to approximate the haul fleet working throughout a 15 minute operational period. The SWL for the point source is calculated based on the length of time any truck is expected to be passing that location during the assessment period.

For mobile plant, the measured Leq noise levels in the table in Appendix III represent a single passby for each plant item whereas the values adopted in the EA (particularly for haul trucks) are for the 15-minute calculated sound power level of 350m long sections of haul road. These values are typically 7-10 dB lower than the single pass-by level.





We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully, SPECTRUM ACOUSTICS PTY LIMITED

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Neil Perit

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SPECTRUM COUSTICS

Appendix I



Attended Noise Monitoring Locations





## Appendix II

Noise Limits

Location		Day Evening/Nigh		Night	Long Term	Acquisition
		L <sub>Aeq,15</sub> minute	L <sub>Aeq,15</sub> minute	L <sub>A1(1min)</sub>	L <sub>Aeq, 15</sub> minute	L <sub>Aeq,15</sub> minute
R12	"Quipolly Railway Cottage"	38	38	45	35	40
R24	"Hazeldene"	37	37	45	35	40
R96	"Talavera" <sup>#</sup>	38	37	45	35	40
All other privately-owned land		35	35	45	35	40

#### LOM Project Revised Noise Criteria

# "Talavera" property was listed in the EA under its previous property name of "Millbank"

#### Table 21: Properties with Private Agreements Noise Criteria

	Location	Noise Works Criteria dB(A) Leq	Noise Acquisition Criteria dB(A) Leq
R7	83 Wadwells Lane	40	45
R8	"Almawillee"	40	45
R9	"Gedhurst"	40	45
R10	"Meadholme"	40	45
R11	"Glenara"	40	45
R20	"Tonsley Park"	40	45
R21	"Alco Park"	40	45
R22	"Mountain View"	40	45
R98	"Kyooma"	40	45



## Appendix III

Plant Sound Power Levels

Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	Date Measured
Haul truck CAT 785C (unattenuated)	608	117.7	120	122	17/7/12
Haul truck CAT 785C (attenuated)	608	117.7	116.7	118	24/4/14
Haul truck CAT 785C (unattenuated)	614	117.7	119	121	28/1/14
Haul truck CAT 785C (attenuated)	614	117.7	117.5	119	24/4/14
Haul truck CAT 785C (unattenuated)	609	117.7	120		11/9/12
Haul truck CAT 785C (attenuated)	609	117.7	117.4	119	11/9/12
Haul truck CAT 785C (unattenuated)	610	117.7	121		11/9/12
Haul truck CAT 785C (unattenuated)	611	117.7	120		11/9/12
Haul truck CAT 785C (unattenuated)	612	117.7	120	122	28/1/14
Haul truck CAT 785C (attenuated)	612	117.7	117.8	120	24/4/14
Haul truck CAT 785C (unattenuated)	600	117.7	119		11/9/12
Haul truck CAT 785C (unattenuated)	613	117.7	122		8/8/13
Haul truck CAT 785C (attenuated)	613	117.7	117.9		24/4/14
Haul truck CAT 785C (unattenuated)	624	117.7	121		8/8/13
Haul truck CAT 785C (attenuated)	624	117.7	118.1		24/4/14
Haul truck CAT 789 (unattenuated)	875	117.7	119	121	28/1/14
Water Cart	WA897	113	113		11/9/12
Scraper	SC882	118	113		11/9/12
Excavator (PC 3600)	EX551	116	115		11/9/12
Dozer	829	118	115		24/4/14
Dozer (D10T)	832	118	113	118	28/1/14
Crushing Plant	n/a	116	118		11/9/12
Haul truck CAT 785C Horn pre attenuation	608	117.7		129	17/7/12
Haul truck Cat 785C Horn post attenuation	608	117.7		124	11/9/12
Excavator (PC4000)	EX837	116	115		18/12/12
Dozer D10T (1 <sup>st</sup> gear)	505	118	113 109	128 121	18/12/12
Dozer D10T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	505	118	118 109	124 113	6/2/13
Dozer D9T on stockpile (2 <sup>nd</sup> gear) (1 <sup>st</sup> gear)	501	118	119 113	122 118	6/2/13



Plant Item		NMP SWL	Actual	Actual	Date Measured
Туре	No.	dB(A) Leq	dB(A) Leq	dB(A) Lmax	
Excavator (EX 5600)	570	121	116	119	28/1/14
Haul truck CAT 793XQ	660	115	116	119	28/1/14
Haul truck CAT 793XQ	661	115	115	118	28/1/14
Haul truck CAT 793XQ	662	115	116	119	28/1/14
Haul truck CAT 793XQ	663	115	116	119	8/8/13
Haul truck CAT 793XQ	664	115	114	117	8/8/13
Haul truck CAT 793XQ	665	115	115	118	28/1/14
Haul truck CAT 793XQ	666	115	116	118	28/1/14
Haul truck CAT 793XQ	667	115	115	118	28/1/14
Hitachi Excavator 1900	543	116	115	118	28/1/14
Grader	849	n/a	110	113	28/1/14
Warrior 2400 crusher	n/a	116	117	117	8/8/13
Kleeman screen	MCR401	116	111	112	8/8/13
Water Cart (Volvo)	863	113	114	118	28/1/14
Water Cart (Cat 773D)	869	113	119	123	28/1/14
Water Cart (Cat 773D)	869	113	117.5	119	24/4/14
Drill (Bucyrus)	524	116	107	-	28/1/14
Drill (Cat 6420)	526	116	108	-	28/1/14
Water pump (Dam 4)			106		24/4/14
Evaporation fan (Dam 4)			105		24/4/14

\*Leq noise level from vehicle pass by only (modelled levels in the EA for LOM are based on an Leq (15 min) for an attenuated haul truck.
# Appendix 5 – Blasting Monitoring Results

