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The Wallerawang Collieries Ltd
Baal Bone Colliery
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Attention: Angela Vanderkroft

31 August 2016

Atkins Acoustics and Associates Pty Ltd.
Consulting Acoustical & Vibration Engineers

BAAL BONE COLLIERY COMPLIANCE NOISE AUDIT AUGUST 2016

1.0 Introduction

Atkins Acoustics was engaged by The Wallerawang Collieries Ltd to conduct an environmental noise audit for Baal Bone Colliery *(BBC)*. The results and findings presented in this report are from site attended audits conducted on Monday 29 August 2016 between 4.30pm and 12.00 midnight. The audits were conducted by Graham Atkins, Graham's qualifications and membership include BE; MAAS, MIEAust, CPEng and MINCE. Graham is employed by Atkins Acoustics and Associates Pty Ltd a Member Firm of the AAAC.

Site plant/equipment identified during the attended audit included the mine ventilation fan, it is understood that no mobile plant was operational during the audit. The reference measurement locations *(Attachment 1)* selected for noise monitoring are summarised in *Table 1*.

Table 1. Noise Monitoring Locations

Measurement Location	Description
R1	'Muldon' Residence
R2/R3	'Speirs/Desch' Residence

2.0 Measurement Instrumentation

The noise measurement instrumentation selected comprised a SVAN949 Sound and Vibration Analyzer. The meter was programmed to calculate and record 15 minute statistical levels. The reference calibration level of the meter was checked prior to and after the measurements with a Bruel & Kjaer Sound Level Calibrator Type 4230 and remained within ± 0.5dBA. The meter carried appropriate and current NATA calibration *(Attachment 2)*.

The noise audit and measurements were undertaken in accordance with procedures documented in Australian Standard AS1055-1997 ' Acoustics - Description and Measurement of Environmental Noise' and the NSW Environmental Protection Authority Industrial Noise Policy *(INP)*.

3.0 Weather Conditions

Weather conditions during the audit were calm, approximate 80% light cloud cover during the day/evening/night. The day temperatures ranged between 14°C and 15°C. Evening/night temperatures ranged from 8°C and 6°C. An analysis of the evening and night sigma-theta and wind speed data confirmed that positive temperature inversion conditions were not present. No rainfall was recorded during the audit.

4.0 Project Consent Noise Limits

The Licence noise limits for *BBC* are documented in Schedule 3 'Specific Environmental Conditions' of the *DoPI* Conditional Approval (Project Approval 09_0178) dated 14 January 2011.

4.1 Noise Assessment Limits ROM Surface Infrastructure (09_0178)

Condition 4.

By 31 December 2011, the Proponent will ensure that noise generated by the project does not exceed the long-term noise assessment criteria in *Table 1* at any residence on privately owned land or on more than 25 percent of any privately-owned land.

Table 1: Long Term Noise Assessment Criteria

Assessment Location	All periods dBA LAeq, 15 min	Night dBA LA1, 1 min
Location R1	46	47
Location R2	41	48
Location R3	41	48
All other privately-owned land	35	45

Condition 5.

Until 31 December 2011, the Proponent will ensure that noise generated by the project does not exceed the interim noise assessment criteria in *Table 2* at any residence on privately owned land or on more than 25 per cent of any privately-owned land.

Table 2: Interim Noise Impact Assessment Criteria

Assessment Location	All periods dBA LAeq, 15 min	Night dBA LA1, 1 min
Location R1	48	47
Location R2	43	48
Location R3	43	48
All other privately-owned land	35	45

Notes to Tables 1 and 2:

- *Noise generated to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy; and*
- *These noise assessment criteria do not apply if the Proponent has an agreement with the relevant owner/s to generate higher noise levels, and the Proponent has advised the DoPI in writing of the terms of this agreement.*

4.2 Comments

Referenced to the *BBC* Noise Management Plan *(NMP)* and the *EPA, Industrial Noise Policy* environmental noise *(INP Section 2.2.1)* is measured or assessed at the most affected point on or within the residential property boundary or, if this is more than 30m from the residence, at the most affected point within 30m of the residence. In accordance with *INP* procedures, the noise levels summarised in this report were measured within approximately 30m of the residences.

