29 October 2020

John Studdert
Manildra Group
PO Box 123
Nowra NSW 2541

Our ref: 12534209-35391-13
Your ref:

Dear John

Manildra Modification 19 Air Quality Assessment
Letter to address DPIE request for Additional Information regarding Shoalhaven Starches Expansion Project Modification 19 Air Quality Assessment

1 Introduction

GHD was engaged by Shoalhaven Starches Pty Ltd (Manildra) to provide addition information regarding the Shoalhaven Starches Expansion Project (06_0228 Modification 19) (herein referred to as MOD19) Air Quality Assessment (GHD, 24/09/2020) in response to a request from the Department of Planning, Industry and Environment (DPIE).

DPIE submitted a letter titled *Shoalhaven Starches Expansion Project Modification 19 (06_0228 Mod-19) Request for Additional Information* dated 22/10/2020 which requested additional information regarding the following two air quality related items:

> *Air Quality*
>
> *1. The Statement of Environmental Effects (SEE) notes the PM_{10} and $PM_{2.5}$ 24 hour criteria are exceeded at a commercial receptor which is attributed to high background concentrations. The Department requests more information be provided on the background particulate matter concentration sources recorded in the assessment. The Applicant should identify if background sources are attributed to site operations and any measures being undertaken to manage or mitigate high background particulate matter concentrations.*
>
> *2. The SEE identified increases in predicted odour levels at commercial receptors due to higher quarterly sampling results attributed mainly to the site's boiler house. The Department requests the Applicant provide further details on the cause of higher quarterly sampling results of odour levels and the measures being implemented to manage or mitigate odour levels.*

This letter provides additional information regarding the two items identified above.

2 Item 1: Background particulate data

The MOD19 Air Quality Assessment (GHD, 24/09/2020) utilised background particulate data (PM_{10} and $PM_{2.5}$) from the Wollongong DPIE ambient air monitoring station (previously operated by the Office of Environment and Heritage) based on year 2004. The Wollongong monitoring station is located

approximately 55 kilometres northeast from the Manildra site and therefore high background particulate concentrations are not attributed to site operations.

It is expected that the predominate sources of particulate emission near the Wollongong station would be typical of urbanised environmental including residential activities and local commercial and industrial operations.

A review of background particulate concentrations is provided in the MOD19 air quality assessment. The review examined PM_{10} and $PM_{2.5}$ concentrations at the Albion Park South monitoring station (for the 2016 calendar year) and at the Wollongong monitoring station (for the 2016 and 2004 calendar years) and data from targeted background ambient air quality monitoring undertaken at 26 Coomea Street, Bomaderry over four seasons by Stephenson Environmental Management Australia (Ambient Air Quality Monitoring –Summary Report 2015-2016, Stephenson Environmental Management Australia, April 2016).

The review identified the Wollongong 2004 dataset to be worst-case containing the highest average particulate concentrations. Therefore use of background particulate concentrations from Wollongong 2004 allows for additional conservatism.

High background particulate concentrations are independent of site operations and consequently, management and mitigation of site particulate emissions does not change background concentrations.

3 Item 2: Boiler odour

Odour sampling is undertaken on a quarterly basis at the site in accordance with the site's development consent conditions. Recent odour sampling results are shown in *EPL Odour Emission Survey Quarter 1, 2020-2021* (Stephenson Environmental Management Australia, 2020) and are provided as Attachment 1 (refer pages 16 – 18 of Attachment 1 for historical boiler odour concentration measurements).

A discussion regarding the increase in boiler odour emission is provided in Table 3-1.

Table 3-1 Discussion regarding increase in boiler odour emissions

Source	Discussion regarding odour emissions
Boiler 2	Boiler 2 was recently added as an EPA licence odour monitoring due to the change from gas-fired to coal-fired. Therefore it was included in the MOD19 air quality assessment. Adding this existing source into the model and assessment increased the predicted odour levels at the commercial receptor. No odour complaints have been received from the receptor and although the model is now showing a higher result, actual impacts have unlikely changed (it was an existing, operating source at the site). Odour from the boilers are described to have an acetylene and disinfectant character which is very different to other sources such as the gluten and starch dryers and biofilters that are described to have a malt, grain and wheat character. The odour dispersion modelling combined odour emissions from all sources

Source	Discussion regarding odour emissions
	regardless of odour character to predict worst-case cumulative concentrations. This is considered conservative as odour impacts (and complaints) are based on the FIDOL factors (Frequency, Intensity, Duration, Offensiveness of odour character and Location). It is unlikely that the boilers would contribute to offensive odour emissions due to their different odour character. Ground level odour impacts from the boilers are low (approximately 1.5 OU at the nearest sensitive receptor when all boilers are modelled on their own) and it is unlikely that odours from any of the boilers would lead to complaints at nearby receptors.
Boiler 4	The increase in boiler 4 odour emissions is attributed to the conversion of fuel source from gas to coal-fired which was proposed under MOD13 and completed at the start of 2019. Subsequent odour sampling reports from 2019 onwards indicate an increase in the boiler 4 stack odour concentration (refer page 17 of Attachment 1) and exhaust flowrate (approximately doubled), both of which contribute to increased odour emissions. As per Boiler 2, odour from boilers is not similar to other odorous sources at the site and these emissions are not leading to cumulative ground level odour impacts or complaints.
Boiler 5/6	Sampling data shows consistent odour concentration measurements from the combined Boiler 5/6 stack. The increase odour emission rate is primarily attributed to odour emission rate calculation method used in the MOD19 air quality assessment. The calculated method incorporated scaling based on current and proposed future production rates. For the MOD19 air quality assessment, the annual production rate was significantly lower than that of the previous MOD17 assessment (182 ML/annum for MOD19 compared with 259 ML/annum for MOD17). Therefore, scaling up odour emissions to the proposed 300ML results in a significantly higher MOD19 odour emission rate despite the sampled odour concentrations for MOD19 and MOD17 being similar. It should be noted that the production rate varies significantly and is based on market demand.

In addition to the discussion provided in Table 3-1, it should be noted that odour sampling in accordance with AS4323.3 and AS4323.4 has an uncertainty factor of up to 3 times. This level of uncertainty may contribute to the observed fluctuations in sampled odour concentrations.

Manildra will continue to undertake odour sampling on a quarterly basis as a means to satisfy regulatory requirements and understand odour emissions from the site. In the case of receiving a valid odour complaint, where possible this would be investigated including details on the character of odour that lead to complaint.

4 Conclusions

GHD has prepared this letter in response to a request from DPIE to provide additional information regarding the MOD19 air quality assessment. All additional information has been provided and should any additional clarification be required, please do not hesitate to contact the undersigned.

Sincerely
GHD

Evan Smith
Senior Engineer
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Attachment 1 – EPL Odour Emission Survey Quarter 1, 2020-2021 (Stephenson Environmental Management Australia, 2020)

Stephenson

Environmental Management Australia

EPL ODOUR EMISSION SURVEY QUARTER 1, 2020-2021

SHOALHAVEN STARCHES PTY LTD

BOMADERRY, NSW

PROJECT NO.: 7065/S25548/20

DATES OF SURVEY: 12, 14, 21 MAY AND 4 JUNE, 2020

DATE OF ISSUE: 21 JULY, 2020

Stephenson

Environmental Management Australia

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EPL ODOUR EMISSION SURVEY QUARTER 1, 2020-2021

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P W STEPHENSON

J WEBER

M KIMBER

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1 INTRODUCTION

Stephenson Environmental Management Australia (SEMA) was requested by Shoalhaven Starches Pty Limited to conduct an odour emission survey at their manufacturing complex in Bomaderry, New South Wales (NSW).

The objective of the survey is to comply with Condition M2.1 of the Environment Protection Licence (EPL) No. 883 issued by the Environment Protection Authority (EPA). The EPA is now part of the Office of Environment and Heritage (OEH).

Section 2 of this report outlines Conditions P1 and M2 which identify the potential point and diffuse odour sources and the sampling and analysis methods respectively required by the OEH. This survey monitored the quarterly odour concentrations as required in section M2.2 of EPL 883.

In addition, the Carbon Dioxide (CO_2) Scrubber Inlet sampling point, which currently is not listed in EPL 883 and therefore does not have EPA Identification No., was also sampled.

The quarters are defined as below:

- Quarter 1 May to July inclusive
- Quarter 2 August to October inclusive
- Quarter 3 November to January inclusive
- Quarter 4 February to April inclusive

The Quarter 1, 2020-2021 odour test results are presented in this report. The tests were conducted on 12th, 14th, 21st May and 4th June, 2020.

2 MONITORING REQUIREMENTS

2.1 ENVIRONMENT PROTECTION LICENCE 883 (ISSUED 18 DECEMBER 2015)

2.1.1 CONDITION P1 LOCATION OF MONITORING/DISCHARGE POINTS AND AREAS

Table 2-1 identifies the point and diffuse sources as defined by the OEH that relate to this survey as per most recent version of EPL No. 883 dated 20 June 2018.

TABLE 2-1 LOCATION OF ODOUR MONITORING/DISCHARGE POINTS AND AREAS

EPL ID. No.	Location	Odour Samples TM OM-7/8	Frequency as per M2.2 EPL 883
8	No. 1 Gluten Dryer	1	Quarterly
9	No. 2 Gluten/Starch Dryer*	1	Quarterly
10	No. 3 Gluten Dryer	1	Quarterly
11	No. 4 Gluten Dryer	1	Quarterly
12	No. 1 Starch Dryer	1	Quarterly
13	No. 3 Starch Dryer	1	Quarterly
14	No. 4 Starch Dryer	1	Quarterly
16	CO_2 Scrubber outlet	1	Quarterly
Not specified	CO_2 Scrubber inlet	1	--
19	Effluent Storage Dam 1	1	Yearly
20	Effluent Storage Dam 2	1	Yearly
21	Effluent Storage Dam 3	1	Yearly
23	Effluent Storage Dam 5	1	Yearly
24	Effluent Storage Dam 6	1	Yearly
25	Sulphur Oxidisation Pond	1	Yearly
35	Combined Stack Boilers No.5 & 6	1	Quarterly
39	Inlet Pipe to Biofilters A & B	1	Quarterly
39A	Inlet Pipe to Biofilters A & B	1	Quarterly
40	Outlet of Biofilter A	2	Quarterly
41	Outlet of Biofilter B	2	Quarterly
42	Boiler No.4	1	Quarterly
44	Fermenter	1	Quarterly
45	Boiler No.2	1	Quarterly
46	DDG Pellet Plant Stack	1	Quarterly
47	No. 5 Starch Dryer	1	Quarterly

2.1.2 CONDITION M2 – MONITORING CONCENTRATION OF DISCHARGED POLLUTANTS

Condition M2.1 states: *For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency specified in the opposite columns.*

Key to Tables 2.2 to 2.5:

%	=	percent
^{o}C	=	degrees Celsius
g/g.mole	=	grams per gram mole
kg/m^3	=	kilograms per cubic metre
m/s	=	metres per second
m^3/s	=	cubic metres per second
mg/m^3	=	milligrams per cubic metre
OM	=	Other Method
ou	=	odour units
TM	=	Test Method

TABLE 2-2 SAMPLING AND ANALYSIS OF POINT SOURCES (POINTS 8, 9, 10, 11, 12, 13, 14, 16 & 47)

Pollutant	Units	Frequency	Approved Method
Dry Gas Density	kg/m^3	Quarterly	TM-23
Flow	m^3/s	Quarterly	TM-2
Moisture	%	Quarterly	TM-22
Molecular Weight of stack gases	g/g-mole	Quarterly	TM-23
Odour	ou	Quarterly	OM-7
Oxygen	%	Quarterly	TM-25
Temperature	^{o}C	Quarterly	TM-2
Velocity	m/s	Quarterly	TM-2

TABLE 2-3 SAMPLING AND ANALYSIS OF DIFFUSE SOURCES (POINTS 19, 20, 21 & 23, 24 & 25)

Pollutant	Units	Frequency	Approved Method
Odour	ou	Annual	OM-7

TABLE 2-4 SAMPLING AND ANALYSIS OF SOURCES (POINTS 39, 40, 41, 44 & 46)

Pollutant	Units	Frequency	Approved Method
Odour	ou	Quarterly	OM-7

TABLE 2-5 SAMPLING AND ANALYSIS OF POINT SOURCES (POINTS 35, 42 & 45)

Pollutant	Units	Frequency	Approved Method
Cadmium	mg/m^3	Quarterly	TM-12,TM-13 & TM-14
Mercury	mg/m^3	Quarterly	TM-12,TM-13 & TM-14
Moisture	%	Quarterly	TM-22
Molecular weight of stack gases	g/g.mole	Quarterly	TM-23
Nitrogen Oxides	mg/m^3	Quarterly	TM-11
Odour	ou	Quarterly	OM-7
Opacity	%	Quarterly	CEM-1
Oxygen	%	Quarterly	TM-25
Sulphur Dioxide	mg/m^3	Annual	TM-4
Temperature	^oC	Quarterly	TM-2
Total Solid Particles	mg/m^3	Quarterly	TM-15
Type 1 & Type 2 substances in aggregate	mg/m^3	Quarterly	TM-12,TM-13 & TM-14
Velocity	m/s	Quarterly	TM-2
Volatile Organic Compounds as n-propane equivalent	mg/m^3	Quarterly	TM-34
Volumetric Flowrate	m^3/s	Quarterly	TM-2

3 PRODUCTION CONDITIONS

Shoalhaven Starches personnel considered the factory and the ethanol distillery were operating under typical conditions on the days of testing.

4 ODOUR EMISSION TEST RESULTS

SEMA performed the sampling and the odour analysis was performed by Odour Research Laboratories Australia (ORLA). SEMA and ORLA are both NATA accredited (No.15043) facilities to ISO 17025 for this.

The NATA accredited ORLA Olfactometry Test Report 7065/ORLA/01 is presented in Appendix B. Exhaust gas flow and emission tests results from point sources are detailed in Tables A-1 to A-6, Appendix A. Appendix C details calibration of instruments used to take measurements. Appendix D shows sample locations.

Tables 4-1 and 4-2 summarise the odour emission concentrations for all point and diffuse sources respectively.

TABLE 4-1 EMISSION CONCENTRATION TEST RESULTS POINT SOURCES, Q1, 2020-2021

EPA ID No.	Description	Date	Odour Concentration (ou)
8	No.1 Gluten Dryer	14.05.2020	470
9	No.2 Gluten Dryer	04.06.2020	790
10	No.3 Gluten Dryer	14.05.2020	790
11	No.4 Gluten Dryer	04.06.2020	305
12	No.1 Starch Dryer	14.05.2020	330
13	No.3 Starch Dryer	12.05.2020	360
14	No.4 Starch Dryer	12.05.2020	330
16	Carbon Dioxide Scrubber Outlet	04.06.2020	8,000
--	Carbon Dioxide Scrubber Inlet	04.06.2020	8,700
35	Combined Stack No.5 & 6 Boilers	21.05.2020	1,000
42	Boiler No.4 Outlet	21.05.2020	1,400
44	Fermenter (No. 13)	04.06.2020	7,400
45	Boiler No.2 Outlet	04.06.2020	1,420
46	DDG Pellet Plant Stack	04.06.2020	4,400
47	No.5 Starch Dryer	12.05.2020	390

Key: ou = odour units

TABLE 4-2 EMISSION CONCENTRATION TEST RESULTS DIFFUSE SOURCES, Q1, 2020-2021

EPA ID No.	Description	Date	Odour Concentration (ou)
39	Inlet to Biofilters A & B	12.05.2020	18,500
39A	Inlet to Biofilters A & B	12.05.2020	14,200
40	Outlet of Biofilter A (east)	12.05.2020	2,200
40	Outlet of Biofilter A (west)	12.05.2020	1,500
41	Outlet of Biofilter B (east)	12.05.2020	5,200
41	Outlet of Biofilter B (west)	12.05.2020	2,200

Key: ou = odour units

5 CONCLUSIONS

SEMA completed the odour sampling and analysis at Shoalhaven Starches manufacturing facility at Bomaderry for Quarter 1, 2020 - 2021.

Figure 5-1 presents graphical representations of odour concentrations recorded for Gluten Dryers No.1, 2, 3 and 4 since autumn 2005.

Figure 5-2 presents graphical representations of odour concentrations recorded for Starch Dryers No.1, 3 and 4 since autumn 2005.

Figure 5-3 graphically shows the Starch Dryer No. 5 emission concentrations since spring 2017.

Figure 5-4 graphically shows the Fermenter emission concentrations since summer 2007-2008.

Figure 5-5 illustrates odour emission concentrations from the Carbon Dioxide Scrubber since autumn 2013.

Figures 5-6 and 5-7 graphically show the Combined Boiler 5 and 6 stack and the Boiler No.4 stack emission concentrations since summer 2013-2014 respectively.

Figure 5-8 shows the Boiler 2 stack emission concentrations since winter 2019.

Figure 5-9 graphically shows the Bio-filter emission concentrations since autumn 2010.

Figure 5-10 graphically shows the DDG Pellet plant Stack emission concentrations since spring 2016.