## Werris Creek Coal Blast Monitoring 2014-2015

				WC South												WERRIS CREE	K COAL BLASTING	RESULTS										
Shot number	Date fired	Time Fired	Location	Predicted	Type	01	D44	Kuss		Warda O	h Oth Doo	Manda		0000		ADTO Outwart	APRIL 2014	TEMPERATURE			OINIOL			FINE				TO.
				VIDration K50		Giena Vib (mm/o		Kyoor		Werris C		Werris Vib (mm/		COMP		ARTC Cuivert	Vib (mm/o)	IEMPERATURE	Direction		SINGL			FUNE	DUST	ODA/ib	Duot/Euror	() Other
2014-21	1/04/2014	15:09	E12 7 10 Coopl TEP Dat 1	0.4	TCD		101 0	1 71	06 7	0.75	) OF (UB)		5) OF (ub)	10.00	120.0	Not Monitored	VID (IIIII/S)	2.7	072	2.9	12.7	12.0	12.4	0105	Read	2	Dust/Fullie	Outer
2014-21	4/04/2014	13:00	Bomp 14	0.3	IB	0.12	09.5	0.27	07.5	0.75	06.0	0.40	101.9	10.00	120.0	Not Monitored	50.00	-2.1	200	2.0	10.0	12.3	13.4	0	OK	0	0	0
2014-22	8/04/2014	13:09	S15 10-12 350	0.5	IB	0.12	104.7	1.22	105.3	0.22	111.0	0.10	101.0	10.00	120.0	Not Monitored	50.00	-3.0	283	0.5	10.0	12.0		0	OK	2	0	0
2014-23	16/04/2014	15:13	S13 7-10 Geogl TSB Part 2	0.0	TSB	0.13	104.7	1.22	109.9	0.93	109.0	0.45	103.5	10.00	120.0	Not Monitored	50.00	-2.0	152	6.4	0.8	0.8	0.8	0	Road	2	1	0
2014-24	17/04/2014	10:13	S15_8-10	0.5	IB	0.21	102.6	0.92	101.6	0.00	98.9	0.45	97.2	10.00	120.0	Not Monitored	50.00	-2.4	229	1.5	10.5	10.5	3.0	0	OK	0	0	0
TOTALS	APRIL 2014	# BLAST	5	TARGET	AVERAGE	0.17	101.8	1.18	102.0	0.49	101.9	0.31	96.6	5.00	115.0		00.00	0.2	LLU	1.0	10.0	10.0	1	Ŭ	OIX	Ū	Ū	Ŭ
TOTALS	APRIL 2014	#>0.5mm	4	<1mm/s	HIGHEST	0.25	104.7	1.71	108.8	0.83	111.9	0.48	109.3	10.00	120.0													
TOTALS	ANNUAL	# BLAST	5	<115dBL	AVERAGE	0.17	101.8	1.18	102.0	0.49	101.9	0.31	96.6	5.00	115.0	-												
TOTALS	ANNUAL	MAX #	15	% >115dB(L)	) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%													
				WC South												WERRIS CREE	K COAL BLASTING	RESULTS										
Shot number	Date fired	Time Fired	Location	Predicted	Type												MAY 2014		-		-					-		
Shot number	Date med	Time Theo	Location	Vibration K50	Type	Glena	ra R11	Kyoor	ma R98	Werris C	k Sth R62	Werris	Ck Mid R92	COMP	LIANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	w	IND	SINGL	E FREQUEN	NCY >0.02	FUME	DUST	c	COMPLAIN	rs
				mm/s		Vib (mm/s)	) OP (dB)	Vib (mm/s)	) OP (dB)	Vib (mm/s	) OP (dB)	Vib (mm/	s) OP (dB)	Vib (mm/s	s) OP (dB	) Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	L Hz	V Hz	T Hz	0 to 5		OP/Vib	Dust/Fume	Other
2014-26	5/05/2014	9:05	S13_B10-B17_RL264_TSB#1	0.6	IB	0.28	97.4	2.15	100.5	0.71	95.6	0.54	92.3	10.00	120.0	Not Monitored	50.00	-2.7	334	2.5	10.0,11.5	11.7	11.5	1A	OK	0	0	0
2014-27	7/05/2014	12:08	S16_B9-B12_RL370	0.6	OB	0.10	99.6	0.82	94.8	0.28	93.8	0.19	90.2	10.00	120.0	Not Monitored	50.00	-3.2	107	3.7	15.9	13.2	14.2	2B	OK	0	0	0
2014-28	9/05/2014	12:08	S17_Blackseam	0.7	OB	0.16	97.6	0.70	93.6	0.34	95.5	0.22	92.4	10.00	120.0	Not Monitored	50.00	-2.3	134	1.7	11.5	11.2	11.2	3B	OK	0	0	0
2014-29	14/05/2014	15:08	S13_B10-B17_RL264#2	0.3	IB	0.14	97.4	0.96	97.0	0.33	91.3	0.16	91.3	10.00	120.0	Not Monitored	50.00	-2.3	62	2.6	9.5	9.8	9.8	0	OK	0	0	0
2014-30	16/05/2014	15:15	S13_B7-B10_Gseam	0.9	IB	0.29	93.1	2.42	96.4	0.85	88.5	0.56	85.1	10.00	120.0	Not Monitored	50.00	-1.7	158	2.6	10.0,16.9	9.5	9.8,16.4	0	OK	1	0	0
2014-31	22/05/2014	11:13	S13_B11-B12_Gseam	0.8	IB	0.28	110.5	1.73	109.4	0.68	98.9	0.44	97.4	10.00	120.0	Not Monitored	50.00	-2.3	309	1.9	11.7,16.1	12.7	-	0	Road	1	0	0
2014-32	23/05/2014	15:09	S13_B10-B11_Gseam	0.5	IB DC/ID	0.10	95.7	1.60	90.3	0.13	96.0	0.12	92.8	10.00	120.0	Not Monitored	50.00	-1.8	308	2.9		-	15.6	28	Bood	0	0	0
2014-33	29/05/2014	13.13	S13_11-10_204 Flespilt + S13_D10-D17_RL204#3	0.5	F3/16	0.29	101.4	0.72	94.1	0.55	93.7	0.31	90.0	10.00	120.0	Not Monitored	50.00	-2.0	221	1.4	13.4	10.0,15.1	13.0	30	RUdu OK	2	0	0
2014-34 TOTALS	MAY 2013	# BLAST	313_10-21_204 Prespir	TARGET	AVERAGE	0.25	09.9	1 27	96.6	0.25	93.0	0.20	91.2	5.00	115.0	NOT MOTILOIPU	50.00	*2.0	200	2.0	2.9	2.9	3.2	0	UK	0	0	0
TOTALS	MAY 2013	#>0.5mm	8	<1mm/e	HIGHEST	0.21	110.5	2.42	109.4	0.40	08.0	0.56	97.4	10.00	120.0	-												
TOTALS		# BLAST	14	<115dBl	AVERAGE	0.19	100.3	1.92	99.3	0.03	98.1	0.30	93.9	5.00	115.0	-												
TOTALS		MAX #	15	% >115dB(L)	) or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	-												
				WC South	,		-	• • •				-		-		WEDDIS CREEK	K COAL BLASTING	DESIII TS										
				Predicted	_											WEIGHT OKEE	JUNE 2014	RESOLIS										
Shot number	Date fired	Time Fired	Location	Vibration K50	Туре	Glena	ra R11	Kyoor	ma R98	Werris C	k Sth R62	Werris	Ck Mid R92	COMP	LIANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	W	IND	SINGL	E FREQUEN	NCY >0.02	FUME		С	COMPLAIN	rs
