18 November 2022

Ref: 171356/29907

Muswellbrook Coal Company
PO Box 123
Muswellbrook NSW 2333

RE: NOVEMBER 2022 NOISE MONITORING RESULTS – MUSWELLBROOK COAL MINE

This letter report presents the results of noise compliance monitoring, commencing at about 10.00 pm on Wednesday 16th of November, 2022, for the Muswellbrook Coal Company (MCC) mine at Muscle Creek Road, Muswellbrook. The monitoring was undertaken as per the requirements of D.A. 205/2002 and detailed in the Noise Management Plan (NMP) for the mine.

Attended Noise Monitoring Program

Noise monitoring was undertaken in accordance with the NMP as summarised below.

All attended monitoring and equipment maintenance and calibration is conducted in accordance with the Noise Policy for Industry (NPfI) and AS1055 – Acoustics, Description and Measurement of Environmental Noise.

Attended noise monitoring is undertaken monthly by an independent noise consultant. Each attended noise survey will be conducted during night periods only. If it is identified during the noise monitoring that the mining noise from the operation is exceeding the criteria, MCC will be notified and the operations will be modified as required. Monitoring at the location(s) where the noise levels are elevated will be undertaken again with a minimum break of 75 minutes between monitoring.

The noise criteria for MCC apply under all meteorological conditions except for the following:

i. Wind speeds greater than 3m/s at 10m above ground level; or

ii. Stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10m above ground level; or

iii. Stability category G temperature inversion conditions.

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

Due to the distance of the mine from each residence, the monitoring of LA1 (1minute) at the facade is not considered necessary and will be conducted at/or near the property boundary.

The attended noise monitoring locations are detailed in **Table 1** and shown in **Figure 1**.

Table 1
Noise Monitoring Locations

Location	Description
R13	Sandy Creek Road
R15	Queen St
R17	Queen St
R25	Sandy Creek Road
R32	Muscle Creek Road