FIGURE 5-1 ODOUR EMISSION CONCENTRATIONS, GLUTEN DRYERS NO.1, 2, 3 & 4 (EPA 8,9,10,11)

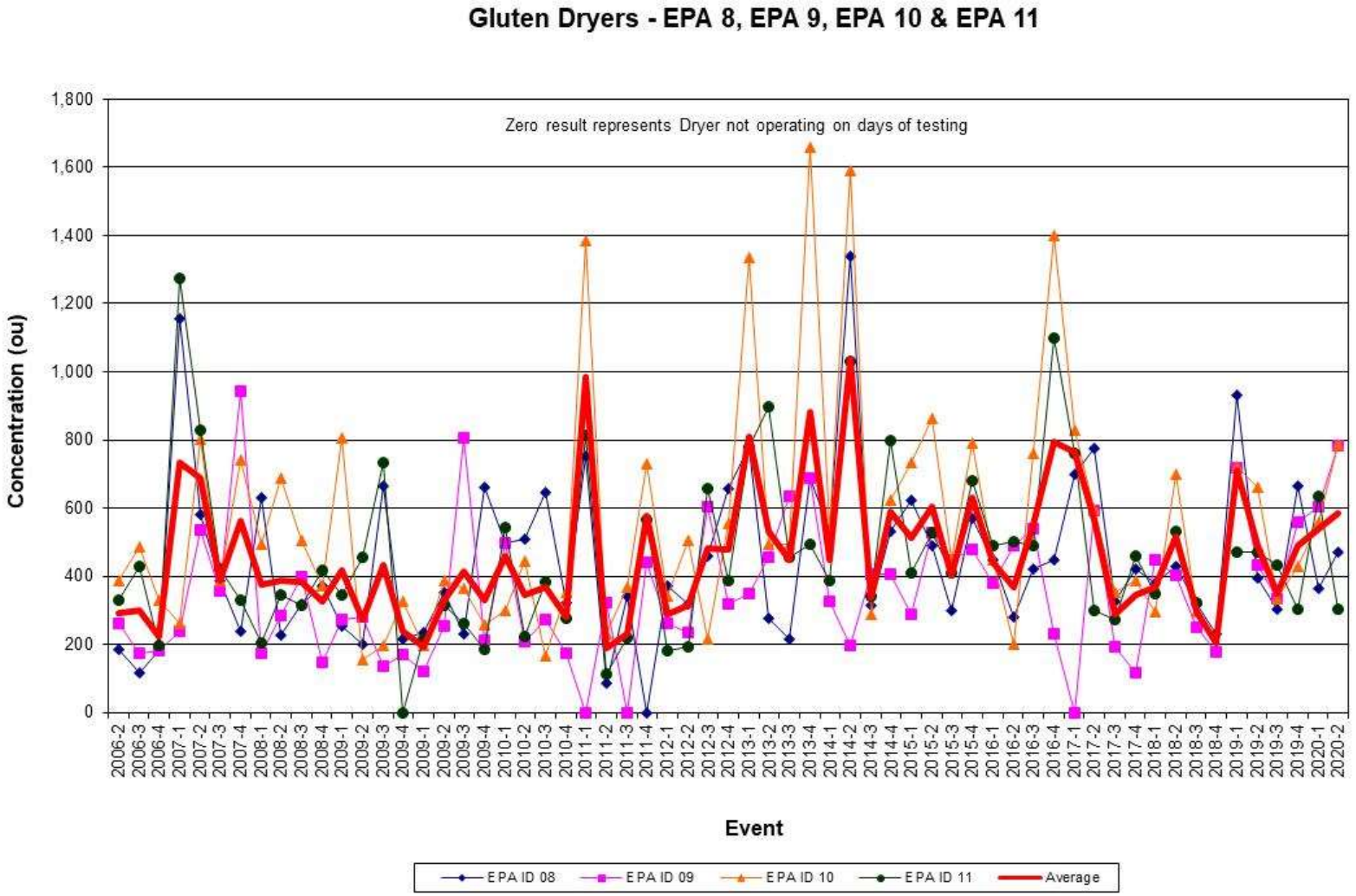


FIGURE 5-2 ODOUR EMISSION CONCENTRATIONS, STARCH DRYERS NO.1, 3 & 4 (EPA 12, 13, 14)

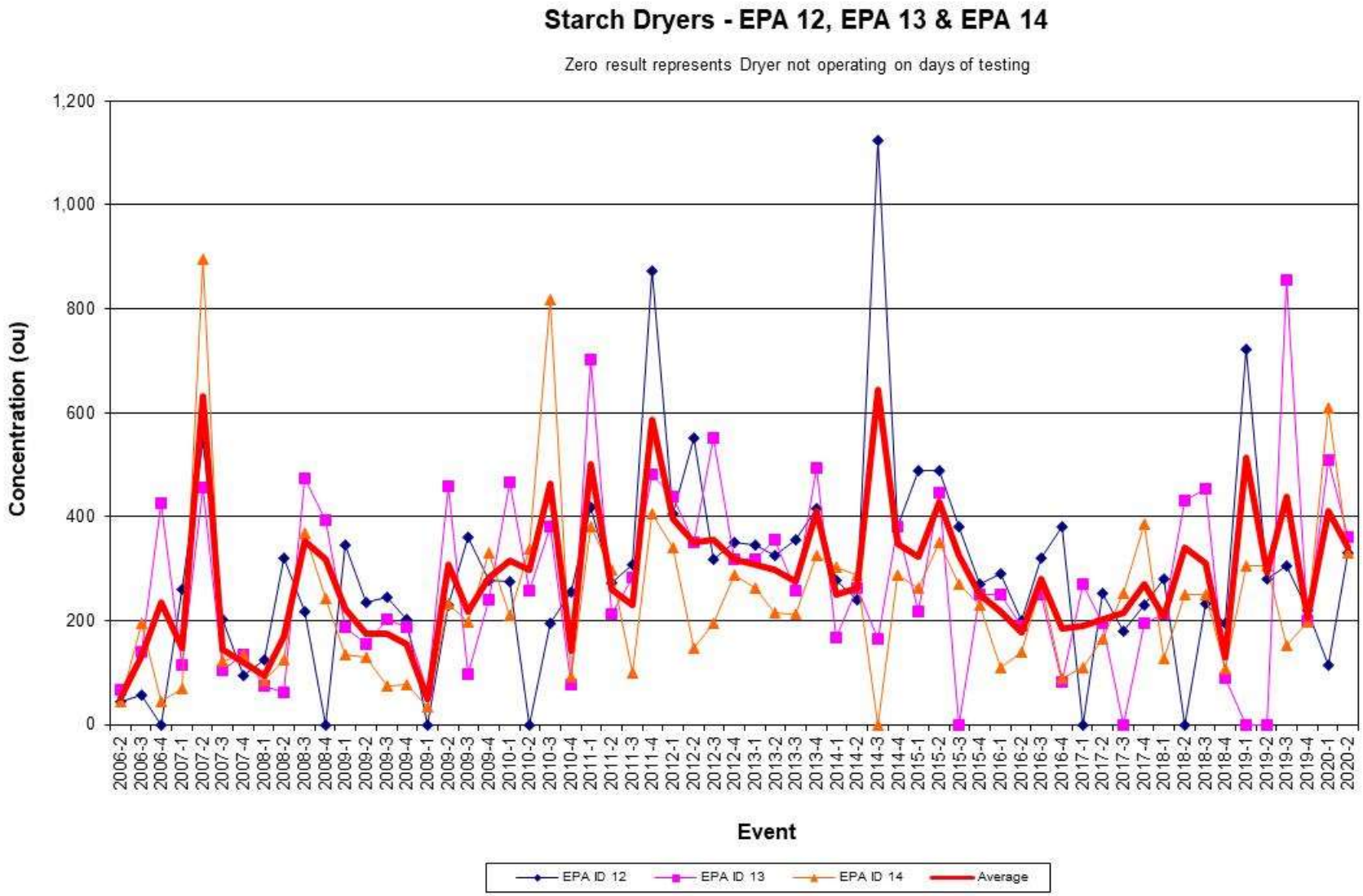


FIGURE 5-3 ODOUR EMISSION CONCENTRATIONS, STARCH DRYER 5 (EPA 47)

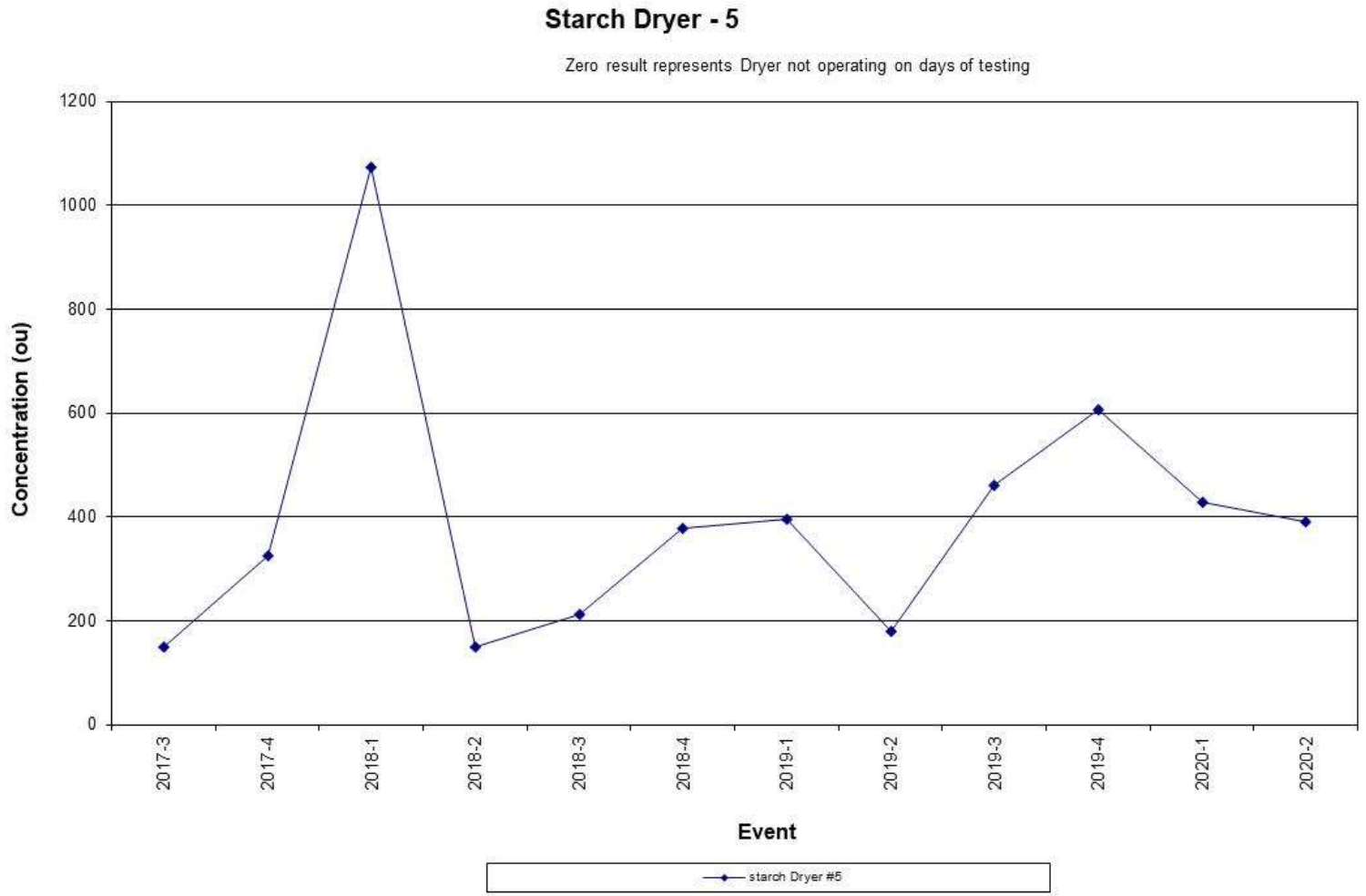


FIGURE 5-4 ODOUR EMISSION CONCENTRATIONS, FERMENTERS (EPA 44)

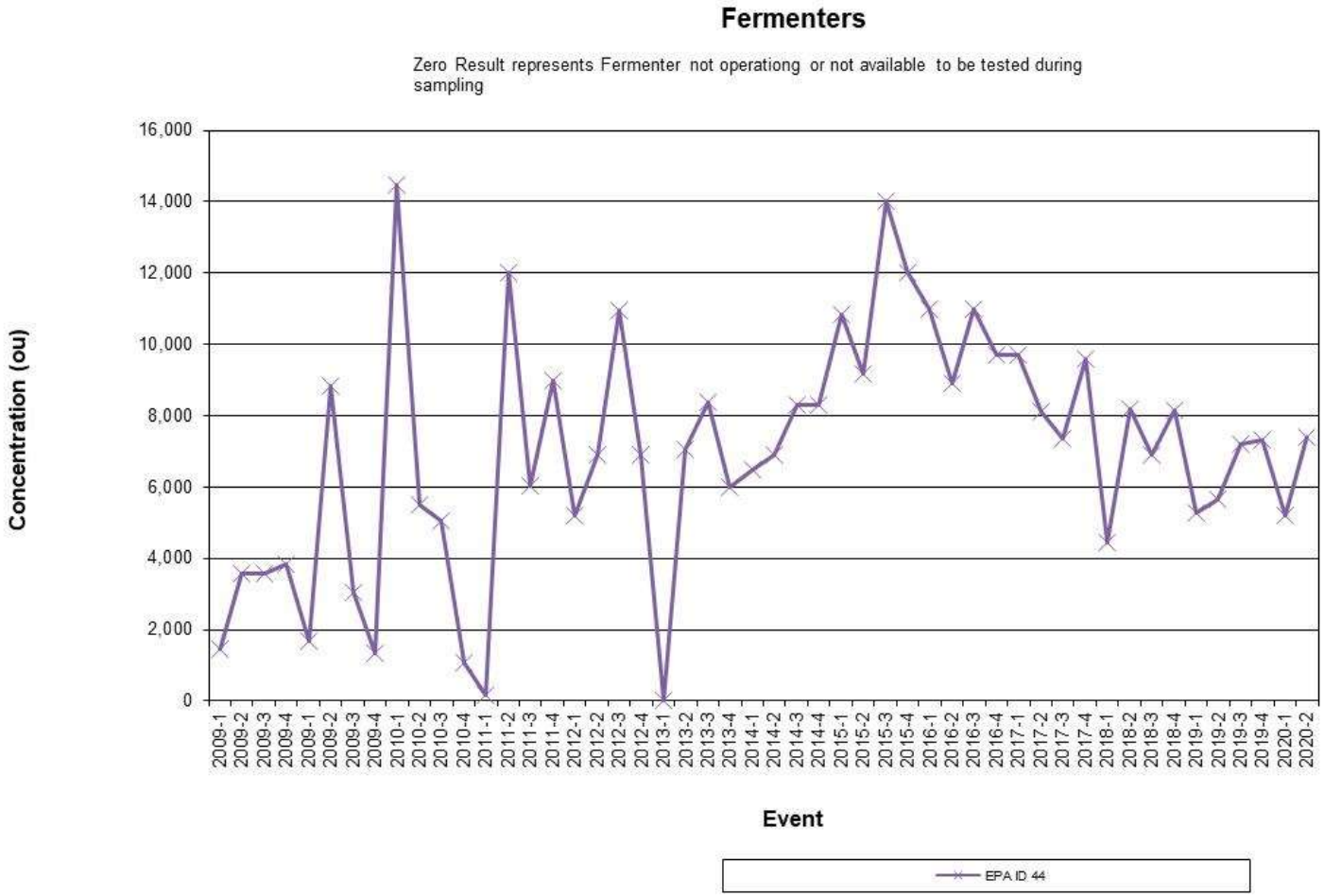


FIGURE 5-5 ODOUR EMISSION CONCENTRATIONS, CARBON DIOXIDE SCRUBBER OUTLET (EPA 16)

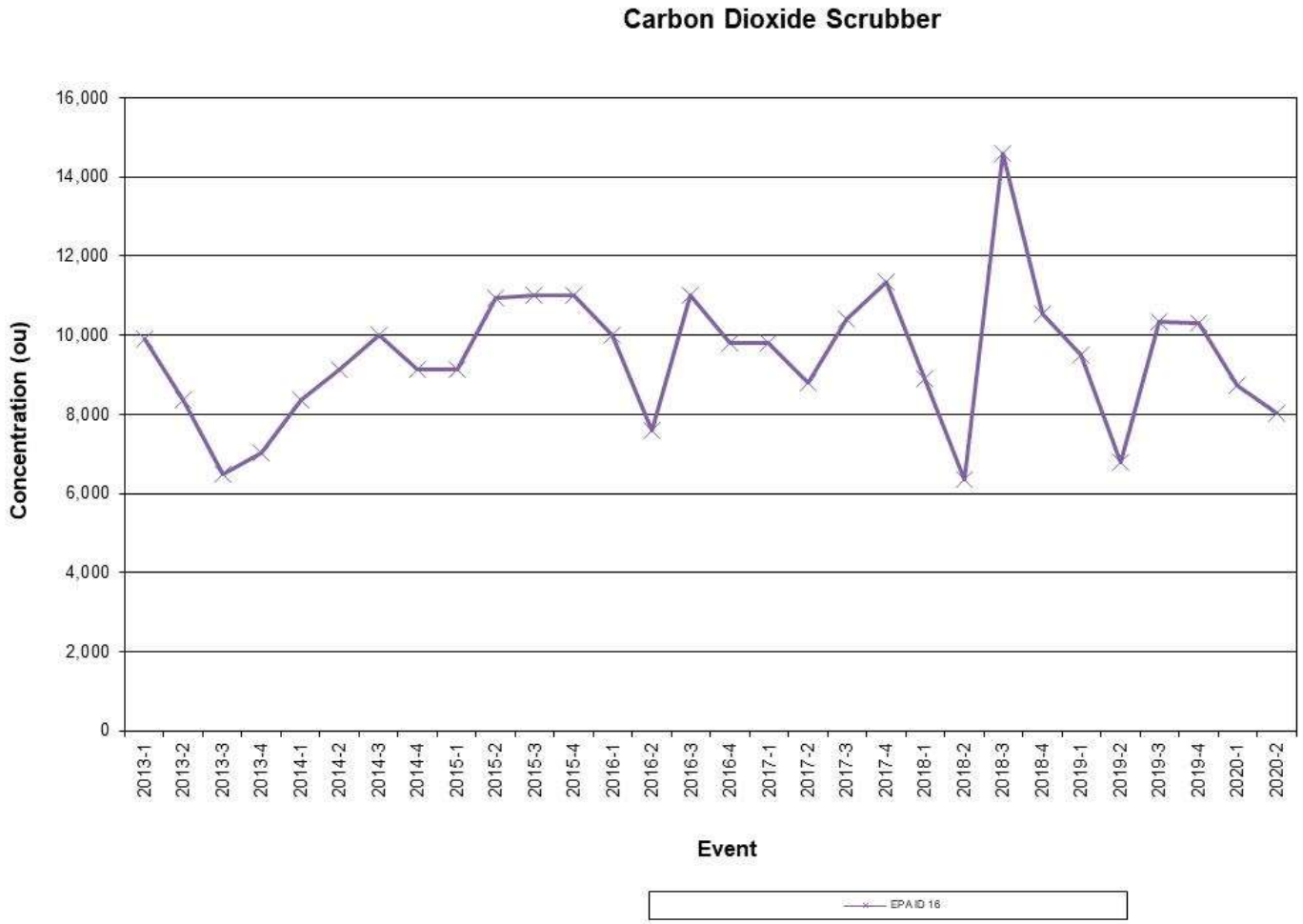


FIGURE 5-6 ODOUR EMISSION CONCENTRATIONS, COMBINED BOILER 5 AND 6 STACK (EPA 35)