				mm/s		Vib (mm/s)	) OP (dB)	Vib (mm/s)	) OP (dB)	Vib (mm/s	) OP (dB)	Vib (mm/	s) OP (dB)	Vib (mm/s	s) OP (dB	) Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	L Hz	V Hz	T Hz	0 to 5	DUST	OP/Vib	Dust/Fume	Other
2014-35	2/06/2014	15:13	S13_B14-B15_Gseam	0.6	IB	0.24	96.4	1.83	91.9	0.25	86.7	0.20	95.4	10.00	120.0	Not Monitored	50.00	-1.9	296	2.5	16.6	-	-	4C	OK	0	0	0
2014-36	6/06/2014	13:07	S13_B17-B23_RL290_TSB#1		TSB	0.26	100.9	0.82	108.2	0.46	103.4	0.27	94.8	10.00	120.0	Not Monitored	50.00	-1.8	143	5.8	11	11	10.7	0	OK	0	0	0
2014-37	10/06/2014	16:00	S13_B11-B13_Gseam#1	0.3	IB	0.16	103.8	1.11	104.1	0.39	98.4	0.37	91.7	10.00	120.0	Not Monitored	50.00	-1.3	134	6.2	11.7	13.4	-	0	OK	0	0	0
2014-38	11/06/2014	13:08	S16_B18-B20_370 Ramp	0.4	IB	0.09	104.4	0.45	103.0	0.24	98.2	0.17	97.6	10.00	120.0	Not Monitored	50.00	-2.3	139	3.2			-	0	OK	0	0	0
2014-39	16/06/2014	9:10	S13_B17-B23_RL290_TSB#2		TSB	0.10	96.8	0.45	99.8	0.14	91.4	0.12	90.4	10.00	120.0	Not Monitored	50.00	-2.7	335	3.2	-	-	-	0	OK	0	0	0
2014-40	17/06/2014	11:03	S15_B9-B12_Boxcut_RL330	0.6	IB	0.15	92.7	1.01	95.9	0.46	92.3	0.22	90.6	10.00	120.0	Not Monitored	50.00	-2.7	323	2.8	10	12.7	-	1A	OK	0	0	1
2014-41	19/06/2014	13:08	S13_B14-B15_Gseam#2	0.4	IB	0.17	98.5	0.97	95.5	0.33	91.8	0.24	91.0	10.00	120.0	Not Monitored	50.00	-2.6	311	4.3	-	-	-	0	OK	0	0	0
2014-42	20/06/2014	9:03	\$15_B7-B8_RL350	0.6	IB	0.11	107.0	0.55	103.2	0.35	94.9	0.15	102.5	10.00	120.0	Not Monitored	50.00	-1.0	337	3.4	13.2	13.2	-	0	OK	0	0	0
2014-43	23/06/2014	13:04	S13_Fault_Gseam	0.4	IB	0.09	103.5	0.51	98.9	0.35	95.5	0.25	101.6	10.00	120.0	Not Monitored	50.00	-1.8	327	5.4	-		-	0	OK	0	0	0
TOTALS	JUNE 2013	# BLAST	9	TARGET	AVERAGE	0.15	100.4	0.86	100.1	0.33	94.7	0.22	95.1	5.00	115.0	-												
TOTALS	JUNE 2013	#>0.5mm	1	<1mm/s	HIGHEST	0.26	107.0	1.83	108.2	0.46	103.4	0.37	102.5	10.00	120.0	-												
TOTALS	ANNUAL	# BLASI	23	<1150BL	AVERAGE	0.18	100.4	1.10	99.6	0.43	97.0	0.28	94.3	5.00	115.0	-												
TOTALS	ANNUAL	WIAA #	15	% >TISUB(L)	j or sinings	0%	076	0%	0%	0%	0%	0%	0%	376	3 76	WEDDIS CREE	K COAL BLASTING	DESIII TS										
				Predicted												MERING ONLES	JULY 2014	NEODE IO										
Shot number	Date fired	Time Fired	Location	Vibration K50	Туре	Glena	ra R11	Kyoor	ma R98	Werris C	k Sth R62	Werris	Ck Mid R92	COMP	LIANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	W	/IND	SINGL	E FREQUEN	NCY >0.02	FUME	DUIOT	C	COMPLAIN	rs
				mm/s		Vib (mm/s)	) OP (dB)	Vib (mm/s)	) OP (dB)	Vib (mm/s	) OP (dB)	Vib (mm/	s) OP (dB)	Vib (mm/s	s) OP (dB	) Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	L Hz	V Hz	T Hz	0 to 5	DUST	OP/Vib	Dust/Fume	Other
2014-44	1/07/2014	13:08	S15_B6-B7_UG1	-	UG	0.09	101.2	0.57	110.8	0.23	108.7	0.18	105.1	10.00	120.0	1.95 127.3	50.00	-1.8	8	1.4	-	-	-	1A	OK	0	0	0
2014-45	2/07/2014	13:05	S15_B12-B16_330_EXT	0.7	IB	0.27	94.7	1.26	99.9	0.53	95.8	0.48	94.1	10.00	120.0	Not Monitored	50.00	-2.6	220	1.8	18.8,11	18.8,11	9.5,16.4	5C	OK	12	8	0
2014-46	4/07/2014	13:12	S15_B6-B7_UG2	-	UG	0.06	106.7	0.30	103.1	0.21	97.3	0.12	104.4	10.00	120.0	2.19 121.2	50.00	-2.7	306	5.5	-	-	-	3B	Road	0	0	0
2014-47	9/07/2014	11:03	S14_Ramp_RL350	0.3	IB	0.13	108.3	0.50	98.0	0.18	95.5	0.22	99.4	10.00	120.0	Not Monitored	50.00	-2.9	325	6.2	-	· ·	10	0	Offsite	0	0	0
2014-48	11/07/2014	13:04	S13_B11_B13_Gseam	0.7	IB	0.21	103.7	1.14	96.2	0.68	91.5	0.49	93.0	10.00	120.0	Not Monitored	50.00	-3.8	273	4.1	16.6	· ·	-	0	OK	0	0	0
2014-49	15/07/2014	13:05	S16_B16-B17_370	0.5	IB	0.13	107.4	0.39	103.3	0.2	95.6	0.16	95.3	10.00	120.0	Not Monitored	50.00	-2.1	334	3.1	16.1	3.4	16.8	0	OK	0	0	0
2014-50	17/07/2014	10:08	S13_B14-B15_Gseam#3	0.4	IB	0.13	98.1	0.63	99.3	0.26	91.6	0.17	90.6	10.00	120.0	Not Monitored	50.00	-2.9	318	5.2	10.3	11.0	10.7	1A	OK	0	0	0
2014-51	21/07/2014	13:23	S13_B16-B20_RL270_TSB	0.3	IB	0.17	93.3	0.36	96	0.27	91.4	0.21	89.3	10.00	120.0	Not Monitored	50.00	-2.8	283	1.6	12.2	12.2	12.2	0	OK	0	0	0
2014-52	24/07/2014	13:03	S15_B14-B16_RL330	0.7	IB	0.12	101.6	0.54	96.3	0.27	98.2	0.22	99.4	10.00	120.0	Not Monitored	50.00	-1.9	19	3.9	13.4	12.7		0	Onsite	1	0	0
2014-53	25/07/2014	13:06	S15_B6-B7_UG3	-	UG	0.06	98.9	0.31	96.3	0.14	93.8	0.09	92.8	10.00	120.0	<1 DNT	50.00	-2.1	22	4.6	-	-	-	2A	OK	0	0	0
2014-54	29/07/2014	13:18	S16_B8-B11_RL350	0.9	IB	0.10	102.3	0.51	102.6	0.21	96.0	0.16	97.3	10.00	120.0	Not Monitored	50.00	-2.8	336	4.9	3.2	3.4	2.7	0	OK	0	0	0
TOTALS	JULY 2014	# BLAST	11	TARGET	AVERAGE	0.13	101.5	0.59	100.2	0.29	95.9	0.23	96.4	5.00	115.0	DNT = Did not trigger												
TOTALS	JULY 2014	#>0.5mm	7	<1mm/s	HIGHEST	0.27	108.3	1.26	110.8	0.68	108.7	0.49	105.1	10.00	120.0	_												
TOTALS	ANNUAL	# BLAST	34	<115dBL	AVERAGE	0.17	100.6	0.98	99.7	0.39	96.7	0.27	94.8	5.00	115.0	-												
IDIAIS		MAX#	15	2/2 >110dB(L)	LOLOMIN/S	11%	11%	11%	1176	11%	117%	111%	11%	5%	5%	1												