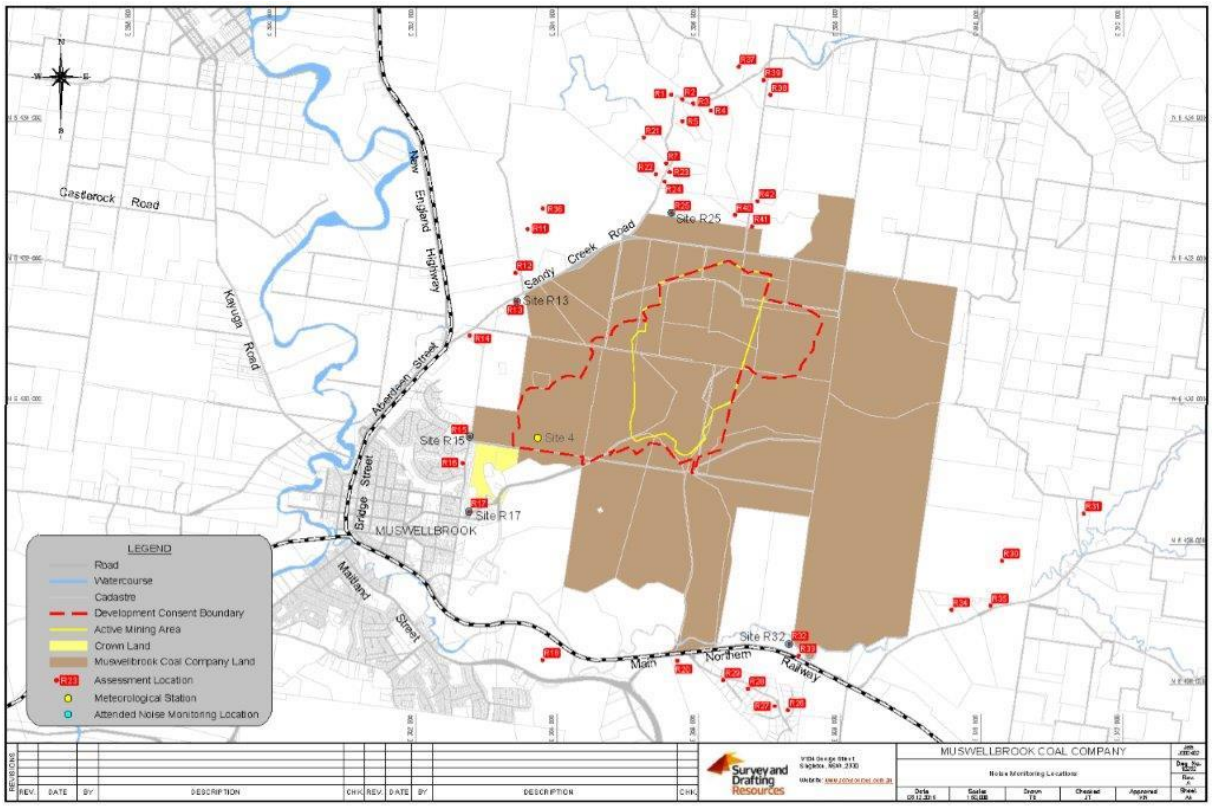

Figure 1 – Noise Monitoring Locations

Noise criteria for all assessment locations shown in Figure 1 are detailed in **Appendix I** to this report.

Monitoring Equipment

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1990 “Sound Level Meters” and has current NATA calibration. Field calibration is carried out at the start and end of each monitoring period. Calibration certificates are attached as **Appendix II** to this report.

A-weighted noise levels were measured over the 15 minute monitoring period with data acquired of 1 second statistical intervals and the meter set to “fast” response. Each 1 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing NPI ‘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 MCC compliance noise criteria are based on a 15 minute Leq noise level. The 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from MCC was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contribution of the mine and other significant noise sources to the overall level. Mine noise from MCC is shown in the table in bold type.

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

MCC Operations

Operational details for MCC for the monitoring period on 16th of November, 2022 are detailed in **Appendix III**. During the monitoring period MCC operations on site were limited.

Noise Compliance Assessment

The results of the noise measurements are shown in **Table 2**.

Table 2
MCC Operational Noise Monitoring Results – 16 November 2022

Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]
R13 Sandy Creek Rd.	10:25 pm	42	n/a	41	n/a	45	D/1.5/240	Yes	Frogs & insects (42), traffic (30), **MCC inaudible**
R15 Queen St.	10:47 pm	33	n/a	37	n/a	45	F/1.1/299	Yes	Frogs & insects (30), dogs (28), traffic (25), **MCC inaudible**
R17 Queen St.	11:05 pm	32	n/a	35	n/a	45	D/1.1/48	Yes	Frogs & insect (31), traffic (25), **MCC inaudible**
R25 Sandy Creek Rd.	10:05 pm	33	n/a	42	n/a	45	F/1.1/230	Yes	Frogs & insects (32), traffic (26), **MCC inaudible**
R32 Muscle Creek Rd.	11:00 pm	32	n/a	35	<20	45	D/0.7/62	Yes	Frogs & insects (32), **MCC occasionally audible**

1. L1 (1 min) from MCC mine noise only
2. See text regarding MCC noise sources

The results in Table 2 show that, under the operational and meteorological conditions at the time, noise from MCC was only occasionally audible at the R32 monitoring location. The noise was from engine revs but was not loud, or consistent, enough to be accurately measured. The noise from MCC was not

audible at any other monitoring location. Noise from MCC, therefore, did not exceed the relevant noise criteria at any time or location during the monitoring period.

The data from the mine operated weather station showed that meteorological conditions were compliant with the conditions in the NMP for the entire noise monitoring survey.

In addition to the operational noise, the noise from MCC must not exceed **45 or 47 dB(A) L1 (1 min)** between the hours of 10 pm and 7 am (see Appendix I for details of noise criteria at various receiver locations). 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 facade 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 applicable at the outside of a bedroom window. As the internal layout of each residence is not known, to consider a worst case, the bedroom windows were assumed to be facing towards the mine.

As shown in Table 2, during the night time measurement circuit the L1 (1 min) noise from MCC was barely audible at R32 (at less than 20 dB(A)) and inaudible at all other locations and, therefore, did not exceed 45 dB(A) at any monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 0412 023 455.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED

Author:

Ross Hodge
Acoustical Consultant

Review:

Neil Pennington
Acoustical Consultant

Appendix I

Noise criteria from Development Consent DA205/2002 (Locations as per Figure 1).