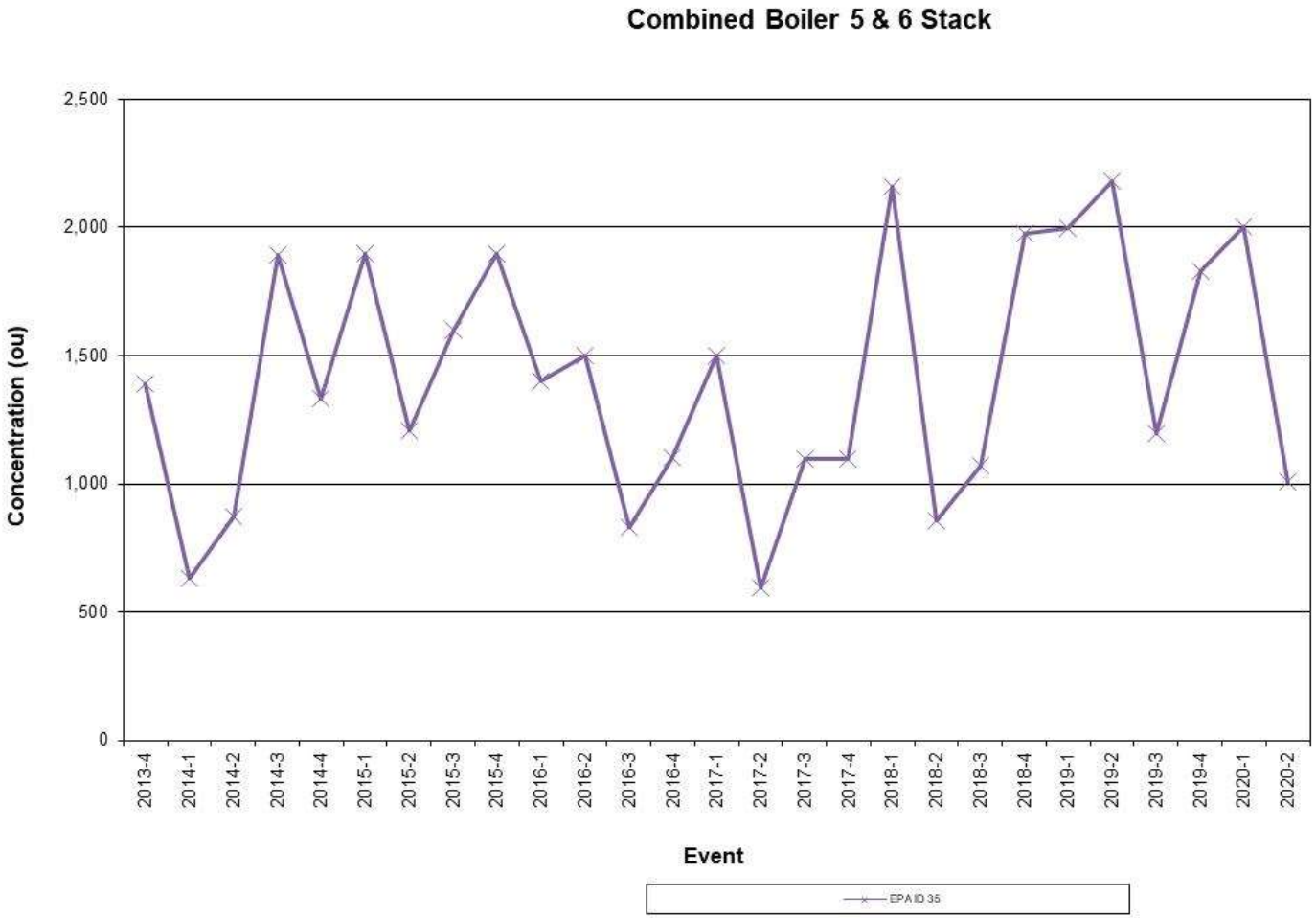


FIGURE 5-7 ODOUR EMISSION CONCENTRATIONS, BOILER 4 STACK (EPA 42)

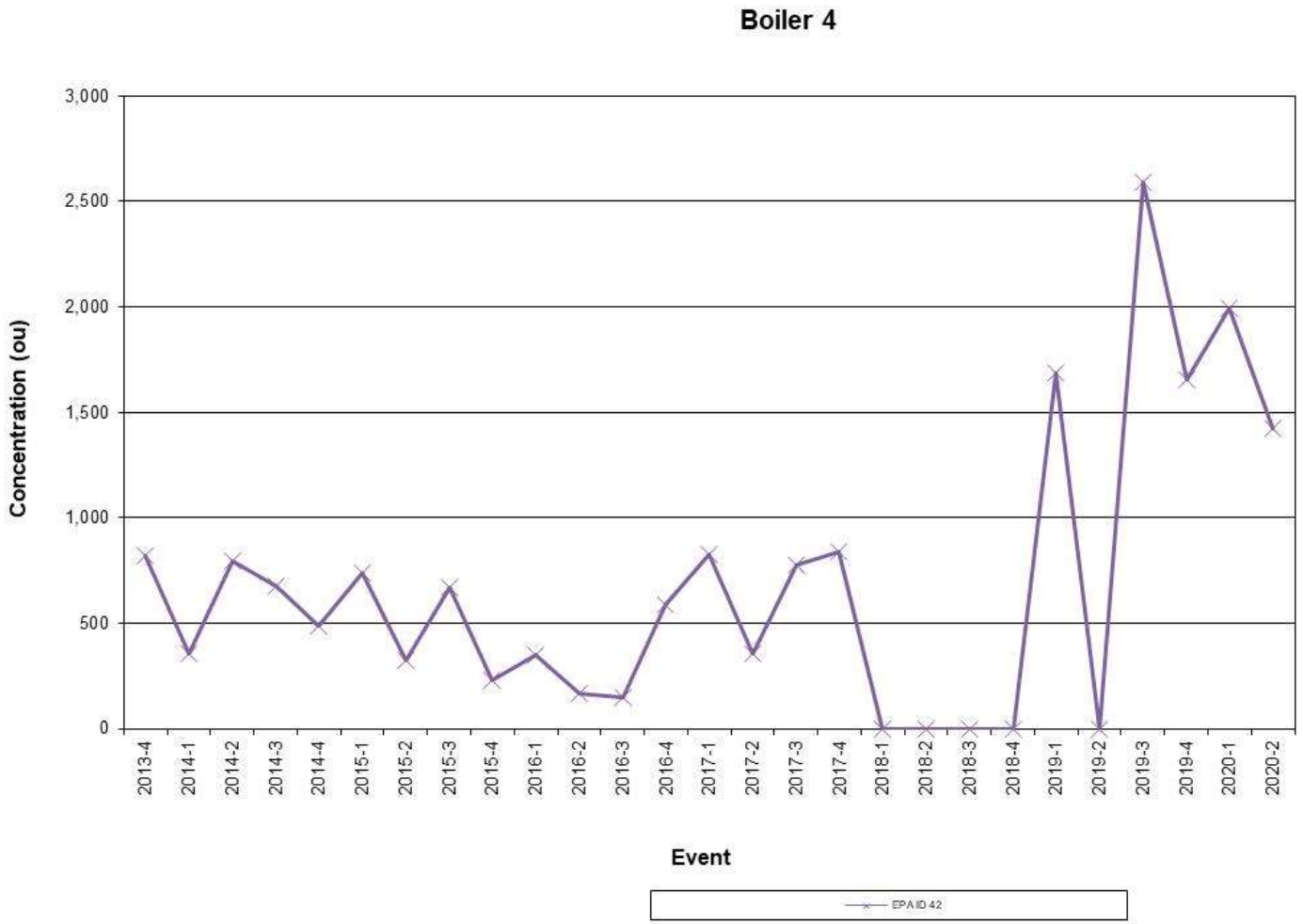


FIGURE 5-8 ODOUR EMISSION CONCENTRATIONS, BOILER 2 STACK (EPA 45)

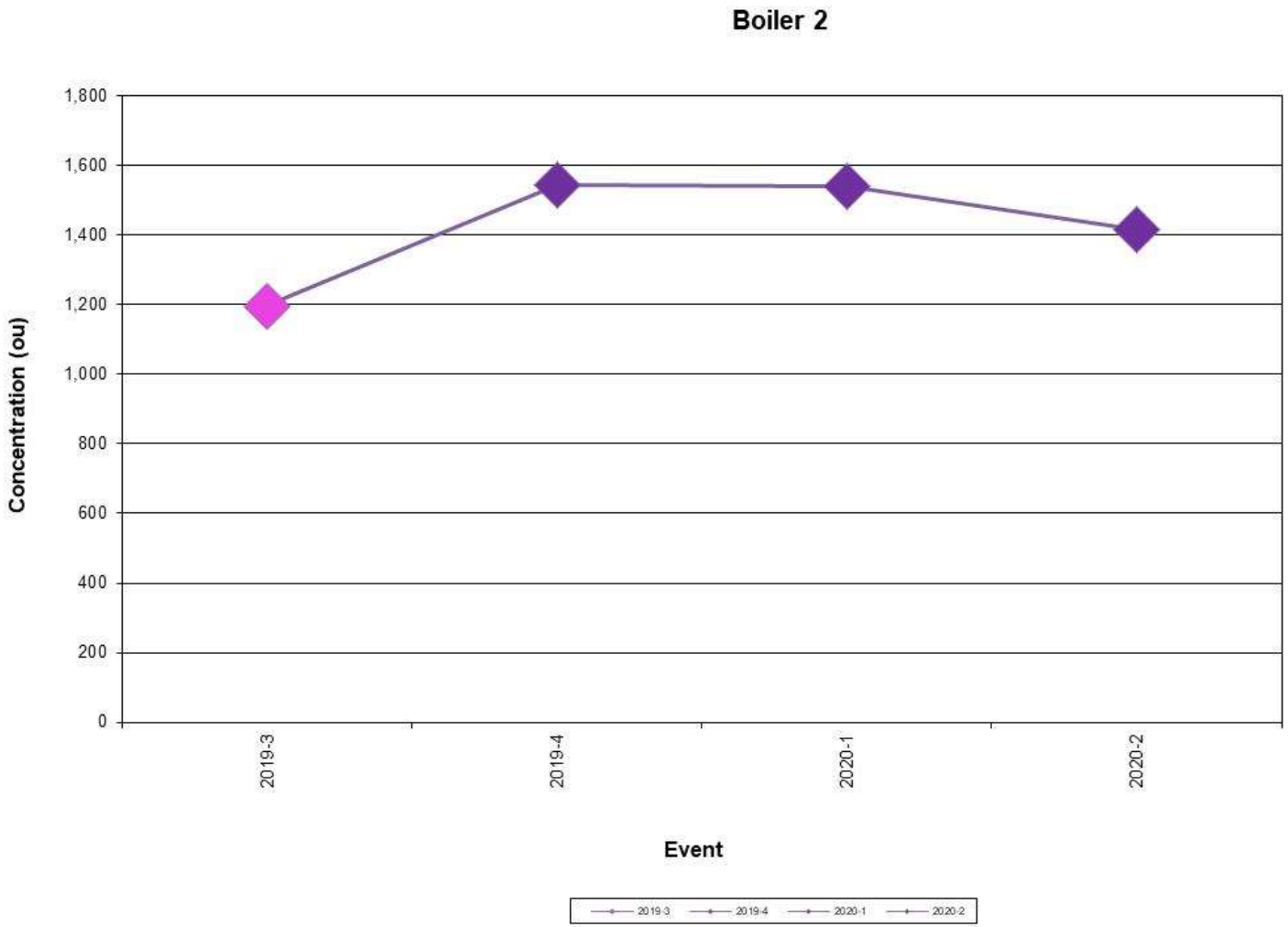


FIGURE 5-9 ODOUR EMISSION CONCENTRATIONS, BIOFILTERS (EPA 39, 40, 41)

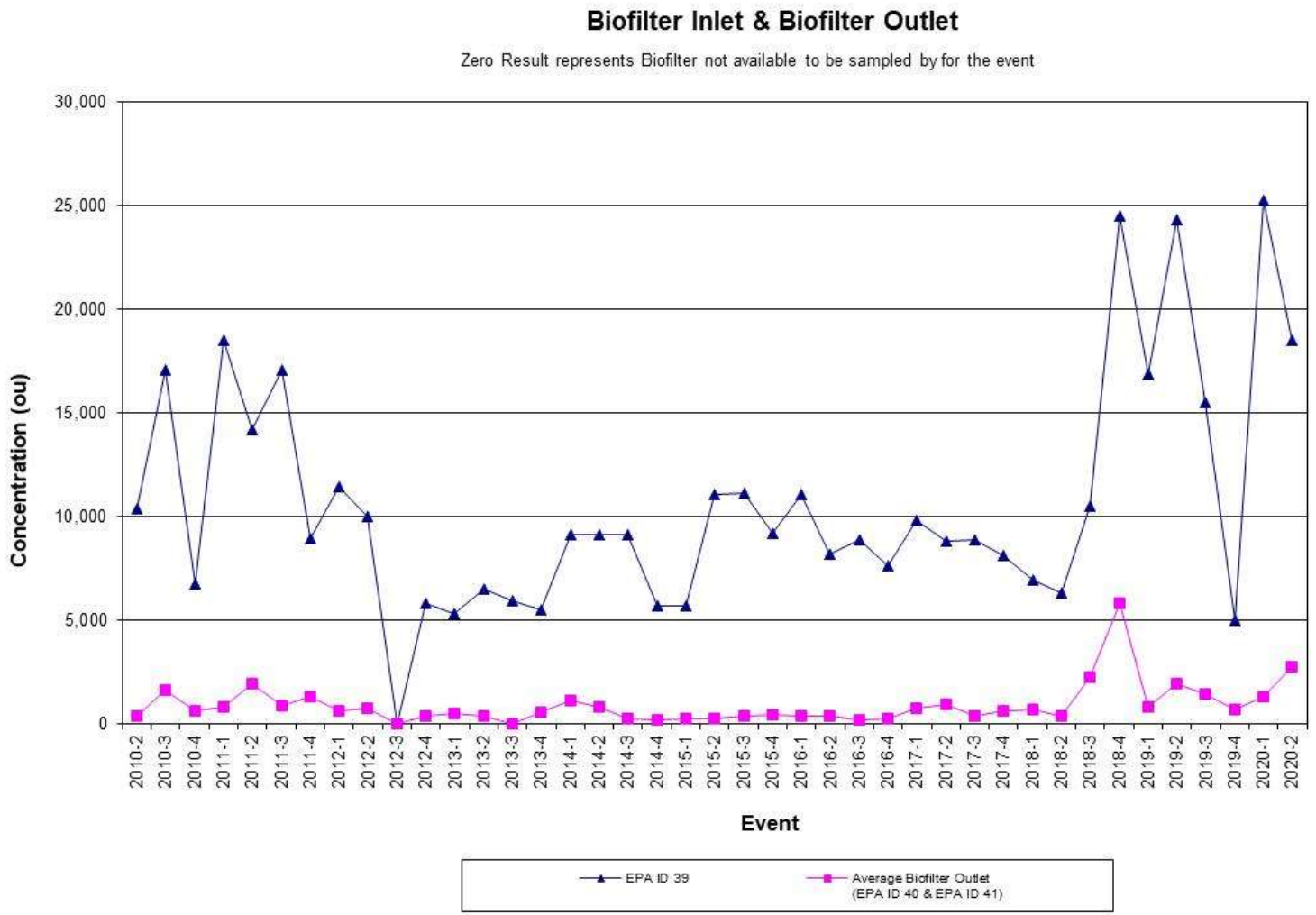
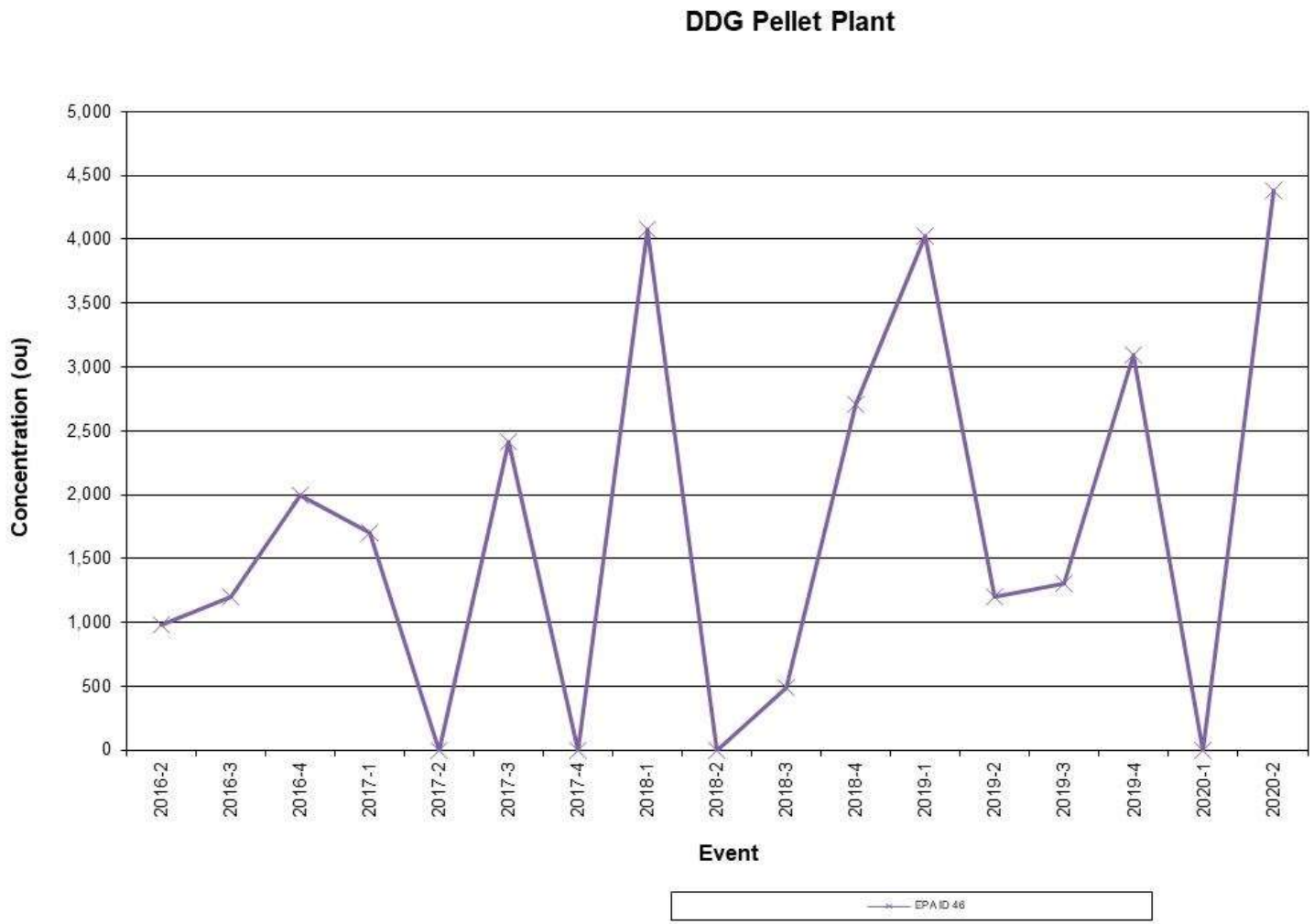


FIGURE 5-10 CONCENTRATION DDG PELLET PLANT STACK (EPA 46)



6 TEST METHODS

6.1 ODOUR MEASUREMENT/DYNAMIC OLFACTOMETRY

(AS 4323.3 & AS 4323.4 and OM-7 and OM-8)

Samples were collected in 30L Nalophane sampling bags which are enclosed in airtight plastic containers. Surface samples were collected utilising an equilibrium flux hood or witches hat flux hood.

Odorous gas for analysis was drawn through a Teflon (PTFE) sample probe. The gas then passes through a Teflon (PTFE) tube connected to the Nalophane sampling bag. The sampling pump is connected to the airtight plastic container to provide a sample gas flow-rate of approximately 0.5 – 1.5 litres per minute. After the required volume has been sampled, the pump is stopped and the bag sealed with a stainless steel valve. Two samples were collected from each site.

Using a triangular forced choice olfactometer, the Nalophane bag of odour sample was dynamically diluted to various concentrations with dry odour free air.

The diluted sample was then presented to a panel of screened panellists as one of these airflows. The panellists then recorded if they could detect any odour and from which flow. The other two flows were discharging odour free air.

