Workplace Monitoring Report - Noise July 2019

Cargill Australia Limited

30 July 2019

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1 Introduction

Cargill Australia Limited, herein referred to as Cargill, commissioned MJM Environmental (MJM) to conduct workplace noise quality monitoring on 3 July 2019 at Cargill's facility located on Raven Street, Kooragang Island, NSW 2304. Workplace noise monitoring was performed on employees working in identified areas of Cargill's site. The monitoring was conducted to measure noise exposure during the oilseed processing conducted at the facility.

The facility operates 24 hours per day, 7 days per week. Noise (dosimeters) sampling was conducted over the period of 07:44 to 15:46. Grab noise sampling was monitored using a Type 1 Sound Level Meter (SLM) to monitor Cargill's equipment-generated noise, and Audio Dosimeters to monitor noise for Cargill's personnel exposure.

This report outlines and evaluates results from the workplace noise quality monitoring performed at Cargill.

2 Methodology

The workplace noise level assessment followed WorkSafe New South Wales guidelines and Australian Standard *AS/NZS 1269:2005 Occupational Noise Management – Part 1: Measurement and assessment of noise emission and exposure*.

An audio-dosimeter records the noise levels experienced over the period of time it is operational. The instruments used for this analysis complied with the requirements of the Australian Standard AS/NZS 2399:1998 *Acoustics – Specifications for personal sound exposure meters*.

2.1 Definitions and Terminology

Definitions and terminology used for the following report are shown in Table 2-1.

Table 2-1: Noise Emission Terminology

Term	Definition
L_{cpk}	($L_{c,peak}$ - peak noise level) means C-weighted peak sound pressure level in decibels measured by a sound level meter with a peak detector-indicator characteristic complying with Australian Standard AS 1259.1.
L_{avg}	($L_{Aeq,8hr}$ - eight-hour equivalent continuous A-weighted sound pressure level in dB(A) referenced to 20 micropascals) means that steady noise level which would, in the course of an eight-hour period, cause the same A-weighted sound energy as that due to the actual noise over an actual working day. $L_{Aeq,8h}$ is to be determined in accordance with Part 1 of Australian/New Zealand Standard AS/NZS 1269.
L_{AF}	Corresponds to Fast response and A-weighting.
L_{asmx}	The highest sound level recorded during a measurement interval and is the highest value that is included in L_{avg} calculations.
L_{asmnx}	The lowest sampled sound level during the measurement interval.
dB(A)	Noise level measurement in unit decibels; A-weighting scale is used to describe human response to noise.
SLC_{80}	Sound Level Conversion rating as applied to hearing protection devices (HPD) is a simple number and class rating derived from a test procedure outlined in the Australian/New Zealand Standard, AS/NZS 1270:2002.

The definitions of the classes of hearing protection used in the following report are shown in Table 2-2.

Table 2-2: Classes of Hearing Protection and Sound Level Conversion (SLC_{80})

Class	SLC80 (dB)	$L_{Aeq,8H}$ dB(A)
1	10 to 13	Less than 90
2	14 to 17	90 to less than 95
3	18 to 21	95 to less than 100
4	22 to 25	100 to less than 105
5	26 to 36	105 to less than 110

The SLC80 rating is the difference between the sound level of the environment in which the HPD is worn and the sound level reaching the wearer's ear's. The SLC value includes a correction to ensure that the stated degree of noise reduction is obtained on 80% of occasions, hence the SLC80 rating.

2.2 Sampling Device and Monitoring

A Quest Soundpro SE/DL Sound Level Meter and Edge 5 Noise Dosimeters were used for the monitoring to record representative site sources and existing ambient noise. The noise monitoring devices and the Quest QC-10 Calibrator are shown in Figure 2-1 and calibration certificates for these instruments are available in Appendix A.

Sound Pro SE DL Sound Level Meter	Quest QC-10 Calibrator	The Edge 5 Noise Dosimeter

Figure 2-1: Workplace Noise Sampling Devices

2.3 Sample Locations and Identification

The workplace noise monitoring was conducted on 3 July 2019 and involved nominated Cargill employees fitted with an audio-dosimeter for the duration of their shift. The locations of the employees are identified in Table 2-3.