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1\ (1\ minute)}$
R1, R2, R3, R4, R17, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R37, R38, R39	35	35	35	45
R5	36	36	36	45
R7	38	38	38	45
R11	39	39	39	45
R12	39	39	39	45
R13	41	41	41	45
R14	38	38	38	45
R15	37	37	37	45
R16	36	36	36	45
R17	35	35	35	45
R18	45	38	37	47
R20	45	38	37	47
R21	37	37	37	45
R22	39	39	39	45
R23	39	39	39	45
R24	40	40	40	45
R25	42	42	42	45
R36	38	38	38	45
R40	42	42	42	45
R41	42	42	42	45
R42	40	40	40	45

Note: All levels are in dB(A)
Note: Following further consultation with the community it has been identified that R11 is a stable complex, not a residence, so the criteria listed in the table above do not apply.

Appendix II

Calibration Certificates

HBK HOTTINGER BRÜEL & KJÆR

NATA WORLD RECOGNISED ACCREDITATION

Australian Calibration Laboratory
Suite 4.03, Level 4, 3 Thomas Holt Drive, Macquarie Park NSW 2113, Australia
Accredited for compliance with ISO/IEC 17025 - Calibration. Laboratory No. 1301

CERTIFICATE OF CALIBRATION

Certificate No: CAU2100868 Page 1 of 11

CALIBRATION OF:

Sound Level Meter:	Bruel & Kjaer	2250	No: 2747794
Microphone:	Bruel & Kjaer	4189	No: 2733511
Preamplifier:	Bruel & Kjaer	ZC-0032	No: 15339
Supplied Calibrator:	Bruel & Kjaer	4231	No: 2466354
Software version:	BZ7224 Version 4.6	Pattern Approval:	PTB
Instruction manual:	BE1712-22	Identification:	N/A

CUSTOMER:

Spectrum Acoustics Pty Ltd
Suite 1, 12 Alma Road
New Lambton NSW 2305

CALIBRATION CONDITIONS:

Preconditioning: 4 hours at 23 °C
Environment conditions: *see actual values in **Environmental conditions** sections*

SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC61672-1:2013 class 1.
Procedures from IEC 61672-3:2013 were used to perform the periodic tests.
The measurements included in this document are traceable to Australian/National standards.

PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System B&K 3630 with application software type 7763 (version 8.3 - DB: 8.30) and test procedure 2250-4189.

RESULTS:

	Initial calibration		Calibration prior to repair/adjustment
X	Calibration without repair/adjustment		Calibration after repair/adjustment

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of Calibration: 06/12/2021 Certificate issued: 06/12/2021

Sajeeb Tharayil
Calibration Technician

Craig Patrick
Approved signatory

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Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Calibrator

IEC 60942-2017

Calibration Certificate

Calibration Number C21052

Client Details Spectrum Acoustics
30 Veronica Street
Cardiff NSW 2285

Equipment Tested/ Model Number : Pulsar Model 105
Instrument Serial Number : 75503

Atmospheric Conditions
Ambient Temperature : 23.8°C
Relative Humidity : 48.3%
Barometric Pressure : 100.16kPa

Calibration Technician : Jeff Yu
Calibration Date : 04 Feb 2021
Secondary Check: Max Moore
Report Issue Date : 5 Feb 2021
Approved Signatory : Ken Williams

Characteristic Tested	Result
Generated Sound Pressure Level	*Pass*
Frequency Generated	*Pass*
Total Distortion	*Pass*

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.00	1000.30

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement -

Specific Tests		Environmental Conditions	
Generated SPL	*±0.14dB*	*Temperature*	*±0.2°C*
Frequency	*±0.09%*	*Relative Humidity*	*±2.4%*
Distortion	*±0.09%*	*Barometric Pressure*	*±0.015kPa*

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

* The tests <1000 kHz are not covered by Acoustic Research Labs Pty Ltd NATA accreditation.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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Appendix III

Operational Details – 16 November 2022 (10pm to midnight)

For that period mining was carried out as follows;

- 211 Excavator was working in strip 25 mining coal. 2 x haul trucks were transporting coal from strip 25 to the ROM stockpile.

- CHPP and CPP were operational throughout.