5.0 Measurement Results

Tables 3, 4 and 5 present a summary of the measured ambient sound pressure levels, calculated *BBC* noise contributions and observations noted during the audit.

Table 3. Attended Noise Measurement Results (Day)

dBA re: 20 x 10^{-6} Pa

Measurement Location	Measured Ambient Sound Pressure Levels						License Noise Limits	Measured Predicted Colliery Noise	Comments
	L_{Aeq}	L_{A90}	L_{A50}	L_{A10}	L_{A1}	L_{Amax}	L_{Aeq^*}	L_{Aeq}	
Daytime Audit (1645-1800)									
Location R1 (1725 hours)	35.4	29.4	31.6	35.8	46.2	54.0	46	<30	Mine ventilation fan <30dBA; Dist road traffic 30/45dBA Ducks/insects/birds 35/40dBA Dog 38/42dBA
Location R1 (1740 hours)	35.9	29.4	32.2	39.1	44.8	51.5	46	<30	Mine ventilation fan <30dBA; Dist road traffic 32/46dBA Ducks/insects/birds 34/43dBA Dog 39/44dBA
Location R2/3 (1645 hours)	35.0	26.3	28.7	36.1	47.6	52.4	41	<30	Ventilation Fan <30dBA Road traffic 38/45dBA, Insects/birds 35/45dBA
Location R2/3 (1700 hours)	46.7	29.0	31.3	37.7	50.9	55.8	41	<30	Ventilation Fan <30dBA Road traffic 38/45dBA, Insects/birds 35/45dBA Dog 48/55dBA

Table 4. Attended Noise Measurement Results (Evening)

dBA re: 20 x 10^{-6} Pa

Measurement Location	Measured Ambient Sound Pressure Levels						License Noise Limits	Measured Predicted Colliery Noise	Comments
	L_{Aeq}	L_{A90}	L_{A50}	L_{A10}	L_{A1}	L_{Amax}	L_{Aeq^*}	L_{Aeq}	
Evening Audit (1820 to 1920)									
Location R1 (1820 hours)	39.4	32.8	36.2	42.5	48.5	51.5	46	<30	Mine ventilation fan <30dBA; Dist road traffic 32/48dBA Ducks/Insects/birds 36/42dBA
Location R1 (1835 hours)	36.4	32.6	35.0	37.5	43.9	49.8	46	<30	Mine ventilation fan <30dBA; Dist road traffic 32/48dBA Ducks/insects/birds 36/42dBA
Location R2/3 (1850 hours)	44.4	35.3	36.4	37.8	50.2	55.4	41	<30	Mine ventilation fan <30dBA; Dist road traffic 38/48BA Insects/Birds/Dog 36/55dBA
Location R2/3 (1905 hours)	37.6	35.5	37.1	38.9	43.6	48.5	41	<30	Mine ventilation fan <30dBA; Dist road traffic 36/45dBA Insects/Birds 36/44dBA

Table 5. Attended Noise Measurement Results. (Night)

dBA re: 20 x 10^{-6} Pa

Measurement Location	Measured Ambient Sound Pressure Levels						License Noise Limits		Measured Predicted Colliery Noise		Comments
	L_{Aeq}	L_{A90}	L_{A50}	L_{A10}	L_{A1}	L_{Amax}	L_{Aeq}	L_{Amax}	L_{Aeq}	L_{Amax}	
Night Audit (2230 to 2345)											
Location R1 (2235 hours)	31.5	29.0	30.7	33.6	38.2	48.8	46	47	<30	<30	Ventilation fan <30dBA; Road traffic 46/8dBA; Insects.
Location R1 (2250 hours)	34.0	29.9	32.9	36.4	39.4	45.6	46	47	<30	<30	Ventilation fan <30dBA; Road traffic 38/44dBA; Insects.
Location R2/3 (2315 hours)	34.4	30.6	32.8	36.5	40.4	46.4	41	48	<30	<30	Ventilation fan <30dBA; Road traffic 35/8dBA; Insects
Location R2/3 (2330 hours)	33.5	30.2	31.8	35.4	41.6	55.4	41	48	<30	<30	Ventilation fan <30dBA; Dog 48/53dBA; Insects

Table 6 presents a summary of the measured L_{Aeq} octave band sound pressure levels with the overall A-weighted and C-weighted levels.