## Werris Creek Coal Blast Monitoring 2014-2015

				WC South												WERRIS CREEK	COAL BLASTING	RESULTS									
Shot number	Date fired	Time Fired	Location	Predicted Vibration K50	Туре	01	- 044		- 000	Manula Oli (	Out Doo	Warda Ol	Mid Dog	COMPI			AUGUST 2014	TEMPEDATURE		WIND SINGLE FREQUENCY >0.02 FLIME							
				mm/s		Glenar Vib (mm/e)		Vib (mm/e)	OP (dB)	Vib (mm/c)	OP (dB) V	Werris Ck	OP (dB)	Vib (mm/e)		Vib (mm/s) OR (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/e	SINGLE	V H7	T H7	0 to 5	DUST		viPLAINTS
2014-55	1/08/2014	12:24	S13 B19-B20 Gseam TSB	0.7	TSB	0.30	103.9	0.99	102.5	0.63	103.3	0.48	109.3	10.00	120.0	Not Monitored	50.00	-2.8	328	6.5	12.2	12.2	12.2	2A	OK	0	
2014-56	4/08/2014	13:03	Big Rocks		Rocks	0.00	87.3	0.00	91.4	0.00	86.1	0.01	82.5	10.00	120.0	Not Monitored	50.00	-2.8	232	0.9		-	-	0	OK	0	0 0
2014-57	5/08/2014	13:03	Big Rocks	-	Rocks	0.00	93.6	0.00	86.0	0.01	92.7	0.01	96.3	10.00	120.0	Not Monitored	50.00	-2.1	209	1.8				0	OK	0	0 0
2014-58	6/08/2014	13:05	S15_B3-5_RL350_TSB	1.0	TSB	0.32	105.0	1.69	104.6	1.02	95.7	0.48	94.2	10.00	120.0	9.84 122.3	50.00	-3.1	336	3.7	12.9	12.9	12.9	0	Road	1	0 0
2014-59	7/08/2014	13:03	S16_B8-B9_RL350	0.7	IB	0.10	94.2	0.60	93.4	0.37	90.4	0.18	88.7	10.00	120.0	2.47 111.2	50.00	-1.2	342	0.6	13.2		9.3	0	OK	0	0 0
2014-60	8/08/2014	13:04	Big Rocks	-	Rocks	0.00	92.2	0.04	85.7	0.00	87.9	0.01	86.9	10.00	120.0	Not Monitored	50.00	-2.6	358	2.6	-		-	0	OK	0	0 0
2014-61	11/08/2014	13:08	S16_B12-B13_RL350	1.0	IB	0.19	98.0	0.81	103.1	0.52	98.4	0.36	94.6	10.00	120.0	Not Monitored	50.00	-3.3	294	2.9	9.8	10.3	9.5	0	OK	2	0 0
2014-62	12/08/2014	16:08	S13_B16-B18_Gseam	0.4	IB	0.13	96.1	0.41	91.3	0.19	90.8	0.14	89.1	10.00	120.0	Not Monitored	50.00	-1.7	152	5.1				0	OK	0	0 0
2014-63	13/08/2014	13:08	S15_B16-B20_Presplit		PS	0.45	98.4	0.89	101.5	0.46	91.6	0.42	89.6	10.00	120.0	Not Monitored	50.00	-3.1	169	3.9	3.2	2.9	2.9	2B	OK	0	0 0
2014-64	14/08/2014	16:08	Big Rocks	-	ROCKS	0.00	85.5	0.04	98.3	0.01	93.6	0.00	94.4	10.00	120.0	Not Monitored	50.00	-1.9	1//	5.4	-		-	0	OK	0	0 0
2014-65	15/08/2014	13:04	S14_B16-B18_Aseam	0.5	IB	0.05	93.1	0.24	93.9	0.15	90.1	0.09	91.1	10.00	120.0	Not Monitored	50.00	-2.0	106	3.5	- 16.1		-	10	Onsite	0	0 0
2014-00	25/08/2014	16:08	S14 B19-B21 BI 330	0.5	TSB	0.22	110.1	0.50	104.9	0.47	102.4	0.24	98.8	10.00	120.0	Not Monitored	50.00	-2.3	166	3.8	13.4	13.4	13.4	0	OK	0	0 0
2014-68	27/08/2014	9:35	S16 B15-B16 BI 370	0.3	IB	0.11	97.9	0.28	97.7	0.23	104.7	0.15	106.0	10.00	120.0	Not Monitored	50.00	-1.4	113	1.1		11.0		2A	OK	0	0 0
2014-69	29/08/2014	16:23	S17_B8-B13_RL370	0.5	IB	0.08	101.5	0.43	105.4	0.35	102.0	0.27	102.4	10.00	120.0	2.74 121.3	50.00	-1.7	165	5.5	16.4	3.4	2.9	2B	OK	0	0 0
TOTALS	AUGUST 2014	# BLAST	15	TARGET	AVERAGE	0.15	96.8	0.51	98.1	0.31	94.9	0.21	95.2	5.00	115.0		1		1								
TOTALS	AUGUST 2014	#>0.5mm	7	<1mm/s	HIGHEST	0.45	110.1	1.69	111.8	1.02	104.7	0.48	109.3	10.00	120.0	Ī											
TOTALS	ANNUAL	# BLAST	49	<115dBL	AVERAGE	0.16	99.9	0.88	99.4	0.38	96.4	0.25	94.9	5.00	115.0												
TOTALS	ANNUAL	MAX #	15	% >115dB(L) o	or 5mm/s	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%												
				WC South												WERRIS CREEK	COAL BLASTING	RESULTS									
Shot number	Date fired	Time Fired	Location	Predicted	Туре											SE	PTEMBER 2014										