The odour is always presented to the panellists in ascending concentration; that is, from lower to higher concentration. The panellists are required at each dilution level to give a response as to what they are smelling from the flows (forced choice methodology). The response options for the panellists are:

'Guess'	Unable to determine which air flow contains the diluted odours
'Inkle'	Thinks that one of the flows could be different from the other two flows
'Detect' or 'Certain'	Is confident that one of the airflows smells different from the other two flows. Not necessarily able to say what the smell is.
'Recognise'	Thinks that one of the flows could be different from the other two flows and is able to: ▪ Assign a 'hedonic tone' (pleasantness scale number) to the odour ranging from –10 to 10 and/or ▪ Able to assign a character to the colour, as in 'it smells like …' *Note: that the Recognise level concentration and Hedonic Tone and Odour descriptors are obtained with the diluted odour, panellists are not exposed to the full strength odour.*

The percentage panel response and dilution levels used were then entered into a computer programme to determine the 50% panel response. This dilution level corresponds to the odour concentration of the sample.

Sampling and dilution lines are constructed from teflon, stainless or glass to prevent contamination of the sample.

The sampling and the dilution procedures used were in accordance with OEH NSW Method OM-7 and OM-8, which are based on Standards Association of Australia, AS4323.3 and AS4323.4.

6.1.1 ODOUR PANEL SELECTION

Odour panellists must meet certain criteria to qualify as and remain panellists. Their average sensitivity to n-Butanol must be between 20 and 80 parts per billion (ppb) and their variability in response to n-Butanol must be within a certain range.

Panellists are screened against n-Butanol before every panel session to ensure they are in compliance.

Panellists should not suffer from respiratory complaints, nor should they eat or smoke or drink anything but water during the half hour preceding or during the test period and their person and clothing should be odour free and have not been exposed to an odorous environment before testing.

6.1.2 ODOUR TERMINOLOGY

The odour level is expressed in odour units and for mixed odours is analogous to concentration expressed in parts per billion. The odour detection level is defined as the ratio of *the volume that a sample of odorous gas would occupy when diluted to the threshold of detection of that odour* to *the volume of the sample*. In simpler terms, the ratio indicated the number of dilutions necessary to reduce the odour to its threshold of detection or odour detection threshold. This ratio is expressed in odour units or number of dilutions to detection threshold. For example, a value of 2,000 odour units would mean the volume of the initial sample of odorous gas would need to be diluted 2,000 times before the odour would just be detectable to the average human nose, that is, at the odour detection threshold.

6.2 EXHAUST GAS VELOCITY

(OEH NSW TM-2 and USEPA Method 12)

Velocity profiles were obtained across the stack utilising an Airflow Developments Ltd. S-type pitot tube and digital manometer.

6.3 EXHAUST GAS TEMPERATURE

(OEH NSW TM- 2, 3 & 4 and USEPA Methods 2, 3 & 4)

The exhaust gas temperature was measured using a Digital thermometer (0-1200^{o}C) connected to a chromel/alumel (K-type) thermocouple probe.

6.4 OXYGEN (O_2)

(OEH NSW TM-24 and USEPA Method 3A)

O_2 was analysed by a Testo 350 analyser.

6.5 MOISTURE

(OEH NSW TM-22 and USEPA Method 4)

Moisture from the stack was determined in accordance with OEH NSW TM-22 and USEPA Method 4. In particular, M4 Section 2.2.1 which nominates a moisture approximation method used to enable calculation of isokinetic sampling rates and where isokinetic sampling is not required such as odour sampling.

6.6 ACCURACY

All results are quoted on a dry basis. SEMA has adopted the following (Table 6-1) uncertainties for various stack testing methods.

TABLE 6-1 ESTIMATION OF MEASUREMENT UNCERTAINTY

Pollutant	Methods	Uncertainty
Moisture	AS4323.2, TM-22, USEPA 4	25%
Odour	AS4323.3, AS4323.4	3 times
Oxygen and Carbon Dioxide	TM-24, TM-25, USEPA 3A	1% actual
Velocity	AS4323.1, TM-2, USEPA 2A & 2C	5%

Key:

Unless otherwise indicated the uncertainties quoted have been determined @ 95% level of Confidence level (i.e. by multiplying the repeatability standard deviation by a co-efficient equal to 1.96) (Source – Measurement Uncertainty)

Sources: *Measurement Uncertainty – implications for the enforcement of emission limits by Maciek Lewandowski (Environment Agency) & Michael Woodfield (AEAT) UK*

Technical Guidance Note (Monitoring) M2 Monitoring of stack emissions to air Environment Agency Version 3.1 June 2005.

APPENDIX A – EMISSION TEST RESULTS

Glossary:

%	=	percent
^{o}C	=	Degrees Celsius
am^3/min	=	cubic metre of gas at actual conditions per minute
Normal Volume (m^3)	=	cubic metre at 0°C and 760 mm pressure and 1 atmosphere
am^3	=	cubic metre of gas at actual conditions
g/g mole	=	grams per gram mole
g/s	=	grams per second
hrs	=	hours
kg/m^3	=	kilograms per cubic metre
kPa	=	kilo Pascals
m^2	=	square metre
m/s	=	metre per second
m^3/sec	=	cubic metre per second at 0^0C and 1 atmosphere
mg	=	milligrams
mg/ m^3	=	milligrams per cubic metre at 0^oC and 1 atmosphere
O_2	=	Oxygen

Abbreviations for names of SEMA staff who completed either Sampling or Analysis or QA Checking

PWS	=	Peter W Stephenson
JW	=	Jay Weber

TABLE A-1 EMISSION TEST RESULTS – GLUTEN DRYERS NO. 1, 2, 3 & 4

Emission Test Results				
Project Number	**7065**			
Project Name	**Shoalhaven Starches**			
Test Location	**EPA ID 8 Gluten Dryer 1**	**EPA ID 9 Gluten Dryer 2**	**EPA ID 10 Gluten Dryer 3**	**EPA ID 11 Gluten Dryer 4**
Date	14-May-20	04-June-20	14-May-20	04-June-20
	Dry			
Run	1			
Method	TM-1, TM-2 & TM-22			
Flow Start Time (hrs)	14:00	15:50	15:20	14:55
Flow Stop Time (hrs)	14:22	16:03	15:47	15:17
Inlet/Exhaust	Exhaust	Exhaust	Exhaust	Exhaust
Stack Temperature (^oC)	71.4	64	74.2	71.8
Stack Cross-Sectional area (m^2)	1.431	1.094	4.410	2.310
Average Stack Gas Velocity (m/s)	13.9	17.4	10.9	17.1
Actual Gas Flow Volume (am^3/min)	1,194	1,140	2,892	2,371
Total Normal Gas Flow Volume (m^3/min)	892	729	2,118	1,775
Total Normal Gas Flow Volume (m^3/s)	14.9	12.2	35.3	29.6
Total Stack Pressure (kPa)	102.6	93.4	101.4	102.3
Moisture Content (% by volume)	6.85	14.36	6.95	6.35
Molecular Weight Dry Stack Gas (g/gmole)	28.84	28.84	28.84	28.84
Dry Gas Density (kg/m^3)	1.29	1.29	1.29	1.29
Oxygen (%)	20.9	20.90	20.9	20.9
Analysis	**Odour**	**Odour**	**Odour**	**Odour**
Method	**AS4323.3**	**AS4323.3**	**AS4323.3**	**AS4323.3**
ORLA Number	5335	5347	5336	5346
SEMA Number	727937	727957	727938	727956
Sample Start Time (hrs)	14:12	15:57	15:37	15:07
Sample Finish Time (hrs)	14:22	16:03	15:47	15:17
Odour Concentration (As Received) (ou)	470	785	787	305
Odour Concentration (Final) (ou)	**470**	**790**	**790**	**305**
Normal MOER (As Received) (ou m^3/s)	6,990	9,543	27,783	9,021
Normal MOER (Final) (ou m^3/s)	7,000	9,500	27,800	9,000
Mass Odour Emission Rate Limit (ou m^3/s)	No Limit	No Limit	No Limit	No Limit
Sample Storage Period prior to disposal	2 days	2 days	2 days	2 days
Calculations entered by	JW	JW	JW	JW
Calculations checked by	PWS	PWS	PWS	PWS

TABLE A-2 EMISSION TEST RESULTS – STARCH DRYERS NO.1, 3, 4 & 5

Emission Test Results				
Project Number	**7065**			
Project Name	**Shoalhaven Starches**			
Test Location	**EPA ID 12 Starch Dryer 1**	**EPA ID 13 Starch Dryer 3**	**EPA ID 14 Starch Dryer 4**	**EPA ID 47 Starch Dryer 5**
Date	14-May-20	12-May-20	12-May-20	12-May-20
	Dry			
Run	1			
Method	TM-1, TM-2 & TM-22			
Flow Start Time (hrs)	12:27	10:18	10:28	11:00
Flow Stop Time (hrs)	12:53	10:40	10:49	11:21
Inlet/Exhaust	Exhaust	Exhaust	Exhaust	Exhaust
Stack Temperature (^oC)	38.2	40.0	39.4	61.8
Stack Cross-Sectional area (m^2)	2.250	1.000	1.000	4.524
Average Stack Gas Velocity (m/s)	5.6	22.6	22.7	15.0
Actual Gas Flow Volume (am^3/min)	754	1,358	1,361	4,073
Total Normal Gas Flow Volume (m^3/min)	634	1,129	1,142	3,170
Total Normal Gas Flow Volume (m^3/s)	10.6	18.8	19.0	52.8
Total Stack Pressure (kPa)	102.69	102.63	102.65	102.50
Moisture Content (% by volume)	5.44	5.88	5.27	5.68
Molecular Weight Dry Stack Gas (g/gmole)	28.836	28.836	28.836	28.836
Dry Gas Density (kg/m^3)	1.29	1.29	1.29	1.29
Oxygen (%)	20.9	20.9	20.9	20.9
Analysis	**Odour**	**Odour**	**Odour**	**Odour**
Method	**AS4323.3**	**AS4323.3**	**AS4323.3**	**AS4323.3**
ORLA Number	5334	5324	5325	5326
SEMA Number	727936	727927	727928	727929
Sample Start Time (hrs)	12:43	10:30	10:26	11:11
Sample Finish Time (hrs)	14:53	10:40	10:36	11:21
Odour Concentration (As Received) (ou)	333	360	330	390
Odour Concentration (Final) (ou)	**330**	**360**	**330**	**390**
Normal MOER (As Received) (ou m^3/s)	3,521	6,777	6,281	20,604
Normal MOER (Final) (ou m^3/s)	3,500	6,800	6,300	20,600
Mass Odour Emission Rate Limit (ou m^3/s)	No Limit	No Limit	No Limit	No Limit
Sample Storage Period prior to disposal	2 days	2 days	2 days	2 days
Calculations entered by	JW	JW	JW	JW
Calculations checked by	PWS	PWS	PWS	PWS

TABLE A- 3 EMISSION TEST RESULTS – BOILERS NO. 5&6, 4 & 2

Emission Test Results			
Project Number	**7065**		
Project Name	**Shoalhaven Starches**		
Test Location	**EPA ID 35 Boilers 5&6**	**EPA ID 42 Boiler 4**	**EPA ID 45 Boiler 2**
Date	21-May-20	21-May-20	04-June-20
	Dry		
Run	1		
Method	TM-1, TM-2 & TM-22		
Flow Start Time (hrs)	12:31	11:44	11:19
Flow Stop Time (hrs)	12:53	12:06	11:41
Inlet/Exhaust	Exhaust	Exhaust	Exhaust
Stack Temperature (^oC)	130.8	152.4	170.8
Stack Cross-Sectional area (m^2)	3.142	1.057	0.950
Average Stack Gas Velocity (m/s)	14.9	14.3	9.3
Actual Gas Flow Volume (am^3/min)	2,806.3	906.7	532.5
Total Normal Gas Flow Volume (m^3/min)	1,798.6	550.1	316.2
Total Normal Gas Flow Volume (m^3/s)	29.976	9.168	5.270
Total Stack Pressure (kPa)	101.06	101.22	102.22
Moisture Content (% by volume)	4.98	5.39	4.35
Molecular Weight Dry Stack Gas (g/gmole)	30.080	29.840	30.080
Dry Gas Density (kg/m^3)	1.34	1.33	1.34
Oxygen (%)	8.4	10.0	8.4
Analysis	**Odour**	**Odour**	**Odour**
Method	**AS4323.3**	**AS4323.3**	**AS4323.3**
ORLA Number	5339	5338	5342
SEMA Number	727940	727939	727952
Sample Start Time (hrs)	12:43	11:56	11:31
Sample Finish Time (hrs)	15:53	12:06	11:41
Odour Concentration (As Received) (ou)	1,009	1,421	1,417
Odour Concentration (Final) (ou)	**1,000**	**1,400**	**1,420**
Normal MOER (As Received) (ou m^3/s)	30,246	13,028	7,467
Normal MOER (Final) (ou m^3/s)	30,200	13,000	7,500
Mass Odour Emission Rate Limit (ou m^3/s)	No Limit	No Limit	No Limit
Sample Storage Period prior to disposal	2 days	2 days	2 days
Calculations entered by	JW	JW	JW
Calculations checked by	PWS	PWS	PWS

TABLE A-4 EMISSION TEST RESULTS – FERMENTER 13 & CO_2 SCRUBBER OUTLET

Emission Test Results		
Project Number	7065	7065
Project Name	Shoalhaven Starches	Shoalhaven Starches
Test Location	**EPA ID 44 Fermenter 13**	**EPA ID 16 CO_2 Scrubber outlet**
Date	04-June-20	04-June-20
	Dry	Dry
Run	1	1
Method	TM-1,TM-2 & TM-22	TM-1,TM-2 & TM-22
Flow Start Time (hrs)	12:39	12:40
Flow Stop Time (hrs)	13:01	13:02
Inlet/Exhaust	Exhaust	Exhaust
Stack Temperature (^oC)	31.5	27.4
Stack Cross-Sectional area (m^2)	0.071	0.196
Average Stack Gas Velocity (m/s)	3.8	2.9
Actual Gas Flow Volume (am^3/min)	16.1	34
Total Normal Gas Flow Volume (m^3/min)	14.0	30
Total Normal Gas Flow Volume (m^3/s)	0.233	0.507
Total Stack Pressure (kPa)	102.32	102.30
Moisture Content (% by volume)	3.91	3.23
Molecular Weight Dry Stack Gas (g/gmole)	29.620	31.204
Dry Gas Density (kg/m^3)	1.32	1.39
Oxygen (%)	0.5	0.1
Analysis	**Odour**	**Odour**
Method	**AS4323.3**	**AS4323.3**
ORLA Number	5343	5344
SEMA Number	727953	727954
Sample Start Time (hrs)	12:51	12:52
Sample Finish Time (hrs)	13:01	13:02
Odour Concentration (As Received) (ou)	7,392	8,035
Odour Concentration (Final) (ou)	**7,400**	**8,000**
Normal MOER (As Received) (ou m^3/s)	1,723	4,077
Normal MOER (Final) (ou m^3/s)	1,700	4,000
Mass Odour Emission Rate Limit (ou m^3/s)	No Limit	No Limit
Sample Storage Period prior to disposal	2 days	2 days
Calculations entered by	JW	JW
Calculations checked by	PWS	PWS

TABLE A-5 EMISSION TEST RESULTS – DDG PELLET PLANT STACK & COMBINED INLET TO BIOFILTERS A & B

Emission Test Results			
Project Number	7065	7065	7065
Project Name	Shoalhaven Starches	Shoalhaven Starches	Shoalhaven Starches
Test Location	**EPA ID 46 DDG Pellet Plant Stack**	**EPA ID 39 Biofilter Inlet DDG Dryers 1, 2 & 3**	**EPA ID 39A Biofilter Inlet DDG Dryer# 4**
Date	04-June-20	12-May-20	12-May-20
	Dry	Dry	Dry
Run	1	1	1
Method	TM-1,TM-2 & TM-22	TM-1,TM-2 & TM-22	TM-1,TM-2 & TM-22
Flow Start Time (hrs)	10:54	11:33	12:22
Flow Stop Time (hrs)	11:24	11:54	12:43
Inlet/Exhaust	Exhaust	Exhaust	Exhaust
Stack Temperature (^oC)	55.3	43.1	23.6
Stack Cross-Sectional area (m^2)	1.674	0.283	0.049
Average Stack Gas Velocity (m/s)	14.7	15.1	11.3
Actual Gas Flow Volume (am^3/min)	1,478.1	256	33
Total Normal Gas Flow Volume (m^3/min)	1,209.0	199	30
Total Normal Gas Flow Volume (m^3/s)	20.150	3.3	0.5
Total Stack Pressure (kPa)	102.12	98.09	103.02
Moisture Content (% by volume)	2.42	7.18	2.22
Molecular Weight Dry Stack Gas (g/gmole)	28.836	28.836	28.836
Dry Gas Density (kg/m^3)	1.29	1.287	1.287
Oxygen (%)	20.9	20.9	20.9
Analysis	**Odour**	**Odour**	**Odour**
Method	**AS4323.3**	**AS4323.3**	**AS4323.3**
ORLA Number	5341	5327	5328
SEMA Number	727951	727930	727931
Sample Start Time (hrs)	11:11	11:44	12:33
Sample Finish Time (hrs)	11:24	11:54	12:43
Odour Concentration (As Received) (ou)	4,378	18,478	14,248
Odour Concentration (Final) (ou)	**4,400**	**18,500**	**14,200**
Normal MOER (As Received) (ou m^3/s)	88,216	61,249	7,239
Normal MOER (Final) (ou m^3/s)	88,200	61,200	7,200
Mass Odour Emission Rate Limit (ou m^3/s)	No Limit	No Limit	No Limit
Sample Storage Period prior to disposal	2 days	2 days	2 days
Calculations entered by	JW	JW	JW
Calculations checked by	PWS	PWS	PWS

TABLE A-6 EMISSION TEST RESULTS – BIOFILTER OUTLETS

Emission Test Results				
Project Number	7065	7065	7065	7065
Project Name	Shoalhaven Starches	Shoalhaven Starches	Shoalhaven Starches	Shoalhaven Starches
Test Location	**EPA ID 40 Biofilter A East**	**EPA ID 40 Biofilter A West**	**EPA ID 41 Biofilter B East**	**EPA ID 41 Biofilter B West**
Date	12-May-20	12-May-20	12-May-20	12-May-20
Run	1	1	1	1
Method	TM-2 & TM-22	TM-2 & TM-22	TM-2 & TM-22	TM-2 & TM-22
Sample & Flow Start Time (hrs)	13:08	13:36	13:09	13:37
Sample & Flow Stop Time (hrs)	13:18	13:46	13:19	13:47
Inlet/Exhaust	Exhaust	Exhaust	Exhaust	Exhaust
Stack Temperature (^oC)	37.7	37.4	40.5	39.0
Proportion of Inlet air flow	**24**	**22**	**29**	**25**
Analysis	Odour	Odour	Odour	Odour
Method	AS4323.3	AS4323.3	AS4323.3	AS4323.3
ORLA Number	5329	5330	5331	5332
SEMA Number	727932	727933	727934	727935
Odour Concentration (As Received) (ou)	2,175	1,549	5,200	2,188
Odour Concentration (Final) (ou)	**2,200**	**1,500**	**5,200**	**2,200**
Normal MOER (As Received) (ou m^3/s)	1,973	1,305	5,728	2,188
Normal MOER (Final) (ou m^3/s)	2,000	1,300	5,700	2,100
Calculations entered by	JW	JW	JW	JW
Calculations checked by	PWS	PWS	PWS	PWS

APPENDIX B – CERTIFICATES OF ANALYSIS

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:	Shoalhaven Starches
	Address:	Bolong Road, Bomaderry NSW 2541
	Contact:	John Studdert
	Sampling Site:	Starch Dryers 1, 3, 4 & 5; Gluten Dryers 1, 2, 3 & 4; Boilers 2, 4 and 5&6; Biofilter A east & west outlets; Biofilter B east & west outlets, Biofilter inlets (DDG dryers #1, 2&3) & (DDG dryer #4); Fermenter; CO_2 Scrubber inlet & outlet, DDG Pellet Plant stack.
	Telephone:	02 4423 8254
	Email:	John.studdert@manildra.com.au
Project	ORLA Report Number:	7065/ORLA/01
	Project Manager:	Margot Kimber
	Testing operator:	Peter Stephenson
	ORLA Sample number(s):	5323 to 5347
	SEMA Sample number(s):	727927 to 727947
Order	Analysis Requested:	Odour Analysis
	Order requested by:	SEMA on behalf of Shoalhaven Starches
	Date of order:	12 May 2020
	Order number:	5123
	Telephone:	02 9737 9991
	Signed by:	Margot Kimber
	Order accepted by:	Peter Stephenson
Report	Date of issue:	21 July 2020

NATA accredited laboratory number 15043.

