Emission Testing Report - 17 December 2019

Cargill Newcastle

51 Raven Street, Kooragang Island

9 January 2020

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M Majerowski	Technical Director Environment	Monica Majerowski	09/01/2019

Table of Contents

List of Figures

List of Tables

Appendices

1 Introduction

MJM Environmental was commissioned by Cargill Newcastle to conduct stationary air monitoring on 17 December 2019. Cargill Newcastle is licensed with the NSW Environment Protection Authority (EPA) under Environment Protection Licence (EPL) number 5810.

The monitoring was performed at the following locations for the pollutants presented in Table 1-1.

Table 1-1: Monitoring performed at Cargill Newcastle

EPL Point ID	Point Description	Pollutant	Licence Limit
4	Meal Grinding Dust Collection Stack	Moisture	N/A
		Odour	N/A
		Temperature	N/A
		Velocity	N/A
		Volumetric flow	N/A
11	3MW Boiler	Moisture	N/A
		Nitrogen Oxides	350 mg/m^3
		Oxygen	N/A
		Temperature	N/A
		Volumetric Flowrate	N/A

2 Methodology

Table 2-1 summarises the test methods performed at Cargill Newcastle.

Table 2-1: Test methods

Parameter	Sampling Method	Reference Method	Unit	Uncertainty[1]	Uncertainty %
Moisture	TM-22	USEPA Method 4	%vol	0.14	1
Nitrogen Oxides	TM-11	USEPA Method 7E (Instrumental Analyzer – Electrochemical Sensor)	mg/m^3	0.69	1
Oxygen	TM-25	USEPA Method 3A (Instrumental Analyzer – Electrochemical Sensor)	mg/m^3	0.35	2
Volumetric Flowrate (2D Pitot Tube)	TM-2	USEPA Method 2	m/s	0.35	11
Odour	OM-7	AS/NZS 4323.3:2001	OU	N/A	N/A

[1] Measurement of Uncertainty (MU) values cited in this table are calculated at the 95% confidence level (coverage factor = 2) including both sampling and laboratory analytical factors.

3 Quality Assurance / Quality Control Information

MJM Environmental performed stack emission testing in accordance with the *Protection of the Environment Operations (Clean Air) Regulation 2010*, and the EPA's *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (2007).*

4 Results

A summary of the results obtained for Cargill Newcastle are provided in the following sections of the report. Emission concentrations and emission rates are converted to standard conditions (STP) of 0°C, dry gas and 1 atmosphere pressure for comparison with appropriate guideline levels. The results presented only relate to the monitoring points tested.

4.1 EPL point 4 (Meal Grinding Dust Collection Stack)

Figure 4-1 shows EPL Point 4.

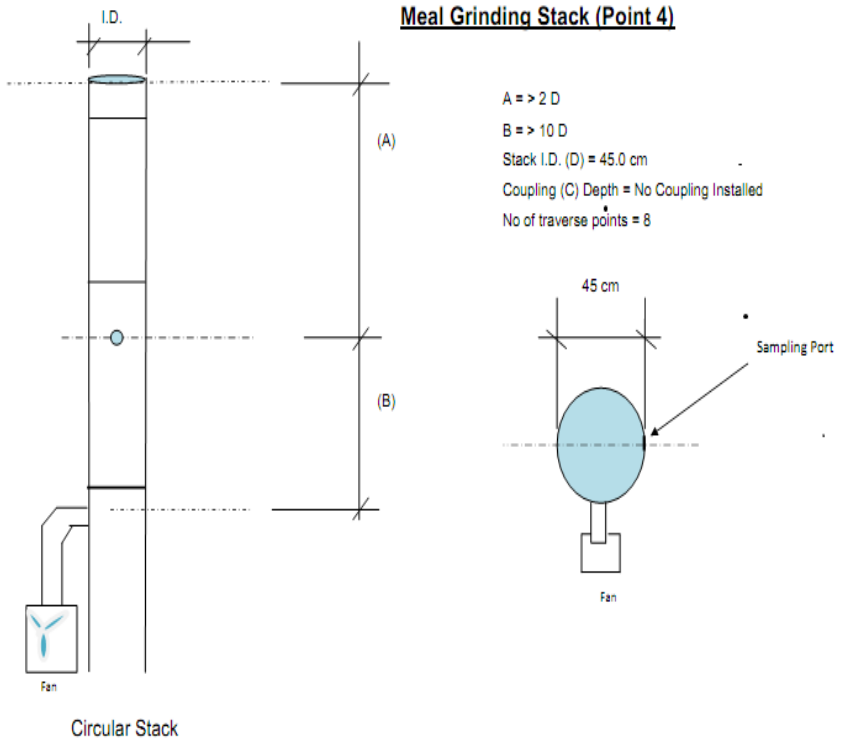

Figure 4-1: EPL Point 4

Table 4-1 shows the testing information for the sampling plane.