				mm/s		Glenar		Kyoon	DR (dR)	Werris Ck s	Sth R62	Werris Ck	Mid R92	COMPL		ARTC Culvert	Vib (mm/a)	IEMPERATURE	Direction	ND m/o	SINGLE	FREQUENCI	Y >0.02	FUME 0.to 5	DUST	ODAVIN	
2014-70	2/09/2014	0.48	S14 B16 B18 PI 330	0.6	IB	0.11		0.31	0F (UB)	0.21	0F (UB) V	0.12	96.6	10.00	120.0	Not Monitored	50.00	-1.9	227	2.0	LHZ	VHZ	1 112	010 5	OK		
2014-71	4/09/2014	9:48	S14 B21 B23 BL330 TSB	0.6	TSB	0.22	100.1	0.96	96.9	0.53	99.9	0.41	97.0	10.00	120.0	Not Monitored	50.00	-3.2	179	2.5	17.6			0	OK	0	0 0
2014-72	5/09/2014	13:08	S17_B13_B16_RL350	0.6	IB	0.17	104.5	0.87	118.3	0.47	101.8	0.34	101.0	10.00	120.0	Not Monitored	50.00	-4.3	135	6.9	10.7	10.7	13.9	0	Onsite	1	0 0
2014-73	10/09/2014	16:08	S17_B9_B12_RL350	1.0	IB	0.14	105.6	0.84	111.3	0.50	107.7	0.45	113.5	10.00	120.0	Not Monitored	50.00	-2.0	260	5.0	3.7	3.2	2.9	0	Road	0	0 0
2014-74	11/09/2014	13:18	S15_B5_B6_Wedge_RL350	0.3	IB	0.07	97.4	0.54	102.3	0.23	94.0	0.12	93.5	10.00	120.0	2.03 114.6	50.00	-3.0	269	1.7	-	-	-	0	Road	0	0 0
2014-75	11/09/2014	13:18	S14_B18_Trim_RL330	0.3	IB	0.07	97.4	0.54	102.3	0.23	94.0	0.12	93.5	10.00	120.0	2.03 114.6	50.00	-3.0	269	1.7	-			0	Road	0	0 0
2014-76	12/09/2014	13:04	S16_B13_B15_RL350	0.3	TSB	0.13	99.5	0.51	98.5	0.40	99.1	0.27	98.9	10.00	120.0	Not Monitored	50.00	-3.2	104	2.5	11.5	11.0	10.7	0	OK	0	0 0
2014-77	12/09/2014	13:04	S16_B21_B22_TSB_RL350	0.3	TSB	0.13	99.5	0.51	98.5	0.40	99.1	0.27	98.9	10.00	120.0	Not Monitored	50.00	-3.2	104	2.5	11.5	11.0	10.7	0	OK	0	0 0
2014-78	15/09/2014	13:08	S14_B18_Trim_RL330_#2	0.2	IB	0.05	101	0.27	97.5	0.12	91.4	0.06	100.7	10.00	120.0	Not Monitored	50.00	-3.7	321	2.9	-			0	OK	0	0 0
2014-79	17/09/2014	9:43	S15_B5_Wedge_RL350 & Big Rocks	0.1	IB	0.03	95.6	0.19	103.5	0.06	101.4	0.05	101.1	10.00	120.0	1.08 119.8	50.00	-3.1	215	1.5				0	OK	0	0 0
2014-80	22/09/2014	16:13	S17_B16-B17_B1 370	0.4	OB	0.13	97.3	0.54	98.7	0.36	95.4	0.30	95.5	10.00	120.0	Not Monitored	50.00	-4.1	122	2.7			10.7	0	OK	0	0 0
2014-82	23/09/2014	16:13	S17 B21-B23 RI 370	0.5	OB	0.10	105.7	0.46	103.8	0.44	103.8	0.22	102.6	10.00	120.0	Not Monitored	50.00	-1.8	31	2.0	12.9	12.7	11.5	1A	OK	1	0 0
2014-83	27/09/2014	9:34	S16_B13_B16_RL350	0.6	IB	0.20	104.1	0.70	104.3	0.36	98.5	0.24	96.9	10.00	120.0	Not Monitored	50.00	-2.5	178	2.4	3.9		3.7	ЗA	OK	0	0 0
2014-84	29/07/2014	16:04	S17_B21-B23_RL370_UG	0.5	OB	0.19	99.5	0.87	104.4	0.35	98.3	0.29	98.5	10.00	120.0	Not Monitored	50.00	-2.6	310	1.6	-	-	10.5	1A	OK	0	0 0
TOTALS	SEPTEMBER 2014	# BLAST	15	TARGET	AVERAGE	0.13	100.4	0.58	102.5	0.34	98.7	0.24	98.7	5.00	115.0												
TOTALS	SEPTEMBER 2014	#>0.5mm	9	<1mm/s	HIGHEST	0.22	105.7	0.96	118.3	0.53	107.7	0.45	113.5	10.00	120.0												
TOTALS	ANNUAL	# BLAST	64	<115dBL	AVERAGE	0.16	100.0	0.83	99.9	0.37	96.8	0.25	95.5	5.00	115.0	-											
TUTALS	ANNUAL	MAX #	15	WC South	51 51111/5	0%	0%	0%	1.6%	0%	0%	0%	0%	5%	5%	WERRIS CREEK	COAL BLASTING	RESULTS									
				Predicted	-											0	OCTOBER 2014										
Shot number	Date fired	Time Fired	Location	Vibration K50	iype	Glenar	a R11	Kyoon	na R98	Werris Ck S	Sth R62	Werris Ck	Mid R92	COMPL	IANCE	ARTC Culvert	COMPLIANCE	TEMPERATURE	w	IND	SINGLE	FREQUENCY	Y >0.02	FUME	DUST	CO	MPLAINTS
				mm/s		Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB) V	lib (mm/s)	OP (dB)	Vib (mm/s)	OP (dB)	Vib (mm/s) OP (dB)	Vib (mm/s)	Inversion oC/100m	Direction	m/s	L Hz	V Hz	T Hz	0 to 5		OP/Vib D	ust/Fume Other