Table 2-3: Workplace Noise Locations

Location No.	Personnel	Area	Description of tasks
1	Heath Robertson	Meal Load out	Loading trucks
2	Joel Crawford	Oil Lab	Laboratory technician
3	Drew Varcoe	Packaging	Packaging operator
4	Melody Van Balen	Seed Lab	Laboratory technician
5	Steve Tredinnick	Maintenance	Maintenance
6	Ken McGuinness	Refinery	Refinery operator
7	Craig Fisher	Pre-press	Pre-press operator
8	Gary Acland	Refinery	Refinery
9	Graham Bird	Terminal	Terminal operator
10	Bob Sheldon	Oil Load Out	Loading tankers
11	Scott Barrat	Weighbridge	Weighbridge operator
12	Matt Biscoe	Extraction Plant/Grinding	Extraction plant operator

Table 2-4 presents the noise grab sampling locations.

Table 2-4: Workplace Noise Grab Sampling Locations

Location Description	
Refinery plant	Meal grinding plant
Pre-press plant	Laboratory
Solvent extraction plant	Waste pump from WTP

2.4 Quality Assurance and Quality Control

MJM Environmental employed the following to ensure quality assurance and quality control during the sampling program:

- Employed the appropriate test method (AS/NZS 1269:2005) and analysis;
- The Edge 5 Noise Dosimeters were calibrated prior to the commencement of sampling; and
- The MJM air quality management team was comprised of experienced technical personnel.

3 Assessment Criteria

The assessment criteria used for occupational noise at Cargill follows the *Work Health and Safety Regulation 2011*. The exposure standards for noise in relation to Cargill personnel are outlined in Table 3-1 below.

Table 3-1: Noise Assessment Criteria as per Work Health and Safety Regulation 2011

Noise Assessment Terminology	Criterion (dB)
L_{cpk} peak noise level	140
L_{avg} $L_{Aeq,8hr}$ average sound level, 8 hours exposure	85

3.1 Calculations

The formula for the L_{avg} time adjustment noise calculations for personnel working 12-hour shifts in the Packaging, Pre-press, and Solvent Extraction areas is shown below. The calculation was sourced *Australian Standard AS/NZS 1269 Part 1*.

a) Time adjustment calculation

$$L_{avg} = L_{avg} + 10 \text{ Log}_{10} \left(\frac{12}{8} \right)$$

Where L_{avg} = average noise energy
12 = hours personnel shift

4 Results

The following sections present the results for the noise quality monitoring conducted at Cargill's Newcastle facility.

4.1 Dosimeter Results

Table 4-1 displays the dosimeter peak and average noise results, exposure threshold limits and recommended class of hearing protection for Cargill personnel.

Table 4-1: Dosimeter Noise Sampling Results

Location No.	Area	L_{cpk} dB(A)	Exposure Standard Threshold Limit dB(A)	L_{avg} dB(A)	Exposure Standard Threshold Limit dB(A)	Class Hearing Protection required[1]
1	Meal Load Out	124	140	**86**	85	2
2	Oil Lab	137	140	67	85	1
3	Packaging	**142**	140	**89**[2]	85	2
4	Seed Lab	126	140	73	85	1
5	Maintenance	**144**	140	**92**[2]	85	2
6	Refinery	131	140	81	85	1
7	Pre-press	132	140	68	85	1
8	Refinery Operator	121	140	81	85	1
9	Terminal	**141**	140	78	85	1
10	Oil Load Out	136	140	78	85	1
11	Weighbridge	**143**	140	55	85	1
12	Solvent Extraction Plant/ Grinding	138	140	**89**[2]	85	2

[1] AS/NZS 1269.3:2005 Table A1

[2] L_{avg} was reported adjusted to 12 hour shift as per AS/NZS 1269 Part 1

4.2 Noise Grab Sample Results

Table 4-2 presents the SLM grab sample results.

Table 4-2: SLM Noise Results

Location/Operation	Description	L_{Aeq} (dB) (A)	Class Hearing Protection Recommended
Refinery Plant	First floor	82	1
	Between perfector and pump	84	1
	Chiller – Outside	83	1
	Chiller – Inside	92	2
Pre-press Plant	Next to flaker	86	2
	Air-blower	84	1
Oil Laboratory	Middle of laboratory	62	-
Seed Laboratory	Middle of laboratory	63	-
Office	Work stations	42	-
Meal Grinding	Middle first floor	86	2
Solvent Extraction Plant	Next to Westfalia separator	86	2
	Next to second stage evaporation	85	1
WWTP	Next to Bioreactor pump	78	-
	Bioreactor tanks	70	-
	Pump Biofilter (Weg)	94	2
Workshop	Work station	62	-
Weighbridge	Truck Air Brakes	92	2

5 Discussion

Cargill commissioned MJM to complete workplace noise monitoring at identified areas at the Newcastle site. Twelve (12) Cargill personnel were fitted with sampling devices and monitored on 3 July 2019. Noise grab samples were also monitored at multiple locations within Cargill's facility.