Accredited for Compliance with ISO/IEC 17025 - Testing

ODOUR CONCENTRATION MEASUREMENTS RESULTS 7065/ORLA/01

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 $12 \leq \chi \leq 92,102$ 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: $r = 0.0020$ (February 2020) 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: $A = 0.020$ (February 2020) 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.

21 July, 2020

Peter Stephenson
Managing Director

Odour Research Laboratories Australia

Odour Olfactometry Results – 7065/ORLA/01

Sample				Analysis Date & Time (Completed)	Panel Size	Valid ITEs	Sample Pre-Dilution	Sample Odour Concentration		Odour Character & Hedonic Tone [^] [*]
Location	ID No.	Date/Time	ORLA No.					(ou) [1] [*]	(ou) [2] [*]	
Sample ID: Starch Dryer 3	727927	12/05/2020 10:30	5324	13/05/2020 10:55	4	8	Nil	360	360	Plastic, vinegar, malt, cereal, grain then musty/earthy, nutty & polyfilla (-1)[*]
Sample ID: Starch Dryer 4	727928	12/05/2020 10:26	5325	13/05/2020 11:24	4	8	Nil	330	330	Hessian,malt, steamed vegetables, cereal, grain, sweet, dry soil (-1)
Sample ID: Starch Dryer 5	727929	12/05/2020 11:11	5326	13/05/2020 11:53	4	8	Nil	390	390	Plastic, vinyl, hessian, dank, malt, earth, mould, grain & sweet (-1)[*]
Sample ID: Biofilter In (DDG1-3)	727930	12/05/2020 11:44	5327	13/05/2020 12:24	4	8	Nil	18478	18500	Potato, citrus garlic, biscuit, sour, vegetables, earth, dank, sweet,gas, butterscotch, old cooking oil & caramel liqueur (-2)[*]
Sample ID: Biofilter inlet (DDG 4)	727931	12/05/2020 12:33	5328	13/05/2020 12:53	4	8	Nil	14248	14200	Dairy farm, barn, sour dough, biscuit, butterscotch, caramel liqueur, garlic, old cooking oil (-1)[*]
Sample ID: Biofilter A east outlet	727932	12/05/2020 13:08	5329	13/05/2020 13:55	4	8	Nil	2175	2200	Coffee, bitter, smoke, ashes, wheat, cooked vegetables, musty, wet cardboard, wood & ethanol (-2)[*]
Sample ID: Biofilter A west outlet	727933	12/05/2020 13:36	5330	13/05/2020 14:23	4	8	Nil	1549	1500	Earth, sweet, wood, potato in dirt, cooked potato, wet cardboard, wheat & burnt biscuit (-1)[*]

Odour Research Laboratories Australia

Odour Olfactometry Results – 7065/ORLA/01

Sample				Analysis Date/Time (Completed)	Panel Size	Valid ITEs	Sample Pre-Dilution	Sample Odour Concentration		Odour Character & Hedonic Tone[*,+]
Location	ID No.	Date/Time	ORLA No.					(ou) [1,*]	(ou) [2,*]	
Sample ID: Biofilter B east outlet	727934	12/05/2020 13:09	5331	13/05/2020 14:52	4	8	Nil	5200	5200	Wheat, onion, tomato, pumpkin, sour, sauerkraut, sweet potato, rotting hay, vegetable soup, sweet Yoplait (-2)[^]
Sample ID: Biofilter B west outlet	727935	12/05/2020 13:37	5332	13/05/2020 15:21	4	8	Nil	2188	2200	Yeast, vegemite, sour, feet odour salt, sauerkraut ,rotting hay, Yoplait (-2)[^]
Sample ID: Starch Dryer 1	727936	14/05/2020 12:44	5334	15/05/2020 10:50	4	8	Nil	333	330	Wheat, musty, plastic, wood, sweet, hessian, (-1)[^]
Sample ID: Gluten Dryer 1	727937	14/05/2020 14:12	5335	15/05/2020 11:25	4	8	Nil	470	470	Plastic, grains, wheat, yeast, moss, pine, hessian, potato, grain, forest (-2)[^]
Sample ID: Gluten Dryer 3	727938	14/05/2020 15:37	5336	15/05/2020 11:54	4	8	Nil	787	790	Yeast, wood, wheat, hops, very slight sweet, mouse, mould, musty, grain, (-2)[^]
Sample ID: Boiler 4 (EPL 42)	727939	21/05/2020 11:56	5338	22/05/2020 10:45	4	8	Nil	1421	1400	Acetylene, disinfectant, acid, citrus, metallic, cloves, swampy, hessian, stale water, (-2)[^]
Sample ID: Boiler 5&6 (EPL 35)	727940	21/05/2020 12:43	5339	22/05/2020 11:14	4	8	Nil	1009	1000	Acetylene, plastic, paint, disinfectant, bleach, hydrochloric, chloride, ammonia, acid, swampy (-2)[^]

Odour Research Laboratories Australia

Odour Olfactometry Results – 7065/ORLA/01

Sample				Analysis Date & Time (Completed)	Panel Size	Valid ITEs	Sample Pre-Dilution	Sample Odour Concentration		Odour Character & Hedonic Tone[^,+]
Location	ID No.	Date/Time	ORLA No.					(ou) [1*]	(ou) [2*]	
Sample ID: DDG Pellet Plant	727951	04/06/2020 11:11	5341	05/06/2020 10:53	4	8	Nil	4378	4400	Strong bitter tar at first & later swampy &musty, caramel, chocolate, coffee, grain, yeast, bread & barley (1)[^]
Sample ID: Boiler 2 (EPL 45)	727952	04/06/2020 11:31	5342	05/06/2020 11:22	4	8	Nil	1417	1420	Resin, disinfectant, acetylene gas, acidic, wheat, swampy then yeast (-2)[^]
Sample ID: Fermenter #13	727953	04/06/2020 12:51	5343	05/06/2020 11:51	4	8	Nil	7392	7400	Tangy, vinegar, citrus, fruity, oil paint, paint, solvent, plastic, vinyl, faint yeast & sweet (1)[^]
Sample ID: CO2 scrub Outlet	727954	04/06/2020 12:52	5344	05/06/2020 12:21	4	8	Nil	8035	8000	Paint, oil paint, resin, solvent, vinegar, sharp, caramel liqueur, fruity, tangy citrus, yoghurt, acidofolis (-2)[^]
Sample ID: CO2 scrub Inlet	727955	04/06/2020 12:54	5345	05/06/202 13:26	4	8	Nil	8735	8700	Vinegar, pen ink, sharp, varnish, paint, solvent, banana essence and caramel liqueur (-2)[^]
Sample ID: Gluten Dryer 4	727956	04/06/2020 15:07	5346	05/06/2020 13:55	4	8	Nil	305	305	Mushroom, mouldy, musty, gtrain, wheat, slight fruity, (-2)[^]
Sample ID: Gluten Dryer 2	727957	04/06/2020 15:57	5347	05/06/2020 14:24	4	8	Nil	785	790	Plastic then wheat, caramel liqueur, sweet grain, musty & dirty drain water (-1)[^]

Odour Research Laboratories Australia

Odour Panel Calibration Results – 7065/ORLA/01

Reference Odorant	ORLA Sample No.	Date	Concentration of Reference Gas (ppm)	Reference Gas Measured Concentration (ou)	Panel Average Measured Concentration (ppb) [3]	Does panel calibration measurement comply with AS/NZS4323.3:P2001 (Yes/No) [4]
n-butanol	5323	13.05.2020	62.0	1236	50.2	Yes
n-butanol	5333	15.05.2020	62.0	1421	43.6	Yes
n-butanol	5337	22.05.2020	62.0	1195	51.9	Yes
n-butanol	5340	05.06.2020	62.0	1421		Yes

Comments: All samples were collected by Stephenson Environmental Management Australia 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:

13/05/2020: SR =48.5, PR = 53.6, TL = 42.4, JW= 58.9

15/05/2020: SR =48.5, PR = 53.6, TL = 41.0, JW= 57.4

22/05/2020: SR =48.5, PR = 53.6, TL = 41.0, JW= 55.9

05/06/2020: SR =48.5, PR = 55.4, TL = 41.0, JW= 52.5

^ 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----------

APPENDIX C – DETAILS OF INSTRUMENT CALIBRATION

TABLE C-1 INSTRUMENT CALIBRATION DETAILS DAY 1

SEMA Asset No.	Equipment Description	Date Last Calibrated	Calibration Due Date
857	Digital Temperature Reader	07-May-20	07-Nov-20
769	Thermocouple	07-May-20	07-Nov-20
893	Thermocouple	07-May-20	07-Nov-20
815	Digital Manometer	06-Dec-19	06-Dec-20
726	Pitot	17-Mar-20	17-Mar-2021 Visually inspected On-Site before use
183	Pitot	17-Mar-20	17-Mar-2021 Visually inspected On-Site before use
946	combustion analyzer	16-Mar-20	16-Sep-20
675	Personal Sampler	12-Mar-20	12-Mar-21
832	Personal Sampler	26-Feb-20	26-Feb-21
675	Personal Sampler	12-Mar-20	12-Mar-21
934	Personal Sampler	26-Aug-19	26-Aug-20
907	Gas Meter	05-May-20	05-May-21
Gas Mixtures used for Analyser Span Response			
Conc.	**Mixture**	**Cylinder No.**	**Expiry Date**
0.099% 9.8% 10.1%	Carbon Monoxide Carbon Dioxide Oxygen In Nitrogen	ALWB 5361	17-Jul-21

TABLE C-2 INSTRUMENT CALIBRATION DETAILS DAY 2

SEMA Asset No.	Equipment Description	Date Last Calibrated	Calibration Due Date
857	Digital Temperature Reader	07-May-20	07-Nov-20
769	Thermocouple	07-May-20	07-Nov-20
893	Thermocouple	07-May-20	07-Nov-20
815	Digital Manometer	06-Dec-19	06-Dec-20
726	Pitot	17-Mar-20	17-Mar-2021 Visually inspected On-Site before use
183	Pitot	17-Mar-20	17-Mar-2021 Visually inspected On-Site before use
946	combustion analyzer	16-Mar-20	16-Sep-20
675	Personal Sampler	12-Mar-20	12-Mar-21
832	Personal Sampler	26-Feb-20	26-Feb-21
675	Personal Sampler	12-Mar-20	12-Mar-21
934	Personal Sampler	26-Aug-19	26-Aug-20
907	Gas Meter	05-May-20	05-May-21
Gas Mixtures used for Analyser Span Response			
Conc.	**Mixture**	**Cylinder No.**	**Expiry Date**
0.099% 9.8% 10.1%	Carbon Monoxide Carbon Dioxide Oxygen In Nitrogen	ALWB 5361	17-Jul-21

TABLE C-3 INSTRUMENT CALIBRATION DETAILS DAY 3

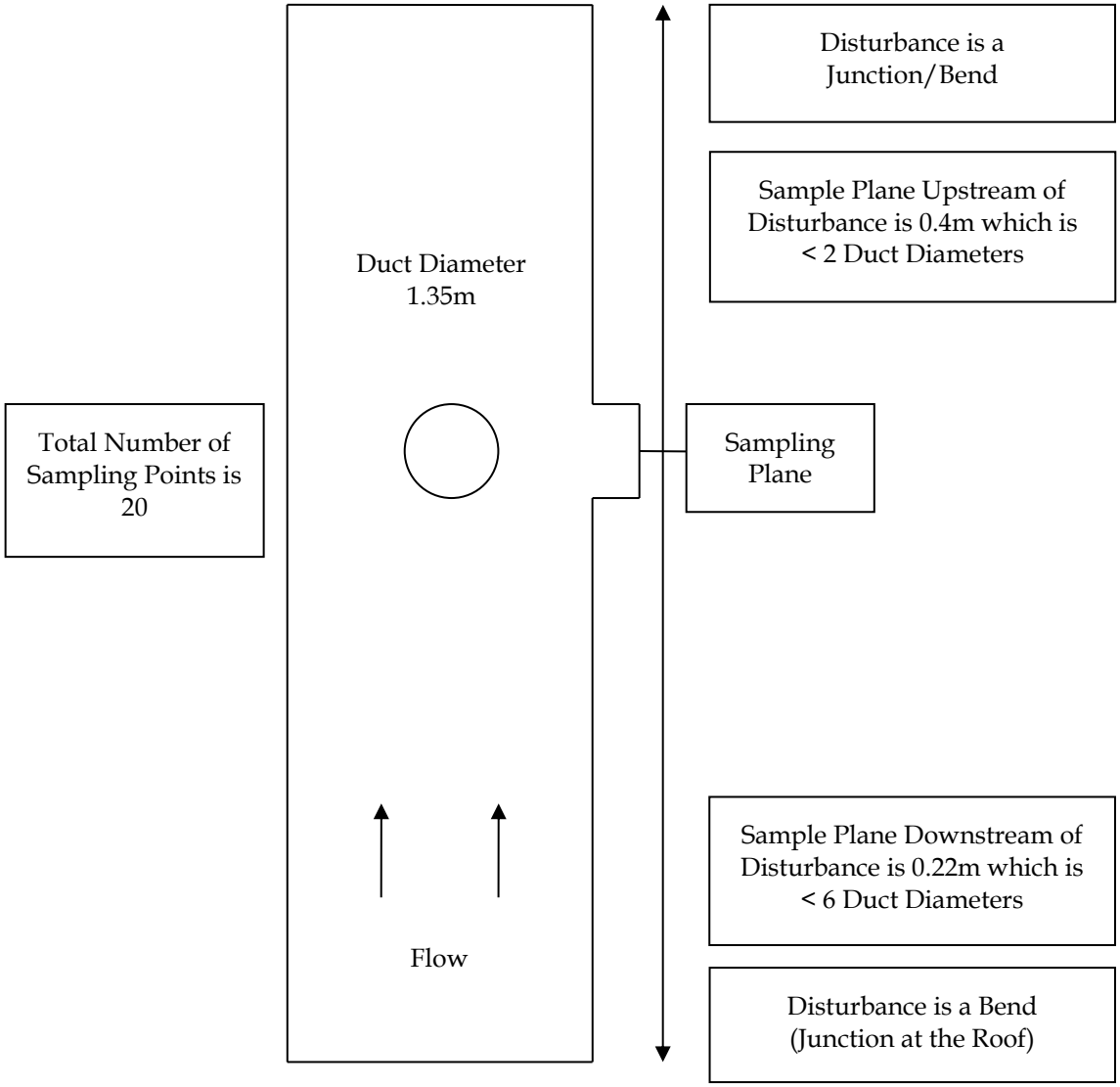
SEMA Asset No.	Equipment Description	Date Last Calibrated	Calibration Due Date
857	Digital Temperature Reader	07-May-20	07-Nov-20
183	Pitot	17-Mar-20	17-Mar-2021 Visually inspected On-Site before use
815	Digital Manometer	06-Dec-19	06-Dec-20
832	Personal Sampler	26-Feb-20	26-Feb-21
769	Thermocouple	07-May-20	07-Nov-20
768	Thermocouple	07-May-20	07-Nov-20
946	combustion analyzer	16-Mar-20	16-Sep-20
Gas Mixtures used for Analyser Span Response			
Conc.	**Mixture**	**Cylinder No.**	**Expiry Date**
0.099% 9.8% 10.1%	Carbon Monoxide Carbon Dioxide Oxygen In Nitrogen	ALWB 5361	17-Jul-21

TABLE C-4 INSTRUMENT CALIBRATION DETAILS DAY 4

SEMA Asset No.	Equipment Description	Date Last Calibrated	Calibration Due Date
857	Digital Temperature Reader	07-May-20	07-Nov-20
920	Thermocouple	07-May-20	07-Nov-20
815	Digital Manometer	06-Dec-19	06-Dec-20
675	Personal Sampler	12-Mar-20	12-Mar-21
832	Personal Sampler	26-Feb-20	26-Feb-21
183	Pitot	17-Mar-20	17-Mar-2021 Visually inspected On-Site before use
725	Pitot	17-Mar-20	17-Mar-2021 Visually inspected On-Site before use
775	Thermocouple	07-May-20	07-Nov-20
726	Pitot	17-Mar-20	17-Mar-2021 Visually inspected On-Site before use
753	Personal Sampler	12-Mar-20	12-Mar-21
946	combustion analyzer	16-Mar-20	16-Sep-20
Gas Mixtures used for Analyser Span Response			
Conc.	**Mixture**	**Cylinder No.**	**Expiry Date**
0.099% 9.8% 10.1%	Carbon Monoxide Carbon Dioxide Oxygen In Nitrogen	ALWB 5361	17-Jul-21