2014-85	1/10/2014	16:09	S14_B14_B16_RL320	0.2	IB	0.13	103.9	0.95	104.4	0.27	104.2	0.17	107.1	10.00	120.0	Not Monitored	50.00	-2.4	168	5.2	16.4			1A	Onsite	0	0 0
2014-86	2/10/2014	13:08	S15_Eastern Trim		TCD	0.02	92.7	0.17	109.4	0.04	102.6	0.03	104.2	10.00	120.0	<0.50 DNT	50.00	-4.1	100	7.0	- 19.1	10.2	- 10.1	24	Onoito	0	0 0
2014-88	8/10/2014	13:08	S14 B12 B15 Cseam	0.8	IB	0.21	102.7	2.15	108.8	0.43	102.3	0.33	100.1	10.00	120.0	Not Monitored	50.00	-3.7	214	4.1	-	12.7	-	0	Road	4	0 0
2014-89	9/10/2014	13:08	ETS Presplit	0.4	PS	0.1	94.7	0.57	94.7	0.18	90.7	0.11	89.2	10.00	120.0	3.03 109.2	50.00	-3.4	146	2.3		-		0	OK	0	0 0
2014-90	10/10/2014	9:33	S16_B16_B17_RL350_TSB#2	0.5	TSB	0.16	98.7	0.53	99.5	0.31	97.3	0.24	94.5	10.00	120.0	Not Monitored	50.00	-3.4	322	3.2	10.3		10.5	0	OK	0	0 0
2014-91	13/10/2014	16:49	S14_B17_B21_RL320_TSB	0.4	TSB	0.11	98.9	0.52	100.7	0.40	97.1	0.17	110.1	10.00	120.0	Not Monitored	50.00	-2.3	1	7.6	12.7	12.7	13.2	0	OK	0	0 0
2014-92	13/10/2014	16:49	S17_B10_B11_RL350_Harddig	0.4	IB	0.11	98.9	0.52	100.7	0.40	97.1	0.17	110.1	10.00	120.0	Not Monitored	50.00	-2.3	1	7.6	12.7	12.7	13.2	0	OK	0	0 0
2014-93	15/10/2014	16:08	S14_B14_B16_RL320	0.4	IB	0.12	93.9	0.81	99.4	0.31	95.7	0.20	97.7	10.00	120.0	Not Monitored	50.00	-2.9	286	1.8	16.4	12.7	15.9	0	OK	0	0 0
2014-94	17/10/2014	13:58	S15_B4_B6_RL335_TSB	0.4	TSB	0.16	97.3	0.91	96.7	0.63	96.3	0.28	101.5	10.00	120.0	7.41 116.4	50.00	-4.0	167	3.5	16.1	13.4	-	0	Road	2	0 0
2014-95	20/10/2014	13:33	S16_B19_B21_RL350_TSB	0.4	TSB	0.14	97.7	0.46	104.2	0.40	98.7	0.24	103.9	10.00	120.0	Not Monitored	50.00	-4.4	177	7.7	-	24.2	-	0	Onsite	1	0 0
2014-96	21/10/2014	13:08	S15_B/_Wedge_KL335 S15_B0_B10_DS_PL320 + S15_B0_B10_DS_Dacam	-	IB DS	0.18	105.8	0.61	102.9	0.51	95.0 95.0	0.20	91.5	10.00	120.0	2.00 113.3	50.00	-4.4	122	3.3	10.3	2.7	10.3	0	Onsite	0	0 0
2014-98	22/10/2014	12:59	S14 Western Trim		IB	0.02	92.1	0.04	89.6	0.03	87.6	0.01	99.8	10.00	120.0	Not Monitored	50.00	-3.6	234	2.8	2.0		2.9	0	OK	0	0 0
2014-99	23/10/2014	13:03	S15_B9-B10_Cseam		IB	0.10	97.8	0.31	101.9	0.14	95.3	0.11	92.7	10.00	120.0	Not Monitored	50.00	-4.1	179	1.5	- 1		-	0	Road	0	0 0
2014-100	28/10/2014	14:08	S17_B18_B19_RL370	0.5	IB	0.34	103.1	0.78	104.6	0.57	110.8	0.28	111.9	10.00	120.0	2.13 116.1	50.00	-5.0	258	6.4	10.3	10.3	10.7	0	Road	0	0 0
2014-101	28/10/2014	14:08	S17_B6_B7_RL375	0.5	IB	0.34	103.1	0.78	104.6	0.57	110.8	0.28	111.9	10.00	120.0	2.13 116.1	50.00	-5.0	258	6.4	10.3	10.3	10.7	0	Road	0	0 0
2014-102	30/10/2014	13:08	S15_B7_Wedge_RL335	0.3	IB	0.23	89.4	0.78	96.4	0.35	100.3	0.35	91.4	10.00	120.0	2.15 97.5	50.00	-4.2	311	3.4	-		-	0	Road	0	0 0
2014-103	30/10/2014	13:08	S14_B14_B21_PS_RL290	0.3	PS	0.23	89.4	0.78	96.4	0.35	100.3	0.35	91.4	10.00	120.0	2.15 97.5	50.00	-4.2	311	3.4	3.2	2.9	2.9	2A	OK	0	0 0
2014-104	31/10/2014	13:13	S16_B3-B4_RL370_TSB	0.2	IB	0.06	106.4	0.57	93.6	0.21	89.3	0.14	92.8	10.00	120.0	4.61 113.8	50.00	-3.8	336	2.9	-		-	0	OK	0	0 0
TOTALS	OCTOBER 2014	# BLAST	20	TARGET	AVERAGE	0.15	94.9	0.67	97.3	0.35	94.5	0.22	96.2	5.00	115.0	DNT = Did not trigger											
TOTALS	ANNUAL	#>0.5mm	12	<115dBl	AVERACE	0.34	106.4	2.15	118.3	0.63	96.4	0.45	113.5	5.00	120.0	ł											
TOTALS	ANNUAL	MAX #	15	% >115dB(L) o	or 5mm/s	0%	0%	0%	1.2%	0%	0%	0%	0%	5%	5%	t											
				(-/-																							