Table 6. Attended Ambient LAeq Octave Band Noise Measurements

$L_{Aeq,\ 15\ min}$ dB re: 20 x 10^{-6} Pa

Measurement Location	Sound Pressure Level										
	31	62	125	250	500	1K	2K	4K	8K	dBA	dBC
Day											
Location R1	42.4	42.5	39.5	32.7	32.1	30.4	28.9	23.5	19.8	35.4	46.0
Location R1	39.3	37.9	38.1	28.4	25.2	30.2	31.6	26.5	18.5	35.9	43.0
Location R2/3	37.8	38.4	37.3	29.9	24.1	26.4	30.9	27.9	18.4	35.0	42.6
Location R2/3	48.8	49.6	41.9	31.0	30.3	32.7	33.1	41.3	45.3	46.9	52.3
Evening											
Location R1	46.0	42.4	40.8	32.2	30.0	32.1	35.9	29.9	21.2	39.4	47.0
Location R1	47.9	47.7	44.7	35.7	33.0	29.3	29.1	26.0	21.0	36.4	50.7
Location R2/3	37.6	39.8	34.5	28.3	42.1	37.9	39.7	28.4	20.4	44.4	46.7
Location R2/3	42.4	49.5	49.2	30.4	28.4	25.0	33.1	29.7	19.3	37.6	52.4
Night											
Location R1	37.0	35.6	40.0	27.7	23.2	23.4	27.0	22.3	17.6	31.5	42.4
Location R1	39.3	41.1	39.2	32.9	27.4	29.8	27.6	22.5	17.1	34.0	44.4
Location R2/3	43.1	36.2	34.6	32.5	29.5	28.1	29.6	23.9	18.5	34.4	43.3
Location R2/3	43.3	36.7	38.1	32.8	26.1	26.3	28.8	23.1	18.3	33.5	44.3

5.1 Review of Site Investigations

Inquires with the *BBC Environmental Officer* confirmed that no environmental noise incidents were reported during the period between 10 August 2015 and 29 August 2016.

6.0 Discussion

For the purpose of assessing the compliance status of *BBC* with licence noise limits a site-attended audit and noise measurements were conducted on Monday 29 August 2016.

During the daytime/evening/night audits from the mine ventilation fan was audible at the Muldon (R1) and Desch (R2/3) residences. Other noise sources identified included local domestic activities, insects and distant road traffic.

During the site-attended audits noise from the ventilation fan would not be described as tonal, impulsive, irregularity or with low frequency content. Accordingly no 'modifying factor' corrections are required to satisfy EPL 765 (L4.7). From the audit measurements and assessment, the $L_{Aeq,\ 15\ min}$ noise contributions from *BBC* during the day, evening and night assessment periods satisfied the long-term licence noise limits.

BBC related L_{Amax} noise levels were not observed to cause exceedances of the licence noise limits at measurement locations for the duration of the audit.