APPENDIX D – SAMPLE LOCATIONS

FIGURE D-1 GLUTEN DRYER NO. 1 – SAMPLE LOCATION SCHEMATIC



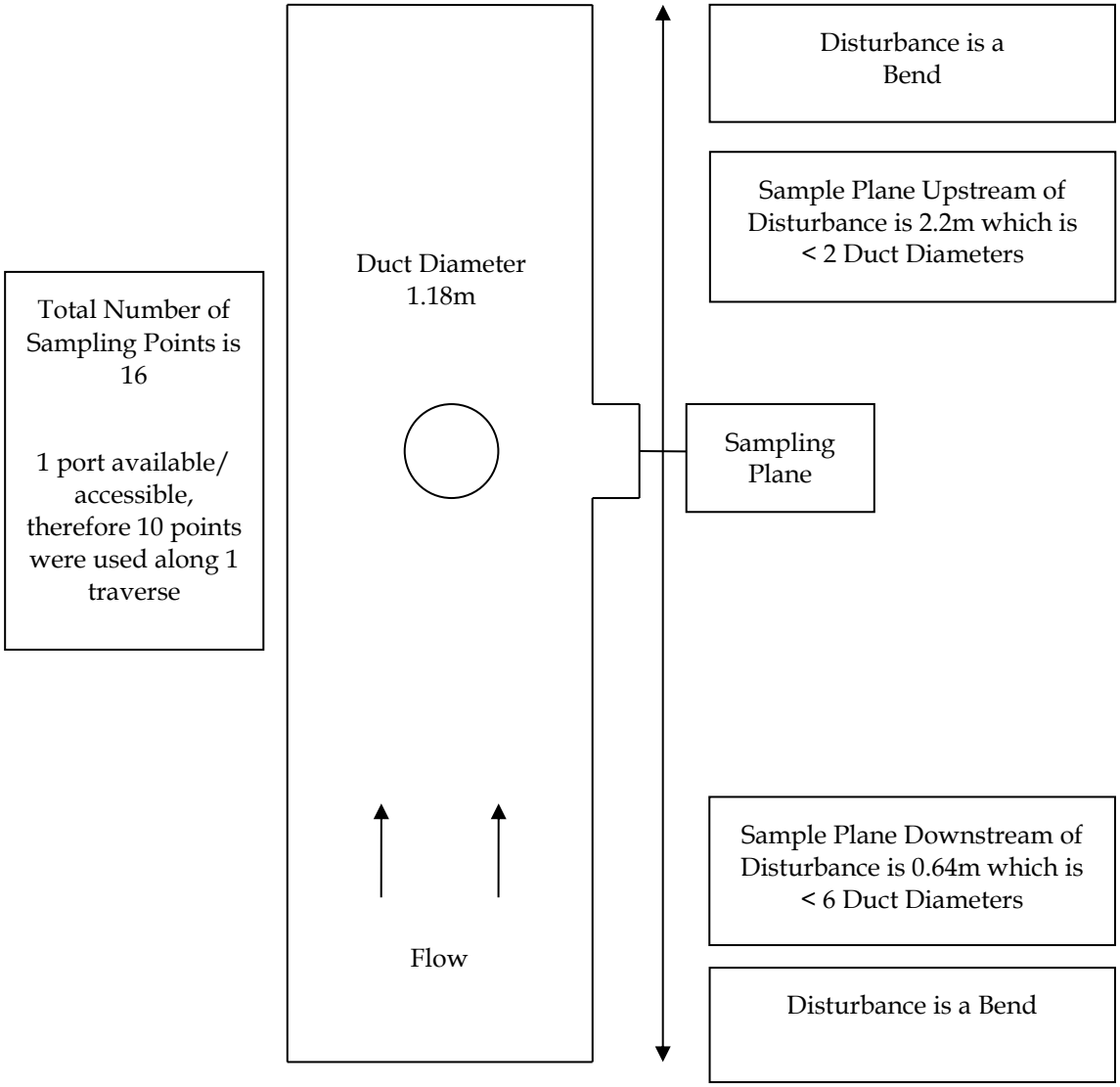
In the absence of cyclonic flow activity ideal sampling plane positions will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

However the sample plane also does not meet the minimum sampling plane position; sampling plane position will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance. A suitable sampling plane should be sought fitting these criteria.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-2 GLUTEN DRYER NO. 1 – SAMPLE LOCATION

FIGURE D-3 GLUTEN DRYER NO. 2 –SAMPLE LOCATION SCHEMATIC



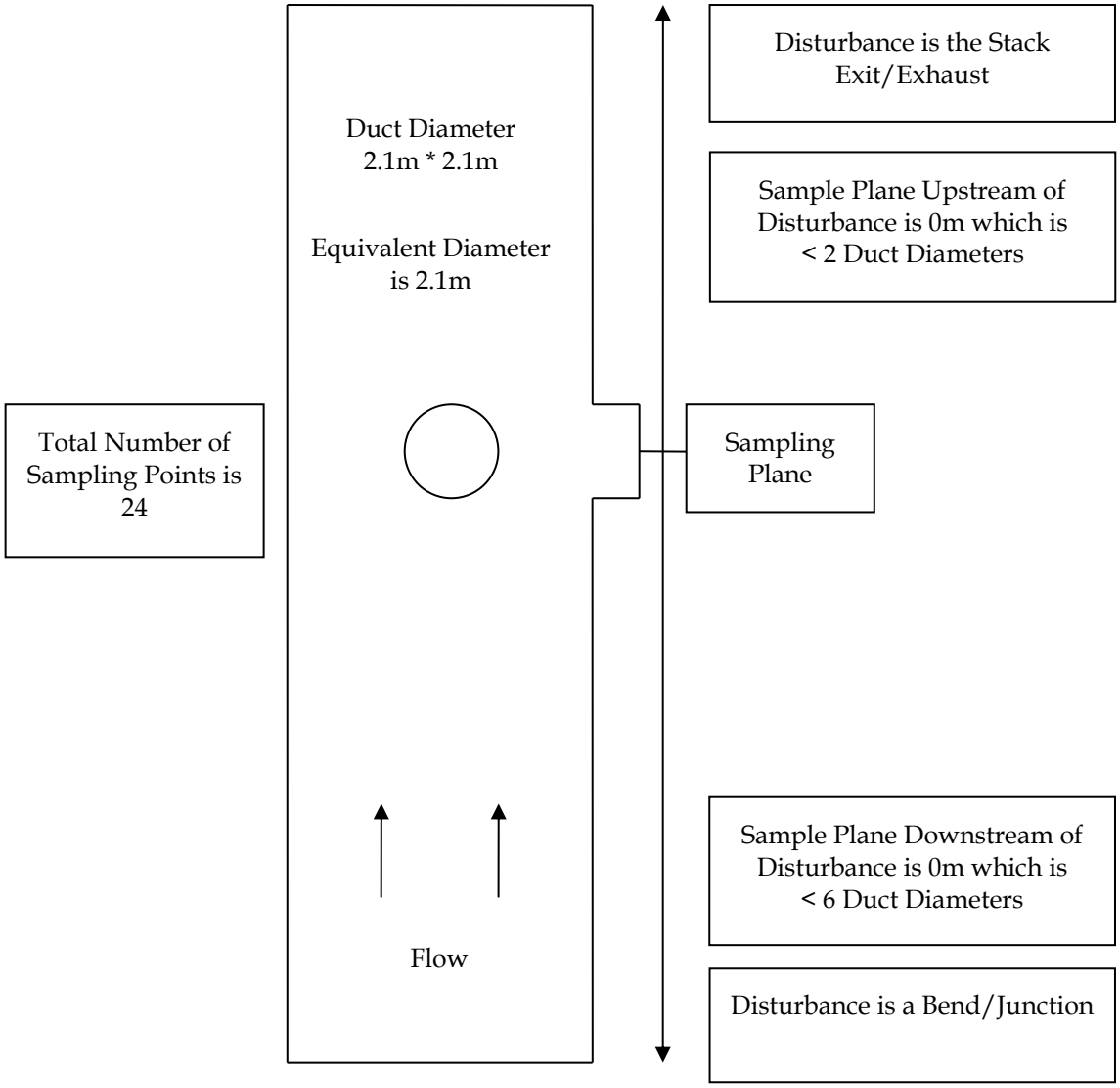
In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

However the sample plane also does not meet the minimum sampling plane position; sampling plane position will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance. A suitable sampling plane should be sought fitting these criteria.

The location of the interim exit sampling plane complies with AS4323.1 temperature and AS4323.3 odour criteria for sampling.

FIGURE D-4 GLUTEN DRYER NO. 2 – ODOUR SAMPLE LOCATION AT DUCT EXIT

FIGURE D-5 GLUTEN DRYER NO. 3 – SAMPLE LOCATION SCHEMATIC



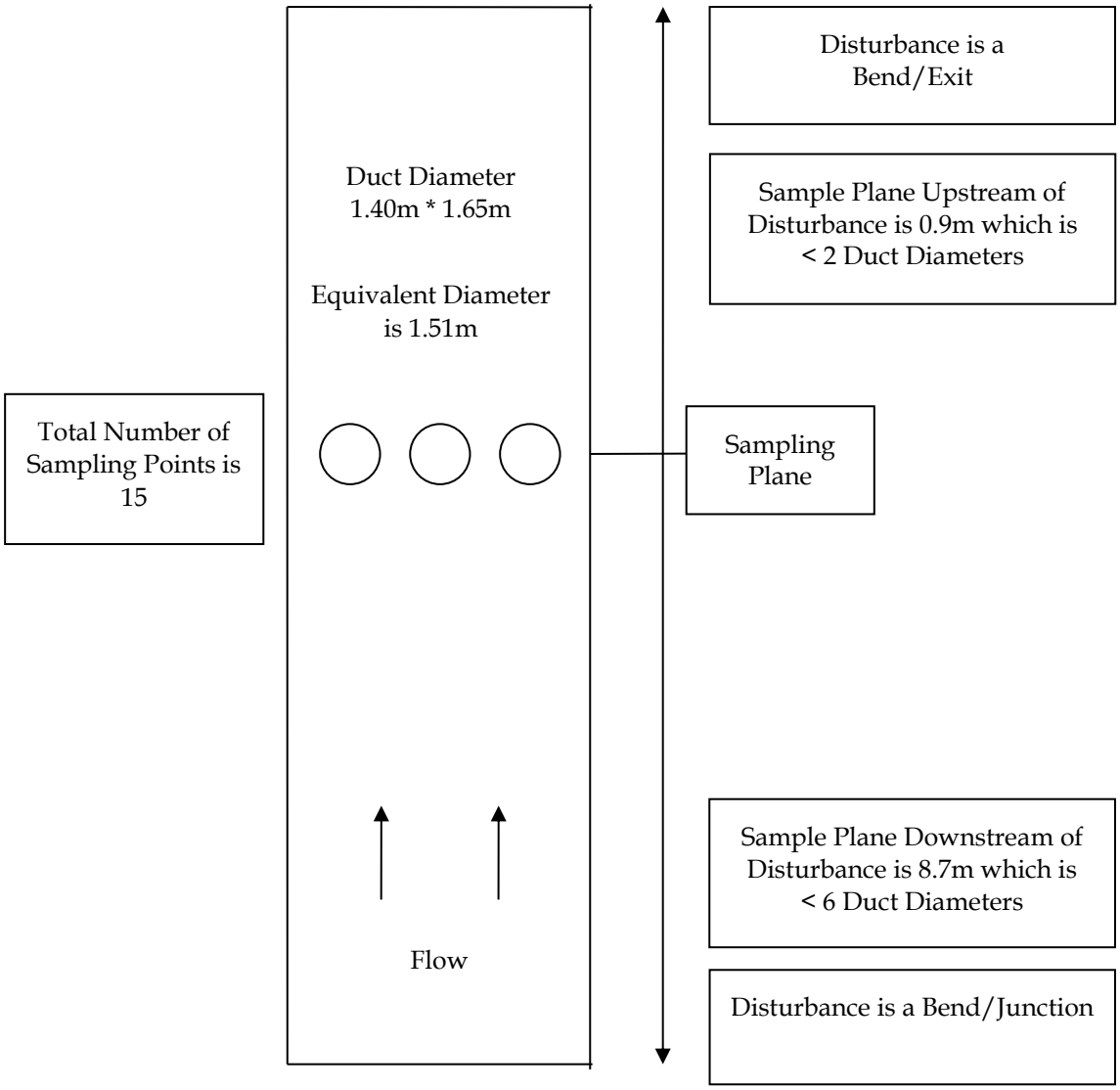
In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

However the sample plane also does not meet the minimum sampling plane position; sampling plane position will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance. A suitable sampling plane should be sought fitting these criteria.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling with the exception of minimum velocity profile not meeting the minimum 3 metres per second (m/s) at every sampling point. Previous Minimum (0.8 m/s), Current Minimum (0 m/s).

FIGURE D-6 GLUTEN DRYER NO. 3 – SAMPLE LOCATION

FIGURE D-7 GLUTEN DRYER NO. 4 – SAMPLE LOCATION SCHEMATIC



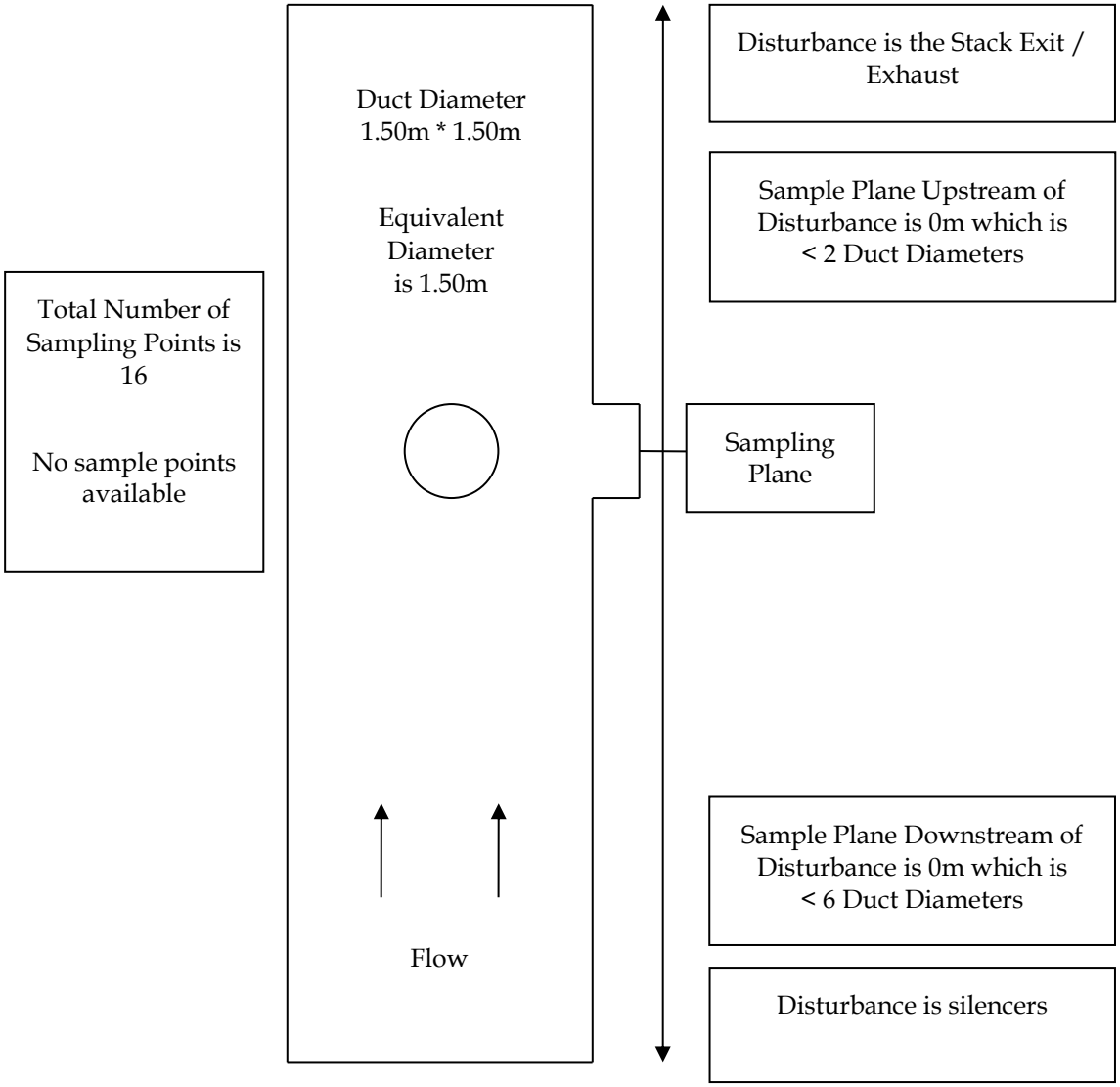
In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

However the sample plane does meet the minimum sampling plane position; sampling plane position will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-8 GLUTEN DRYER NO. 4 – SAMPLE LOCATION

FIGURE D-9 STARCH DRYER NO. 1 – SAMPLE LOCATION SCHEMATIC



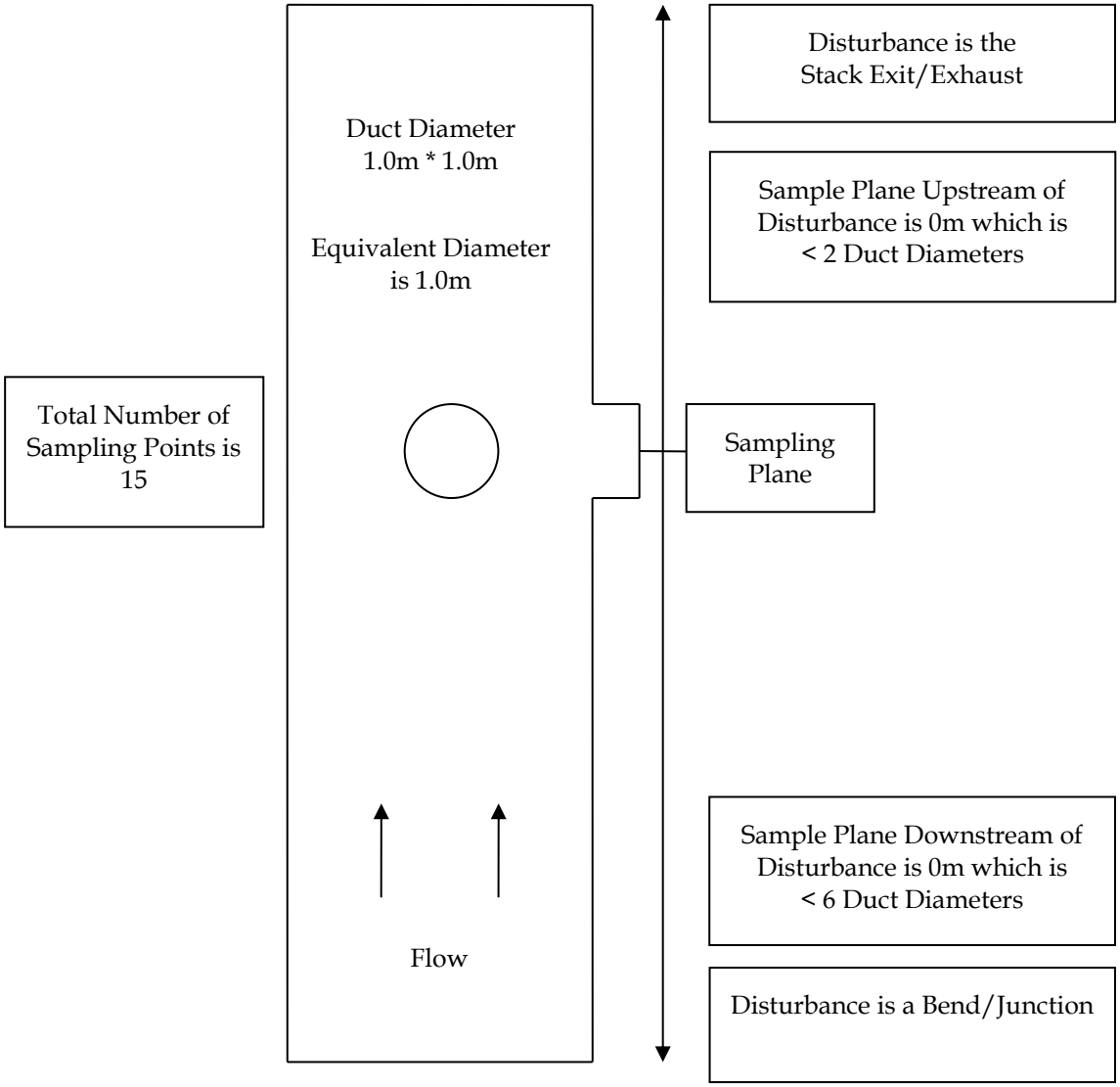
In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