# Appendix 6 – Groundwater Monitoring Results

r. WEF	RIS CREEK CO	DAL PTY LTD										ACIRL LABORATO	RY:				
ESS/OF	FFICE											Bi-Monthly Ground	Waters - SWL (Sta	anding Water Leve	I Only)		(ALS)
CT ID	WERRIS CRE	EK COAL QUAR	TERLY GROUNDW	ATERS													ACIRI
	AME:	CElha	P	Phillip	15												<u>AAAIIII A</u>
		AND SUBBOU	INDS									State of the second		Field Observations			Comments
WERR	IS CHEEK MIN	mole ID Informatio	0	Bor	e Data		Sor	npling Data		0	Pielo losta	field	ranc	b	tour		
			The state	iding ater wel	depth	ek up	Type Type	emulo	Depth	0 - lie	-H	dime	e	õ	ö		
San	ID	Date	(Inte	Star We Le	Bore	Bti	2	Contraction of the second		<u> </u>	NAME OF TAXABLE						
			(24hr)	Imbgl II	mbgl mbtoc	m	Pump / Bailer	Ļ	□mbtoc	uS/cm	pH units	°C		111	an-	C Monthly	Hillden
		1	13.10	0m	um 🛐	.12	Bell -			1212	6.6	219	Clear	NI	CLEDIF	6 Monthly	Rolan vier
•	MW1	22/9	15:55.	20.01	0	115	in a			837	7.2	20.4	Gear	MI	Gow	6 Monthly	Europa
•	MW2	22/9	13:35	276		105	RI			544	7.9	19.6	leer	NI	t	MOININ	Faite Ena
	MW3	29	9.30	11.54	C	5.41	Dail .			Broken .	Hickyp	Blockog	Tm	(Stinky Ke	a water	6 Monthly	u v
	MW4	2219	11:10	20.20		-	e 11			1604	7.6	19.6 -	Clau	Not	Vear	6 Monthly	Mine atte
	MW4B	22/9	11:25	13-46		10	Da.I.	0 * 5		2440	6.9	19.8	Clear	101	Vier		2 P
	MW5	22/9	10:00	10.73		1.13					-		Shat		0	0 Manthl	All wenter (
	MW5B	29	9:45	10.71		0-10	0.1			1798	Tio	21.2	Turka	N.I	" Bou		MI mil
-	MW6	29	11:40	13.62		105	Bail.			"Stick	- OP K	naked are	r with	new rai		5	the and
	MW9			+							1					K	scor lave
	MW10	22/9	12:55	. 11.16		0.1	-		-	-				N		1	tion rol lo
	MW11			Fun	par	W	cone.										10 10 100
*	MW14	229	12:30	18:57		0.90										¥ 1	11 11 1
+	WW14B	22/9	12:40	18:30	1	0-15							1. 1				Jordine I In
	MW17B	22/9/1	4 13:30	11.82	2	0.62								1 24			usley tank
	MW20	23/4/14	60.6	20.61		2.25						Ce.				(M	averge unp
Ĩ	MW24A	239/14	10:35	14-79		0.15							-	10 K	· ·	31 me	R R
	MW25A	4									C		1		10.00	6-	· jent.
	MW25B																1
	P1					N											
	P2		5	1	10.00												+ 1. (+1
	PUG	4	-	100												- 6-5C	pe. cuont
p	MW27	229	13:15	52.3	6	0.4							(not	ronning	).		pan a - whe
	MW29	239	10:15	13.6	1			•	1	1	med "	1		1		la	levere,
	MW31	1	-					NO	Voney	e mansa				· · ·			
SPECIA	L COMMENTS:	M															