The noise results from Cargill's workplace have been compared with recognised exposure standards. The workplace noise level assessment followed WorkSafe New South Wales guidelines and Australian Standard *AS/NZS 1269:2005 Occupational Noise Management – Part 1: Measurement and assessment of noise emission and exposure.*

The peak noise level (L_{cpk}) for the Packaging, Maintenance, Terminal and Weighbridge areas exceeded the peak noise level exposure standard threshold limit of 140 dB(A) with L_{pk} results of 142 dB(A), 144 dB(A), 141 dB(A) and 143 dB(A) respectively.

The average noise level (L_{avg}) for the Meal Loadout, Packaging, Maintenance and Solvent Extraction Plant areas exceeded the average noise level exposure standard threshold limit of 85 dB(A) with L_{avg} results of 86 dB(A), 89 dB(A), 92 dB(A and 89 dB(A) respectively.

All other monitoring personnel locations were below the peak and average noise level exposure standard threshold limits.

The monitoring results show that hearing protection is recommended in specific areas, and these areas are outlined in Section 4 of the report. It has been recommended that hearing protection of Classes 1 to 2 could be worn during work to protect the workers from frequent noise peak exposure as specified under *AS/NZS 1269.3:2005* Table A1 page 20. However, Cargill must also ensure that wearing the specified hearing protection does not over-compensate the requirement and block out other necessary sounds in the environment for personnel safety.

It is noted that a number of locations reported noise levels that approached the peak noise limit of 140 dB(A). It is recommended that Cargill consider noise protection in these areas.

6 Conclusion

Monitoring of workplace noise has been conducted at Cargill Newcastle's site at Raven Street, Kooragang Island, NSW 2304.

The results recorded on 3 July 2019 for the Packaging, Maintenance, Terminal and Weighbridge areas exceeded the peak noise level exposure standard threshold limit.

The results recorded on 3 July 2019 for the Meal Loadout, Packaging, Maintenance and Solvent Extraction Plant areas exceeded the average noise level exposure standard threshold limit of 85 dB(A).

The exposure standards do not represent 'no-effect' levels that guarantee protection to every worker. Given the nature of biological variation and the range of individual susceptibility, it is inevitable that a very small proportion of workers who are exposed to noise levels around or below the exposure standard may suffer mild and transitory discomfort. An even smaller number may exhibit symptoms of hearing loss. It follows that the exposure standards are not fine dividing lines between satisfactory and unsatisfactory working conditions, but rather that they are best used to assess the quality of the working environment and indicate where appropriate control measures are required.

7 Limitations

7.1 Scope of Services and Reliance of Data

This Workplace Monitoring Report ('the report') has been prepared in accordance with the scope of work/services agreed, between MJM Environmental Pty Ltd (MJM) and the Client. In preparing the report, MJM has relied upon data and other information provided by the Client and other individuals and organisations. Except as otherwise stated in the report, MJM has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions/summary") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. MJM will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to MJM.

7.2 Study for Benefit of Client

This report has been prepared for the exclusive benefit of the Client and no other party. MJM assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with in this report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in this report (including without limitation matters arising from any negligent act or omission of MJM or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in this report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

7.3 Other Limitations

To the best of MJM's knowledge, the proposal presented and the facts and matters described in this report reasonably represent the Client's intentions at the time of printing of the report. However, the passage of time, the manifestation of latent conditions or the impact of future events (including a change in applicable law) may have resulted in a variation of the Proposal and of its possible environmental or health impact. MJM will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

Appendix A Noise Monitoring Equipment Calibration Certificates

Noise Dosimeter

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument Edge 5
Serial No. ESI080160

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Battery Holder	✓	
	Alkaline Battery	✓	
	Cover	✓	
	Output	✓	
Switch/Keypad	Operation	✓	
Display	Intensity	✓	
	Operation	✓	
Microphone	Type	✓	
	Socket	✓	
	Cable		
	Plug	✓	
PCB	Condition	✓	
Calibrator	Condition		
	Battery Holder		
	IVAC Output		
	Frequency		
A Weighting	Operation	✓	
C Weighting	Operation	✓	
Software	Version		
Datalogger	Operation	✓	
Download	Operation	✓	
Other Tests			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Frequency	dB	Volts AC		Calibration Equipment	Instrument Reading Before	After
1Khz	114dB	1 Vac		QC10 QI0070027	114.2dB	114.0dB

Calibrated by: Ben Pearson

Calibration date: 28/06/2019

Next calibration due: 25/12/2019