However the sample plane also does not meet the minimum sampling plane position; sampling plane position will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance. A suitable sampling plane should be sought fitting these criteria.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-10 STARCH DRYER NO. 1 – SAMPLE LOCATION

FIGURE D-11 STARCH DRYER NO. 3 – SAMPLE LOCATION SCHEMATIC



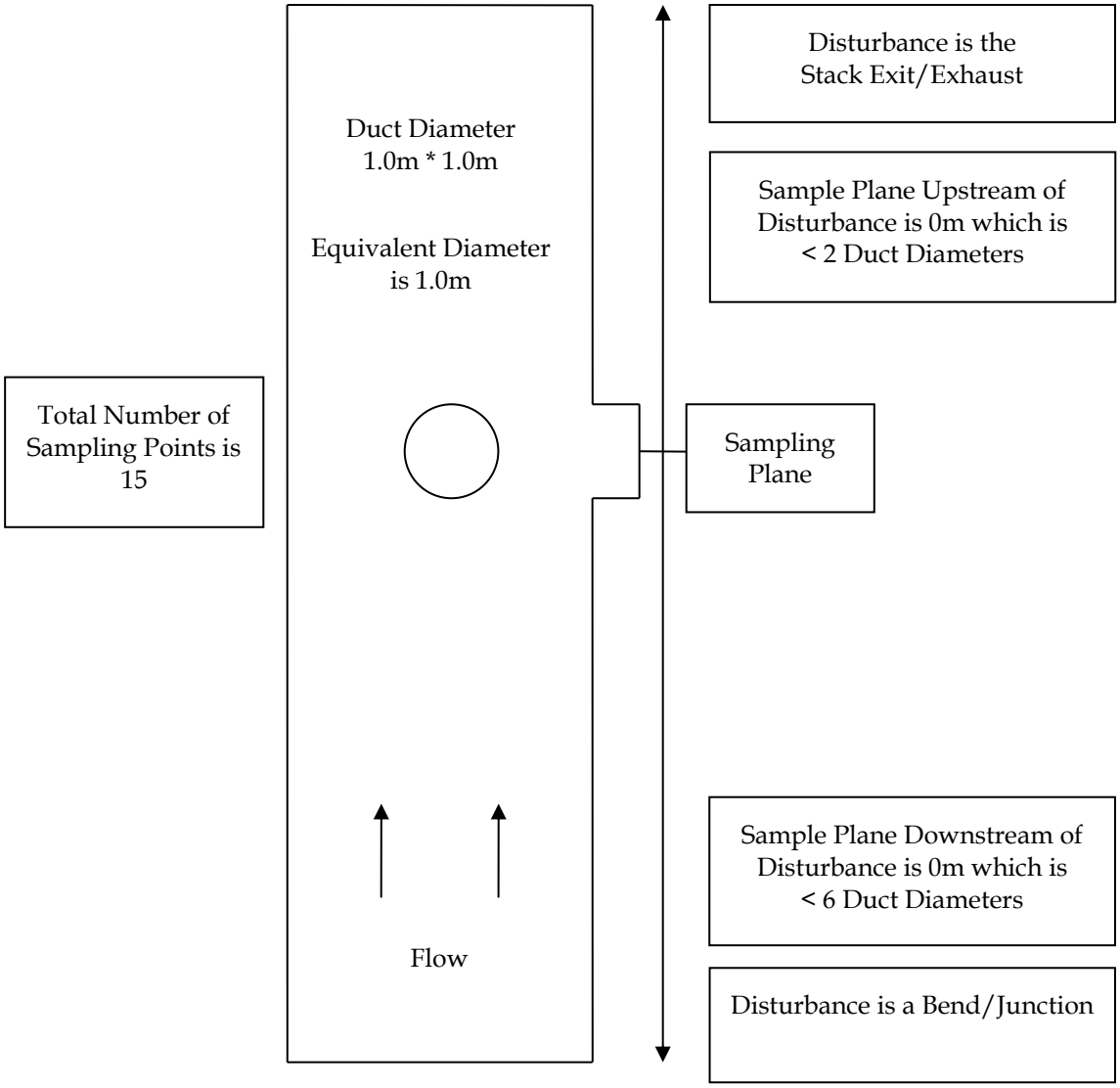
In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

However the sample plane also does not meet the minimum sampling plane position; sampling plane position will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance. A suitable sampling plane should be sought fitting these criteria.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-12 STARCH DRYER NO. 3 – SAMPLE LOCATION

FIGURE D-13 STARCH DRYER NO. 4 – SAMPLE LOCATION SCHEMATIC



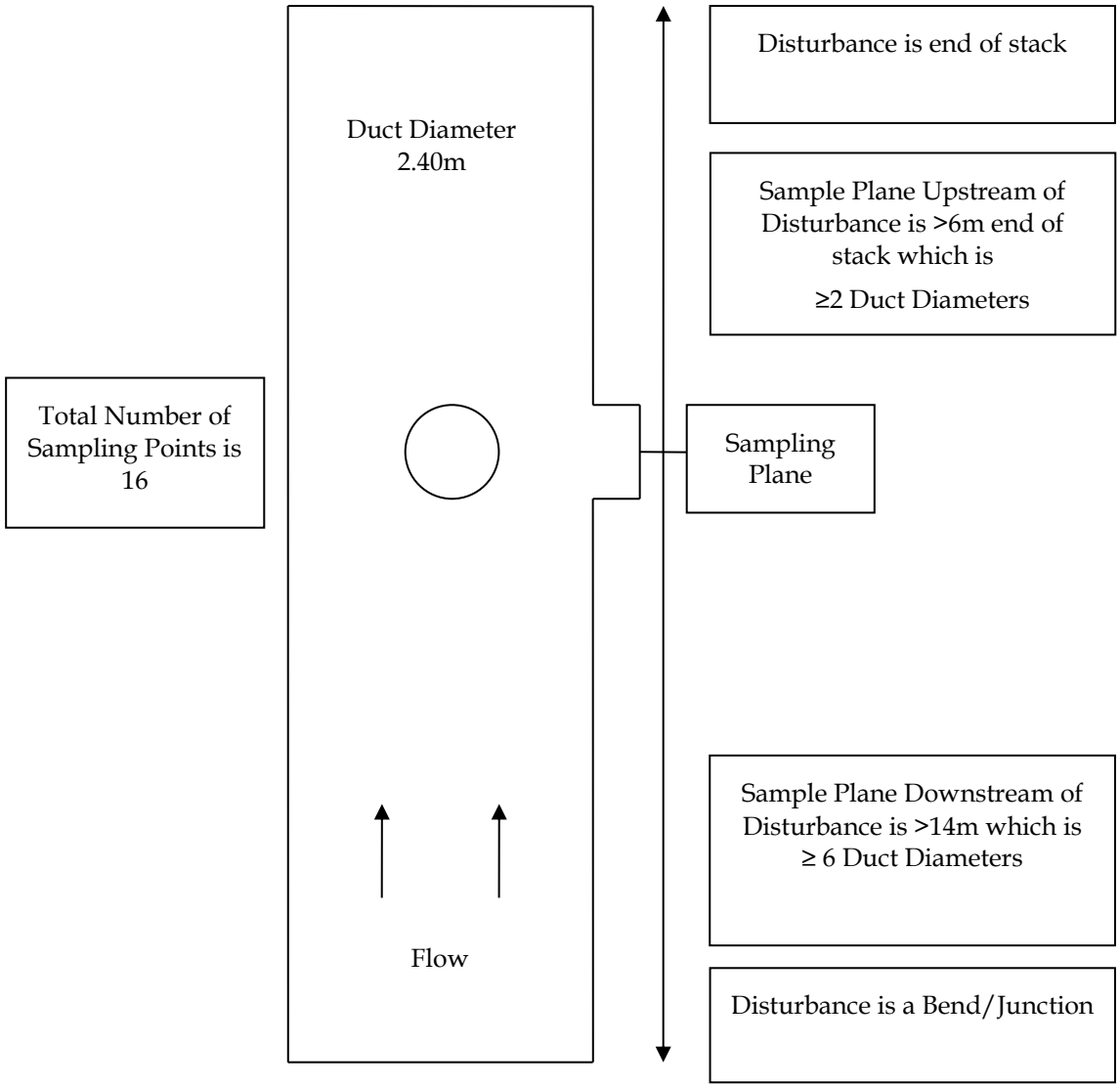
In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

However the sample plane also does not meet the minimum sampling plane position; sampling plane position will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance. A suitable sampling plane should be sought fitting these criteria.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-14 STARCH DRYER NO. 4 – SAMPLE LOCATION

FIGURE D-15 STARCH DRYER NO. 5 – SAMPLE LOCATION SCHEMATIC

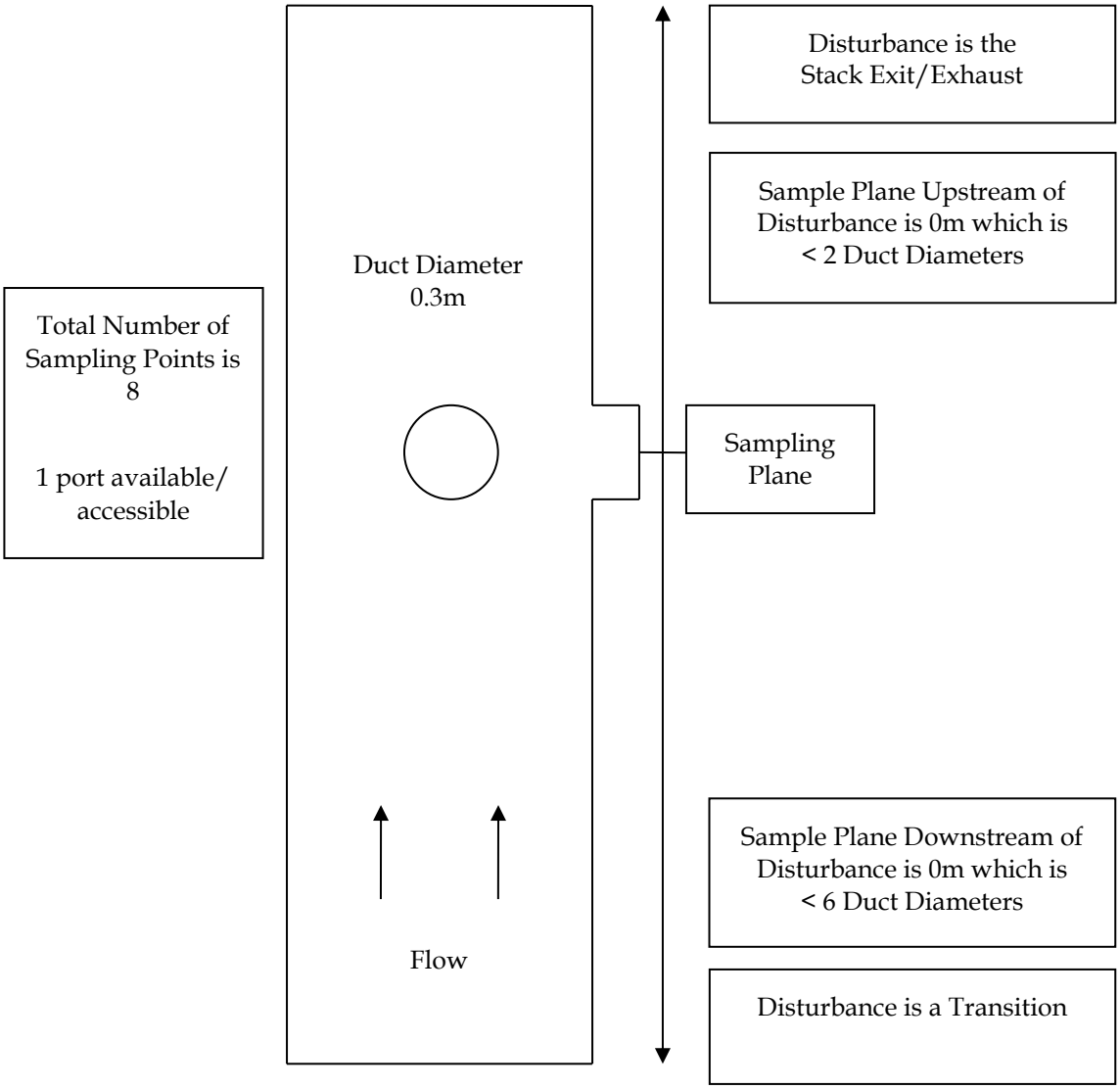


In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does meet this criterion. .

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-16 STARCH DRYER NO. 5 – SAMPLE LOCATION

FIGURE D-17 FERMENTERS – SAMPLE LOCATION SCHEMATIC



In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

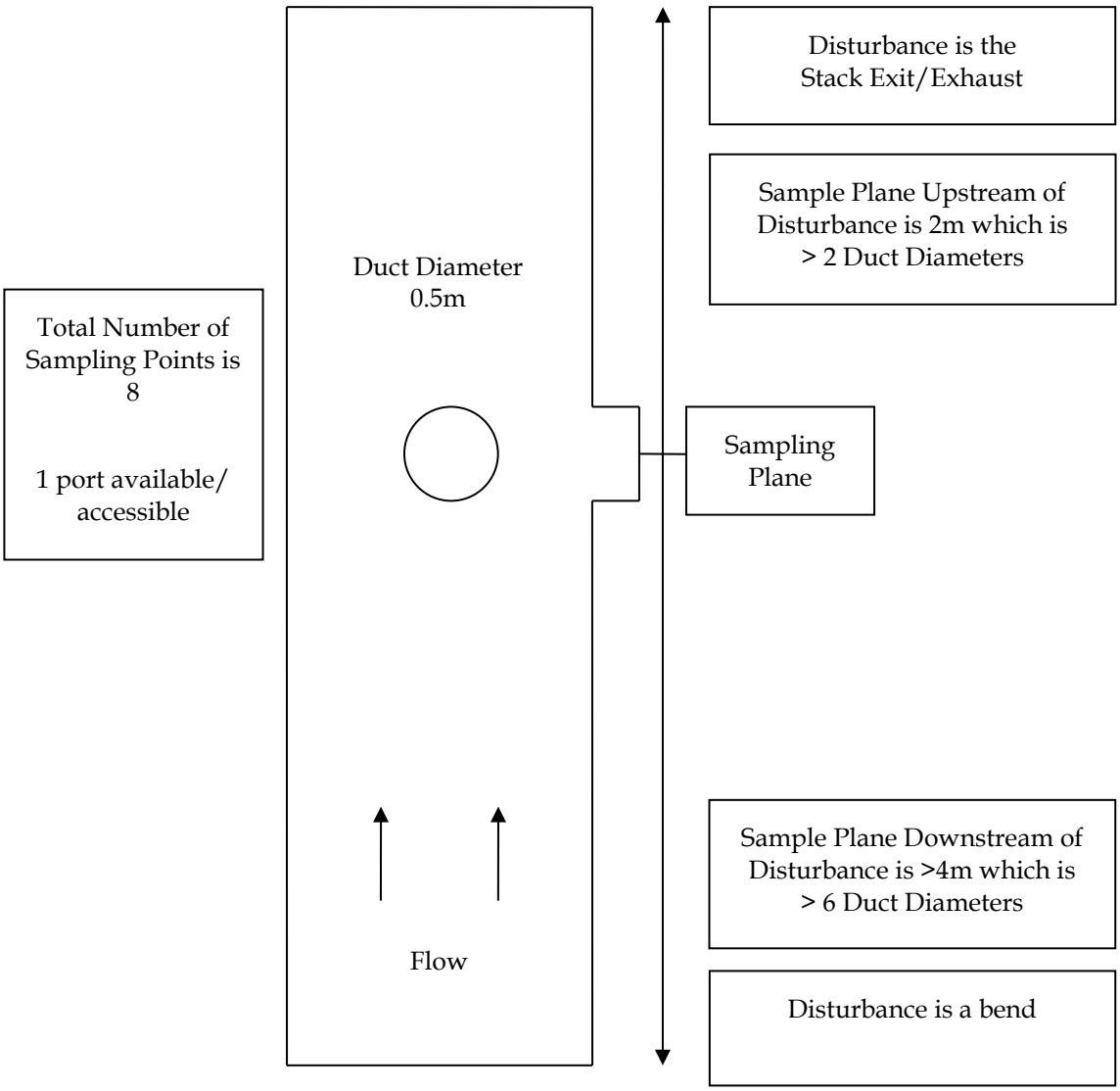
However the sample plane also does not meet the minimum sampling plane position; sampling plane position will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance. A suitable sampling plane should be sought fitting these criteria.

The sample location also does not meet the minimum number of access holes available.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling with the exception of the velocity profile not meeting the minimum 3 metres per second (m/s) at any sampling point. Previous measurements were Average (0.9 m/s), maximum (1.1 m/s) and minimum (0.8 m/s) velocity profile. Current measurements are Average (1.7 m/s), maximum (3.5 m/s) and minimum (0 m/s) velocity profile.

FIGURE D-18 FERMENTERS – SAMPLE LOCATION

FIGURE D-19 CO_2 SCRUBBER OUTLET – SAMPLE LOCATION SCHEMATIC

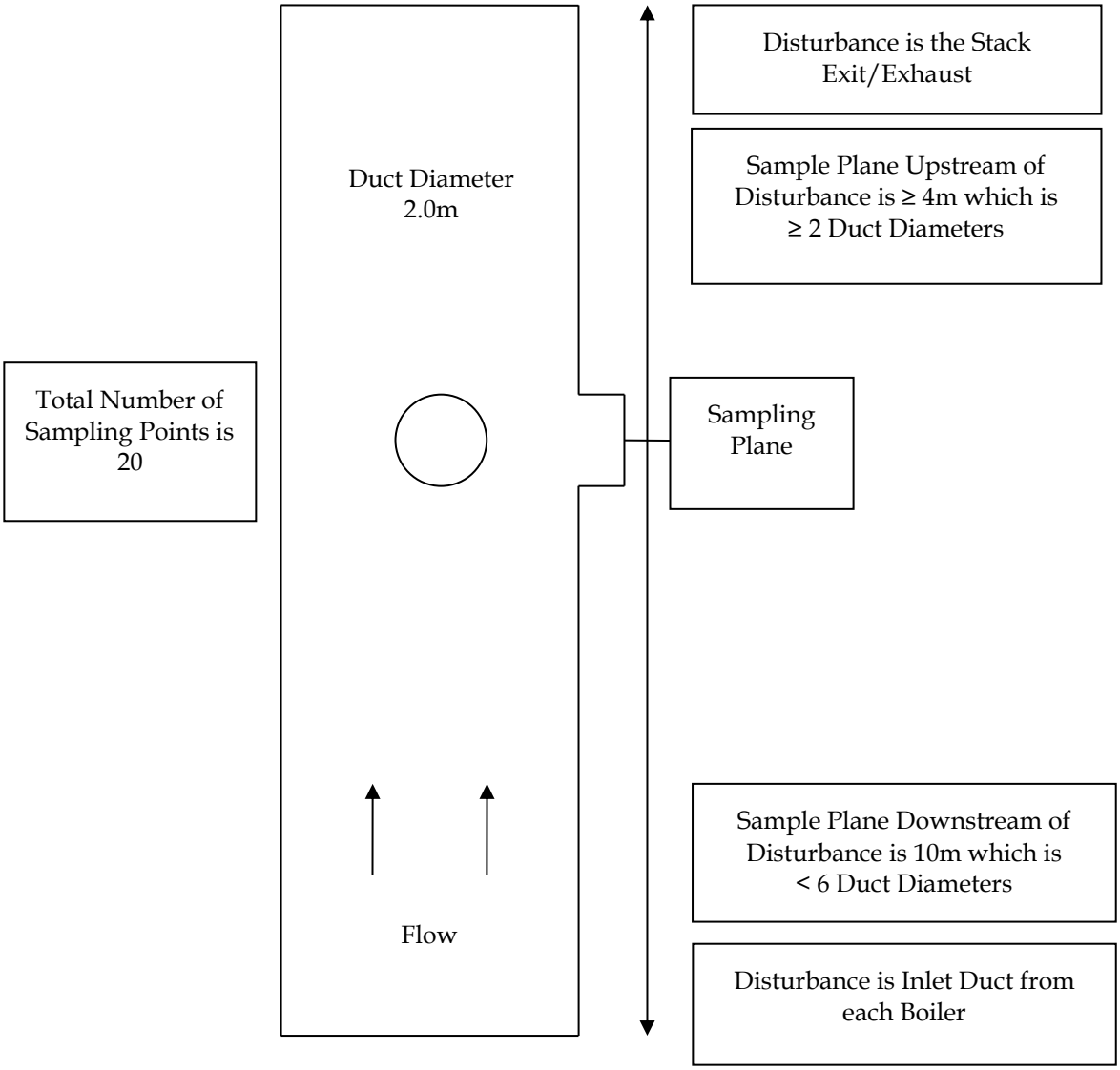


In the absence of cyclonic flow activity ideal sampling plane position will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does meet this criterion.