Table 4-1: Sampling plane information EPL Point 4 (Meal Grinding Dust Collection Stack)

Parameter	Unit	Information	Comments
Date	-	17/12/2019	
Sampling start and end time(s)	-	13:58 – 14:28	
Number of sampling runs performed	-	1	
Sampling duration	min	30	
Process conditions at time of sampling	-	Steady state	
Sample plane diameter	mm	450	
Sample plane area	m^2	0.16	
Sample port diameter and depth	mm	64, 150	
Number of sample ports	-	2	
Duct orientation and shape	-	Vertical, circular	
Number of traverse points sampled	-	8	
Sample port compliant with AS4323.1	-	Yes	

Table 4-2 shows the volumetric and continuous gaseous parameters measured during testing.

Table 4-2: Results for EPL Point 4 (Meal Grinding Dust Collection Stack)

Parameter	Unit	Result	EPL Limit	Compliant with EPL
Temperature	°K	302	N/A	N/A
Carbon dioxide	%	0.0	N/A	N/A
Oxygen	%	20.9	N/A	N/A
Moisture content	%	1.6	N/A	N/A
Molecular weight dry	g/gmol	29	N/A	N/A
Velocity at sampling plane	m/s	11	N/A	N/A
Volumetric flow rate (wet, actual)	m^3/s	1.7	N/A	N/A
Volumetric flow rate (dry, STP)	m^3/s	1.5	N/A	N/A

Table 4-3 shows the concentration and emission rate results of testing.

Table 4-3: Results for EPL Point 4 (Meal Grinding Dust Collection Stack)

Pollutant	Run	Concentration OU	Emission rate $OU.m^3/s$	EPL Limit	Compliant with EPL
Odour	1	660	1,031	N/A	-

4.2 EPL Point 11 (3 MW Boiler)

Figure 4-2 shows EPL Point 11.