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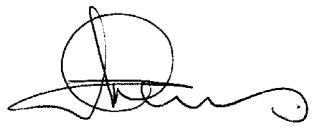
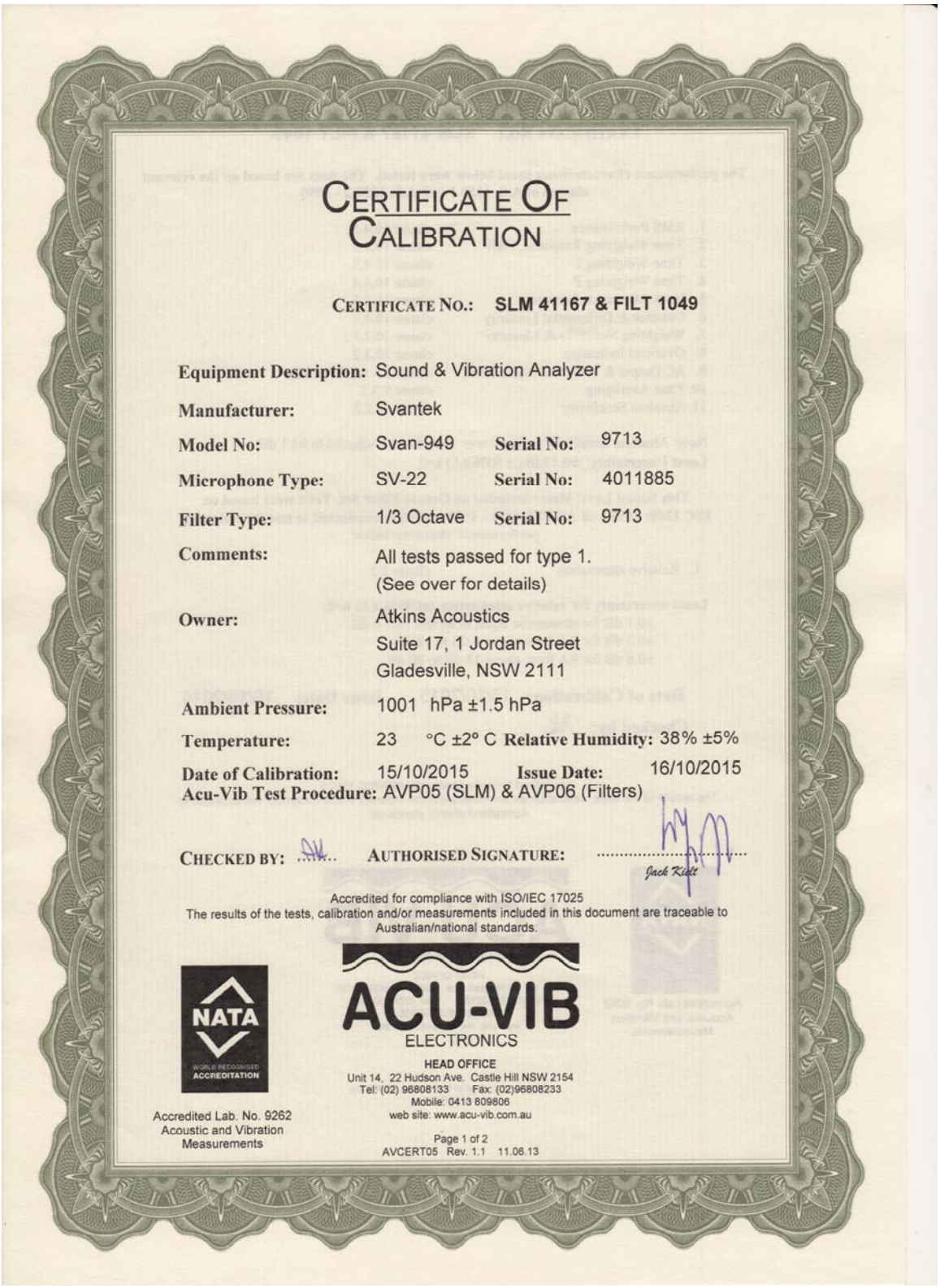


Graham Atkins

ATTACHMENT 1. REFERENCE MEASUREMENT LOCATIONS

ATTACHMENT 2: SVAN Certificate of Calibration.



CERTIFICATE OF CALIBRATION

CERTIFICATE NO.: SLM 41167 & FILT 1049

Equipment Description:	Sound & Vibration Analyzer		
Manufacturer:	Svantek		
Model No:	Svan-949	**Serial No:**	9713
Microphone Type:	SV-22	**Serial No:**	4011885
Filter Type:	1/3 Octave	**Serial No:**	9713
Comments:	All tests passed for type 1. (See over for details)		
Owner:	Atkins Acoustics Suite 17, 1 Jordan Street Gladesville, NSW 2111		
Ambient Pressure:	1001 hPa ±1.5 hPa		
Temperature:	23 °C ±2° C	**Relative Humidity:**	38% ±5%
Date of Calibration:	15/10/2015	**Issue Date:**	16/10/2015

Acu-Vib Test Procedure: AVP05 (SLM) & AVP06 (Filters)

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Jack Kidd

Accredited for compliance with ISO/IEC 17025
The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.

NATA
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