The sample location does not meet the minimum number of access holes available.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-20 BOILER NOS. 5 & 6 – SAMPLE LOCATION SCHEMATIC



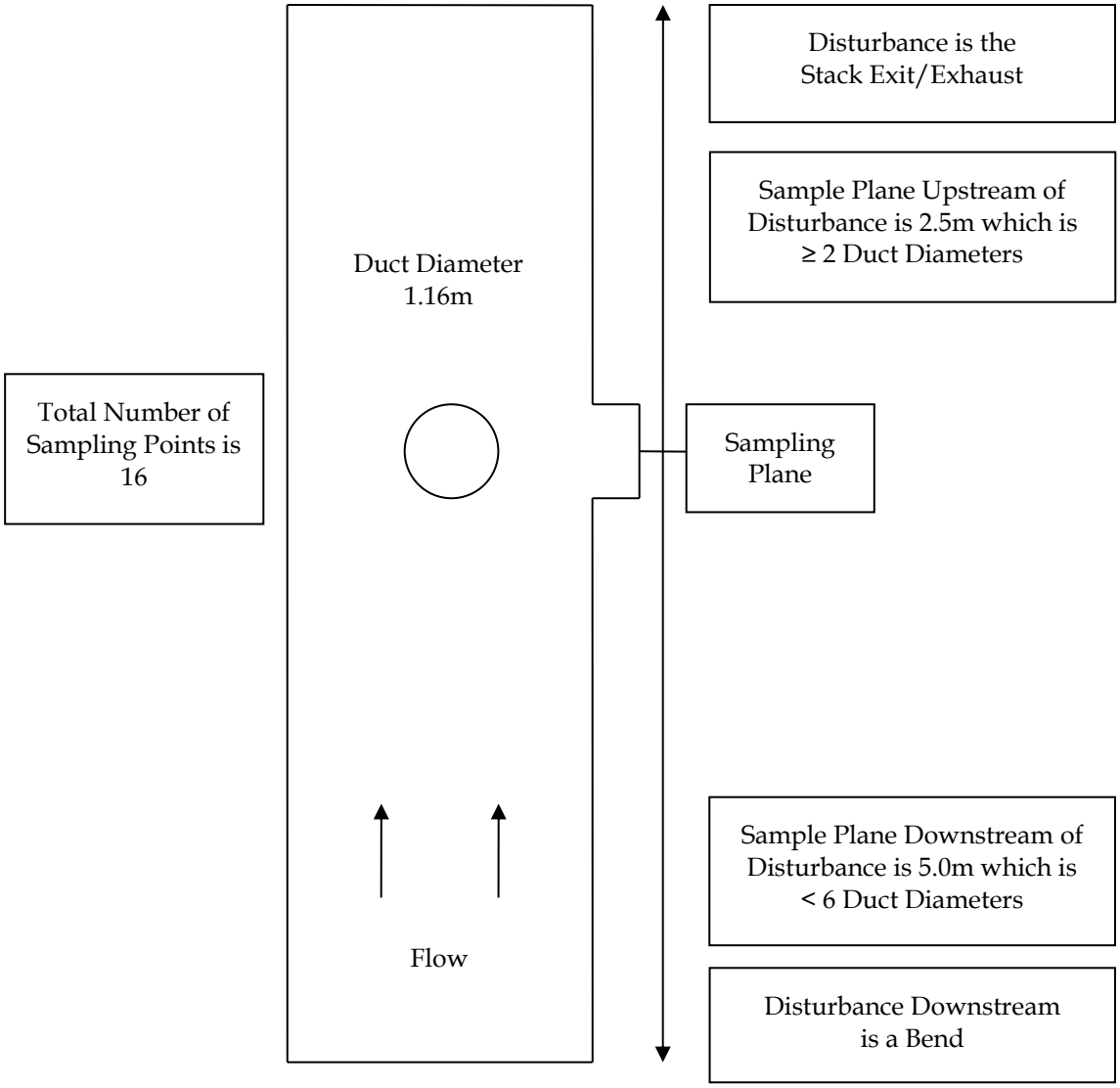
In the absence of cyclonic flow activity ideal sampling plane conditions will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

The sample plane however does meet the minimum sampling plane conditions; sampling plane conditions will be found to exist at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-21 BOILER NOS. 5 & 6 – SAMPLE LOCATION

FIGURE D-22 BOILER NO. 4– SAMPLE LOCATION SCHEMATIC



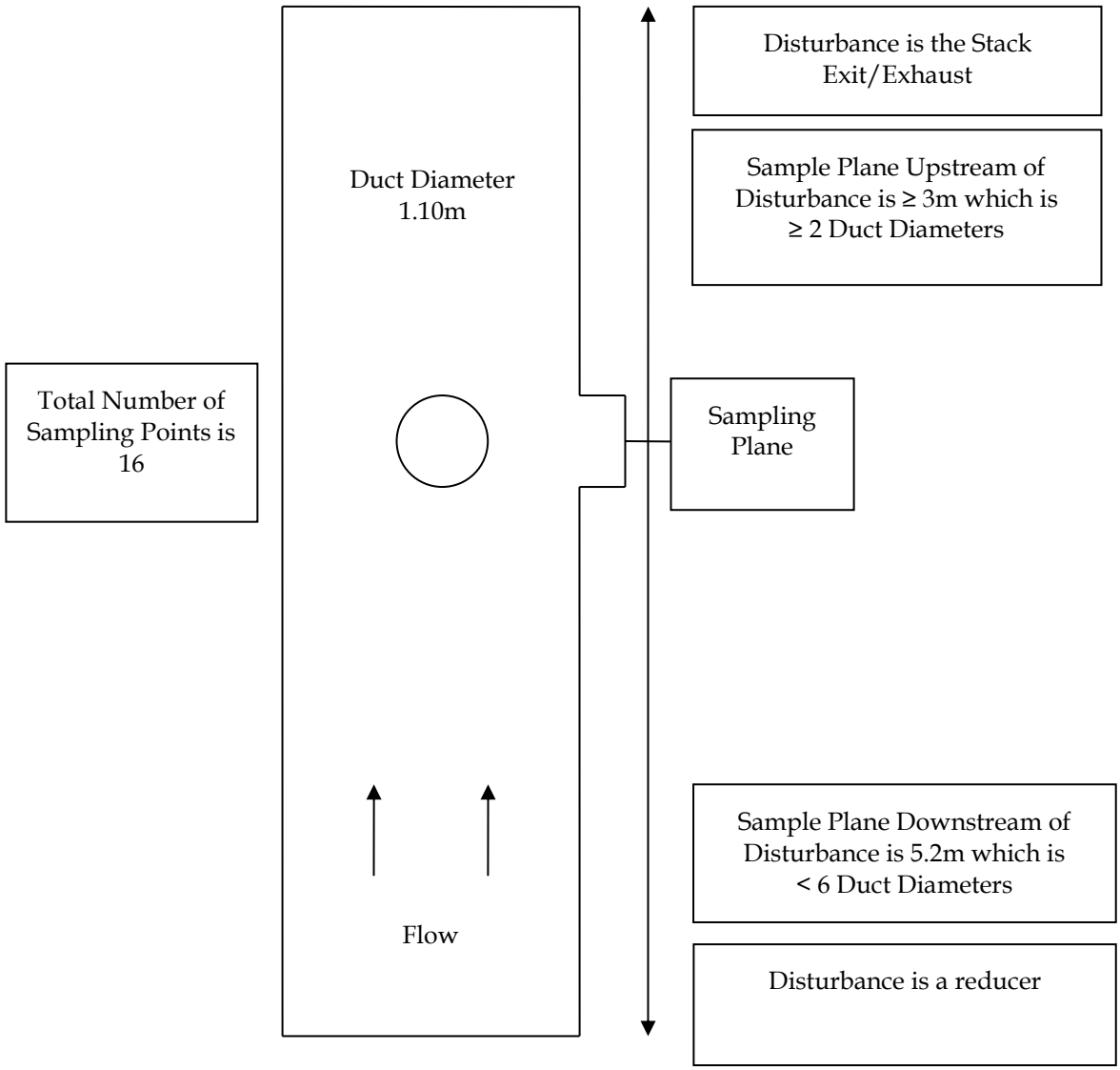
In the absence of cyclonic flow activity ideal sampling plane conditions will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

The sample plane however does meet the minimum sampling plane conditions; sampling plane conditions will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-23 BOILER NO 4 – SAMPLE LOCATION

FIGURE D-24 BOILER NO 2 – SAMPLE LOCATION SCHEMATIC

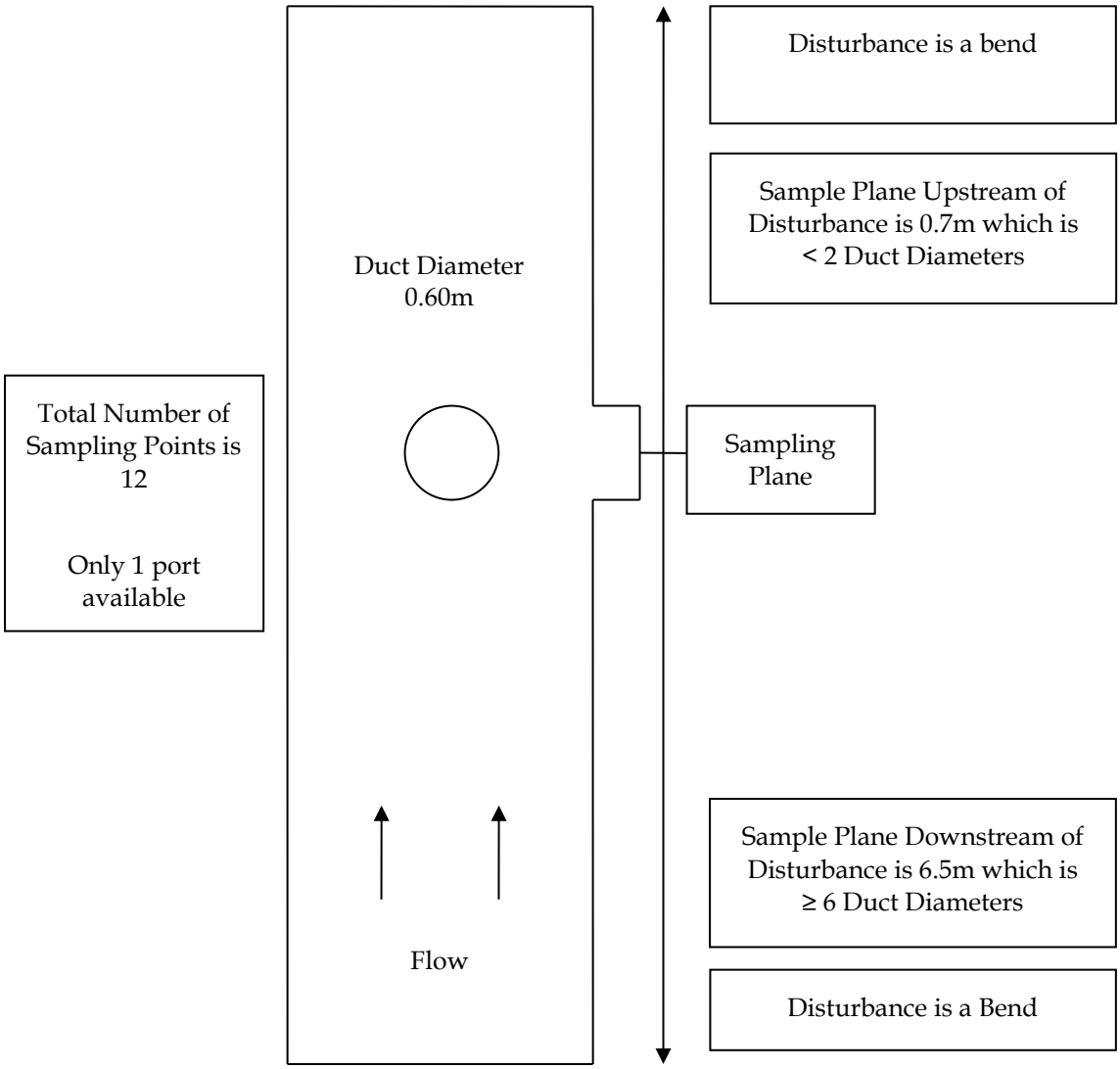


In the absence of cyclonic flow activity ideal sampling plane conditions will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

The sample plane however does meet the minimum sampling plane conditions; sampling plane conditions will be found to exist at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-25 BIOFILTER INLET – SAMPLE LOCATION SCHEMATIC



In the absence of cyclonic flow activity ideal sampling plane conditions will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

The sample plane however does meet the minimum sampling plane conditions; sampling plane conditions will be found to exit at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance.

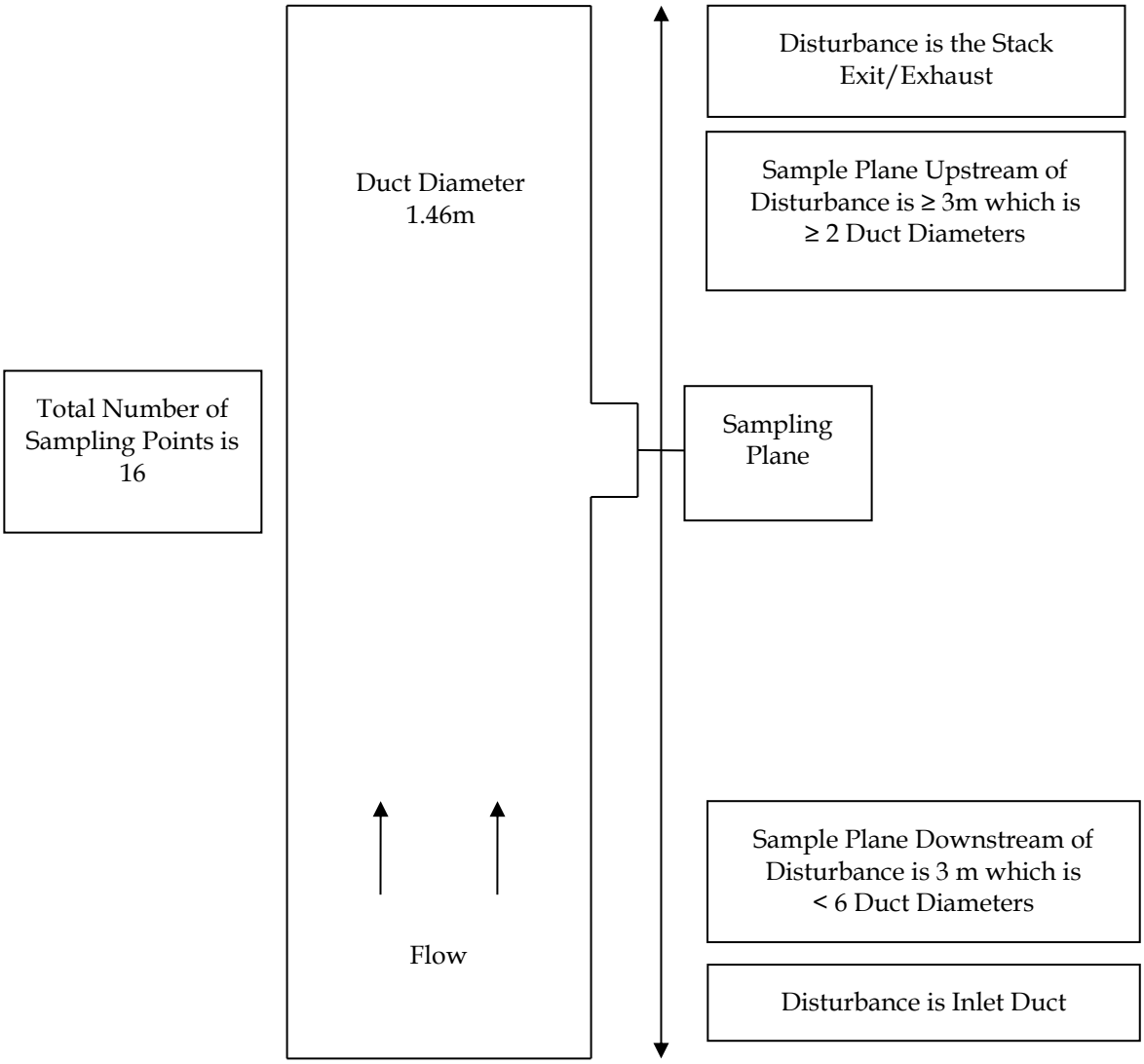
The sample plane also does not meet the minimum number of access points required. Additional sample points were used in compliance with AS4323.1.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling with the exception of velocity meeting the minimum velocity of 3m/s at every sampling point. Maximum = 5.2 m/s, Average = 2.4 m/s, Minimum = 1.0 m/s.

FIGURE D-26 BIOFILTER OUTLET EAST EPL ID 40 & 41 – SAMPLE LOCATION

FIGURE D-27 BIOFILTER OUTLET WEST EPL ID 41 – SAMPLE LOCATION

FIGURE D-28 DDG PELLET PLANT STACK – SAMPLE LOCATION SCHEMATIC



In the absence of cyclonic flow activity ideal sampling plane conditions will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

The sample plane however does meet the minimum sampling plane conditions; sampling plane conditions will be found to exist at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance.

The location of the sampling plane complies with AS4323.1 temperature, velocity and gas flow profile criteria for sampling.

FIGURE D-29 DDG PELLET PLANT STACK – SAMPLE LOCATION PHOTOGRAPH