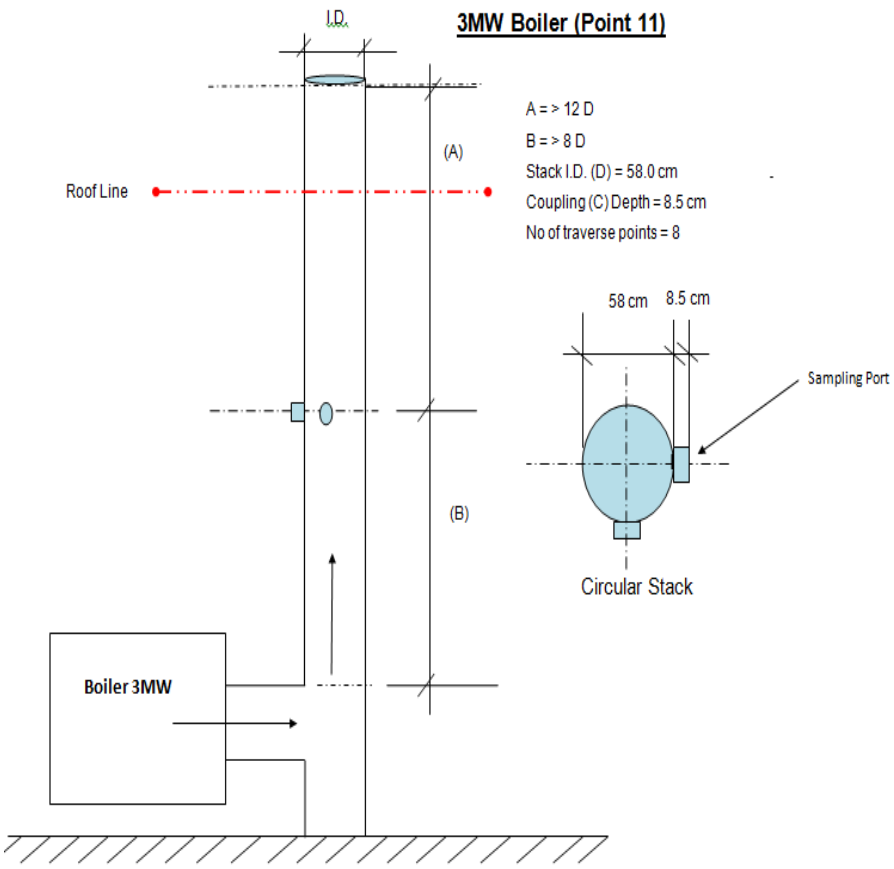

Figure 4-2: EPL Point 11

Table 4-4 shows the testing information for the sampling plane.

Table 4-4: Sampling plane information EPL Point 11 (3MW Boiler)

Parameter	Unit	Information	Comments
Date	-	17/01/2019	
Sampling start and end time(s)	-	11:01 – 11:31	
Number of sampling runs performed	-	1	
Sampling duration	min	30	
Process conditions at time of sampling	-	Steady state	
Sample plane diameter	mm	580	
Sample plane area	m^2	0.26	
Sample port diameter and depth	mm	100, 85	
Number of sample ports	-	2	
Duct orientation and shape	-	Vertical, circular	
Number of traverse points sampled	-	8	
Sample port compliant with AS4323.1	-	Yes	

Table 4-5 shows the volumetric and continuous gaseous parameters measured during testing.

Table 4-5: Results for EPL Point 11 (3MW Boiler)

Parameter	Unit	Result	EPL Limit	Compliant with EPL
Temperature	°C	112	N/A	N/A
Carbon dioxide	%	3.7	N/A	N/A
Oxygen	%	14.4	N/A	N/A
Moisture content	%	14	N/A	N/A
Molecular weight dry	g/gmol	29	N/A	N/A
Velocity at sampling plane	m/s	1.8	N/A	N/A
Volumetric flow rate (wet, actual)	m^3/s	0.47	N/A	N/A
Volumetric flow rate (dry, STP)	m^3/s	0.29	N/A	N/A

Table 4-6 shows the concentration and emission rate results of testing.

Table 4-6: Results for EPL Point 11 (3MW Boiler)

Pollutant	Run	Concentration mg/m^3	Emission rate g/s	EPL Limit	Compliant with EPL
Nitrogen Dioxide [1]	1	93	0.01	350 mg/m^3	✓

[1] Emission concentration corrected at 7% O_2 reference gas as specified in EPL 5810 under condition L2

5 Discussion

Testing for emission compliance was executed on 17 December 2019. During sampling the facility was operating under normal plant operating conditions.

Results for all parameters were compared with the emission concentration limits specified in Cargill Newcastle's EPL 5810.

All parameters were below the emission concentration limits specified and thus were compliant with the EPL conditions.

Appendix A Laboratory Odour Results

Odour Research Laboratories Australia

A Division of Peter W. Stephenson & Associates Pty Ltd
ACN 002 600 526 (Incorporated in NSW)
ABN 75 002 600 526

52A Hampstead Road
Auburn NSW 2144 Australia
Tel: (02) 9737 9991
E-Mail: pstephenson@orla.com.au

Olfactometry Test Report

The measurement was commissioned by SEMA on behalf of:

Client	Organisation:	MJM Environmental Pty Ltd
	Address:	Office 1, Level 2, 335 Wharf Road, Newcastle NSW 2300
	Contact:	Brigid Kelly
	Sampling Site:	MJM Project ID: 036-2060
	Telephone:	02 4926 4222
	Email:	brigid@mjmenvironmental.com.au
Project	ORLA Report Number:	7037/ORLA/01
	Project Manager:	Peter Stephenson
	Testing operator:	Peter Stephenson
	ORLA Sample number(s):	5266 and 5267
	MJM Sample ID:	Meal Grinding
Order	Analysis Requested:	Odour Analysis
	Order requested by:	SEMA on behalf of MJM Environmental
	Date of order:	13 December 2019
	Order number:	PO 036-2060
	Telephone:	02 9737 9991
	Signed by:	Margot Kimber
	Order accepted by:	Margot Kimber
Report	Date of this issue:	23 December 2019

NATA accredited laboratory number 15043.