FIELD	SAMPLING SHEE	ET - SURFACE & G	ROUND WATERS						and a second			111111	The final star			1.25.2	
CLIEN	T: WERRIS CREE	EK COAL PTY LTD							×				:				
ADDR	ESS/OFFICE:						4					ACIRL LABORA	TORY:				
PROJE	ECT ID: WERRIS	CREEK COAL QUA	RTERLY GROUN	OWATERS								Bi-Monthly Grou	nd Waters - SWL (	Standing Water Le	vel Only)		(ALS)
SAMPL	ER NAME:						and a second second second second	2								$\sim$	ACIRI
SITE: V	VERRIS CREEK	MINE AND SURRO	UNDS						Name and a straight of the state								
S.		Sample ID Informatio	an a	g	Bore Data	Q.	2 2 2 2 2	Sampling Data	te t	2	Field Tests	eg	e e	Field Observations	1212		Comments
e, Anal	Sample ID / Bore	e Date	fime	Standir Water Level	òre de	Stick u	urge T	Purge Volum	Depth	EC - fie	pH - fie	- dwa	ppear	Odor	Color		
Reportable			(24hr)	⊡mbgl ⊡mbtoc ⊡m	⊡mbgl ⊡mbtoc ⊡m	m	Pump / Bailer	L	⊡mbgl ⊡mbtoc ⊡m	uS/cm	pH units	°C					
	MW8	23/9/14	11:10	18.07	1	0.2						•				. Rezer	A
5	MW12	23/9/14	9:40	11.15	(	0.5			п			Ð				·Hare	ldone
	MW13	23/9/14	11.40	6.10	(	0.4					8					Wad.	mell In well
	MW13B	13/114	11:50	451		0:3				×	8					Jary	leve he - traysle
	MW13D	23 9 14	12:00	4.94	- 0	ッシ										Jayl	an Ing - Windowe
	MW15	23/9/14	13:15	5.61	. 0	0.2										Ray	re In Windmill
	MW16	24 9/14	10:00	6.63		0.3										Mo	untai were
	MW17A	23/9/14	13:55	5.70	c	5.5										83	Wolnell m
	MW18A	23/9/14	13:45	5.55	*	157 g										82	~~ W
	MW19A	23 9 14	11:25	<b>8</b> 97		0.15								5		Lint	an purp.
	MW21A	23/9/4	9725	9.32	c	2.3										9 les	nave.
	MW22A	24/2/04	9:35	678	0	1.55					2		2			30'	8 Paynes In Ho
	MW22B	2494	9:45	7:04	0	2.45										*	+ · Ing
	MW23A	23 9 14	12:40	4.32	. 0	9.2				(Prop	on)					Pega	y Kasy Hars
	MW23B	23 9 14	13:00	5.37	(	0.1		Υ. ··		llup	an j					~	- Irrigo
	MW28A	23 9 14	10:50	13.54	•	0.25				1		à			5 S	Wa	Slann LHSP
0.00	MW28B	· ·			*	Purp	aur	bare	4	я						. ^	" RHSp
SPECIAI	L COMMENTS:	M											· · · ·	<u>,</u>	đ.,		<b>N</b>
		1	•													Chaot	of
L														3	7	Sileet.	VI

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and Holmann

D SAMPLING SHE	et - Su Ek coai	RFACE &	GROUND WATERS		, ,								):				
RESS/OFFICE:						and an approximate whe						ACIRL LABORA	TORY:		2		
JECT ID: WERRIS	CREEK	COAL QU	ARTERLY GROUND	WATERS								Bi-Monthly Grour	nd Waters - SWL (	Standing Water Le	evel Only)		(ALS)
PLER NAME:																	
WERRIS CREEK	MINE AI	ND SURRO	DUNDS														ACIRL
	Sample	e ID Informa	tion	5	Bore Data	i a	ad;	Sampling Data	Ţ	g	Field Tests	er	2	Field Observation	8		Comments
Sample ID / Bor	e	Date	Time	Standir Water Level	ore de	Stick u	Irge Ty	Purge	Depth	EC - fie	H- fie	- ofu	ppeara	Odor	Colou		
			(24hr)	⊡mbgl ⊡mbtoc	mbgl ⊡mbtoc	m	Pump /	L	⊡mbgl ⊡mbtoc	uS/cm	pH units	9C	4		All Andrews		
MW7		19.91		⊡m	⊡m		Ballet		⊡m						3	Ma	Ata nu
MW7B	-	_				-				2						1 113	a will
MW32	23	9	11:15	4.10	,	0.45					1.					"Naranii" -	Pump Shed - 3 Johns Lane
MW36A	22	9	12:00	23-91	6	095										M	ne site offert
MW36B	22	9	12:10	23:79	5	0.95	0										
MW35	-	1									0					ladoc	& Black City D.
MW34	24	9	9:15	11.20	4	0.15										Off	and id. (W/c)
MW5P	22	<b>A</b>	10:15.	12.81	0	070										M	elsite
MWC	22	9	10:25	10:54	ł	0.95											v 1
MWSE	22	9	10155	11.67	1	o-TS											/ /
MWSF	22	9	10:45	14-26		1.2						,				1	/
MWSG	29	19	10:35	12.6	ð	0.85											
		·								8						- v	
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L COMMENTS:	м		I	J		J					ñ	L	inde in		· ·		u -
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# Appendix 7 – Surface Water Monitoring Results

# Appendix 8 – Discharge Monitoring Results