Accredited for Compliance with ISO/IEC 17025 - Testing

Investigated Item	Odour concentration in odour units 'ou' determined by Sensory odour concentration measurements, of an odour sample supplied in a sampling bag. All samples were received in good condition.
Analysis Method	The samples were analysed in accordance with AS/NZS4323.3:2001.
Identification	The odour sample bags were labelled individually. Each label recorded the testing laboratory, sample number, sampling location (or Identification) sampling date and time, dilution ratio (if dilution was used) and whether further chemical analysis was required.
Method	The odour concentration measurements were performed using dynamic olfactometry according to the Australian Standard 'Determination of Odour Concentration by Dynamic Olfactometry AS/NZS4323.3:2001. The odour perception characteristics of the panel within the presentation series for the samples were analogous to that for n-butanol calibration. Any deviation from the Australian standard is recorded in the 'Comments' section of this report.
Instrument Used	The Olfactometer used during this testing session was: AC'SCENT International Olfactometer
Measuring Range	The measuring range of the AC'SCENT International olfactometer is $12 \leq \chi \leq 76{,}895$ ou. If the measuring range was insufficient the odour samples will have been pre-diluted.
Environment	The measurements were performed in an air- and odour-conditioned room. The room temperature is maintained between ± 3°C.
Measuring Dates	The date of each measurement is specified with the results.
Instrument Precision	The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.05$ in accordance with the Australian Standard AS/NZS4323.3:2001. AC'SCENT International Olfactometer: $r = 0.0056$ (February 2019) Compliance – Yes
Instrumental Accuracy	The accuracy of this instrument for a sensory calibration must be $A \leq 0.20$ in accordance with the Australian Standard AS/NZS4323.3:2001. AC'SCENT International Olfactometer: $A = 0.050$ (February 2019) Compliance – Yes
Lower Detection Limit (LDL)	The LDL for the AC'SCENT International Olfactometer has been determined to be 12 ou
Traceability	The measurements have been performed using standards for which the traceability to the national standard has been demonstrated. The assessors are individually selected to comply with fixed criteria and are monitored every session to keep within the limits of the standard. The results from the assessors are traceable to primary standards of n-butanol in nitrogen.

23 December 2019

Peter Stephenson
Managing Director

Odour Olfactometry Results – 7037/ORLA/011

Sample Location	Sample ID No.	Sampling Date & Time	ORLA Sample No.	Analysis Date & Time (Completed)	Panel Size	Valid ITEs	Sample Pre-Dilution	Sample Odour Concentration (ou) [1 *]	Sample Odour Concentration (ou) [2 *]	Odour Character & Hedonic Tone[^ +]
Steel River	Meal Grinding	17-12-2019 14:36	5267	18-12-2019 14:23	4	8	Nil	663	660	Mushroom, earthy, bread dough, sulphur, rancid, oil, initially slightly sour burnt savoury meat and vegetables then like car exhaust, overtones of sewerage (-3)

Odour Panel Calibration Results – 7037/ORLA/01

Reference Odorant	ORLA Sample No.	Concentration of Reference Gas (ppm)	Reference Gas Measured Concentration (ou)	Panel Average Measured Concentration (ppb) [3]	Does this panel calibration measurement comply with AS/NZS4323.3:P2001 (Yes/No) [4]
n-butanol	5266	62	1195	51.9	Yes

Comments: All samples were collected by MJM Environmental and analysed by Odour Research Laboratories Australia at their Sydney Laboratory.

Notes from Odour Olfactometry Results:

[1] Sample Odour Concentration: as received in the bag

[2] Sample Odour Concentration: allowing for pre-dilution

[3] Panel Average Measured Concentration: indicates the sensitivity of the panel for the session completed

[4] Target Range for reference gas n-butanol is $20 \leq \chi \leq 80$ ppb and compliance with AS/NZ4323.3:2001 is based on the individuals rolling average and not on the panel average measured concentration. Panellist Rolling Average: JW = 64.4, TL = 43.9, SR = 50.1, PR = 48.5

^ denotes the Average Hedonic Tone: describes the pleasantness of the odour being presented where (+5) represents Very Pleasant, (0) represents Neutral and (-5) represents Very Unpleasant and has been derived from the panellist responses at the recognition threshold.

+ This value is not part of our NATA Scope of Accreditation and AS4323.3

----------END OF TEST REPORT----------