Emissions Testing Report 2014-15

National Ceramic Industries Australia

NATA ACCREDITATION No. 2778 (14391)

Accredited for compliance with ISO/IEC 17025

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Emissions Testing Report 2014-15

National Ceramic Industries Australia

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AECOM in Australia and New Zealand is certified to the latest version of ISO9001, ISO14001, AS/NZS4801 and OHSAS18001.

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1.0 Introduction

AECOM was appointed by National Ceramic Industries Australia Pty Limited (NCIA) to conduct annual air emission measurements at their facility located at Racecourse Road, Rutherford NSW. Emission testing was performed for the assessment of compliance with requirements of the facility's Environment Protection Licence (EPL 11956). Emission sources assessed during the testing period where EPL points 1 (Clay Prep), 2 (Pressing and Drying), 5 (Dryer 1), 6 (Dryer 2), 9 (Glaze Line), 10 (Selection Line), 12 (Spray Dryer), 14 (Kiln 1), 15 (Kiln 2) 18 (Hot Air Cooler 1) and 19 (Hot Air Cooler 2).

Assessment of the following emission parameters associated with each source was performed during September 2014, March & June 2015:

- Velocity;
- Volumetric Flow rate;
- Moisture Content;
- Carbon Monoxide, Carbon Dioxide and Oxygen (for determination of Dry Gas Density);
- Total Particulate Matter; and
- Fine Particulate (PM_{10}).

Concentrations of the following air contaminants were also assessed on Kiln 1 & Kiln 2 stack emissions:

- Total Fluoride;
- Sulfur Dioxide (SO_2 as SO_3) and Sulfuric Acid Mist (H_2SO_4 as SO_3);
- Hazardous Substances; and
- Oxides of Nitrogen (NO, NO_2, NO_x and Equivalent NO_2).

Laboratory analysis was conducted by the following laboratories, which hold NATA accreditation for the specified tests:

- Steel River Testing Pty. Ltd., NATA accreditation number 18079, performed the following analysis detailed in reports numbered 7265-0-M, 7265-0-P, 8476-0-M, 8476-0-P, 9171-0-M & 9171-0-P:
  - Total Particulate;
  - Fine Particulate (PM_{10}); and
  - Moisture
- Australian Laboratory Services (ALS), laboratory NATA accreditation number 825, performed the following analysis detailed in reports numbered EN1403163, EN1511016 & EN1512152:
  - Total Fluoride;
  - Sulfuric Acid Mist (H_2SO_4 as SO_3); and
  - Sulfur Dioxide (SO_2 as SO_3).
- Leeder Consulting, NATA accreditation number 14429, performed the following analysis detailed in report number M141968:
  - Hazardous Substances (Metals).

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2.0 Sampling Plane Requirements

The criteria for sampling planes are specified in AS 4323.1-1995.

Table 1 Criteria for Selection of Sampling Planes (AS4323.1-1995)

Type of flow disturbance	Minimum distance upstream from disturbance, diameters (D)	Minimum distance downstream from disturbance, diameters (D)
Bend, connection, junction, direction change	*>2D*	*>6D*
Louvre, butterfly damper (partially closed or closed)	*>3D*	*>6D*
Axial fan	*>3D*	*>8D (see Note)*
Centrifugal fan	*>3D*	*>6D*

NOTE: The plane should be selected as far as practicable from a fan. Flow straighteners may be required to ensure the position chosen meets the check criteria listed in Items (a) to (f) below.

a) The gas flow is basically in the same direction at all points along each sampling traverse;

b) The gas velocity at all sampling points is greater than 3 m/s;

c) The gas flow profile at the sampling plane shall be steady, evenly distributed and not have a cyclonic component which exceeds an angle of 15^{o} to the duct axis, when measured near the periphery of a circular sampling plane;

d) The temperature difference between adjacent points of the survey along each sampling traverse is less than 10% of the absolute temperature, and the temperature at any point differs by less than 10% from the mean;

e) The ratio of the highest to lowest pitot pressure difference shall not exceed 9:1 and the ratio of highest to lowest gas velocities shall not exceed 3:1. For isokinetic testing with the use of impingers, the gas velocity ratio across the sampling plane should not exceed 1.6:1; and

f) The gas temperature at the sampling plane should preferably be above the dewpoint.

The following stacks did not meet the above criteria in regard to distances from disturbances; as a result extra sampling points were added in accordance with AS 4323.1 – 1995 section 4.2:

- Kiln 1 & 2;
- Pressing and Drying;
- Glaze Line;
- Selection Line;
- Spray Dryer; and
- Hot Air Coolers 1 & 2.

All other points sampled comply with the above criteria.

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3.0 Methodology

3.1 NATA Accredited Methods

The following methods are within the scope of our National Association of Testing Authorities (NATA) accreditation. Accreditation Number 2778 (14391) and are approved for the sampling and analysis of gases. Specific details of the methods are available on request.

All sampling and analysis is conducted according to the methods in **Table 2.**

Table 2 AECOM NATA Endorsed Methods

NSW EPA Approved Methods	USEPA Methods	Method Title
AS4323.1 (NSW EPA TM-1)	USEPA (2000) Method 1	Selection of sampling positions
AS4323.2 (NSW EPA TM-15)	USEPA (2000) Method 5 under approved circumstances	Determination of total particulate matter – isokinetic manual sampling – gravimetric method
NSW EPA TM-2	USEPA (2000) Method 2 or 2C or USEPA (1999) Method 2F or 2G or 2H (as appropriate)	Determination of stack gas velocity and volumetric flow rate (type s pitot tube)
NSW EPA TM-3	USEPA (2000) Method 8 (for sampling and analysis only if interference from fluorides, free ammonia and/or dimethyl aniline has been demonstrated to the satisfaction of the chief Scientist, EPA) (as appropriate)	Determination of sulfuric acid mist emissions from stationary sources
NSW EPA TM-4	USEPA (2000) Method 6 or 6A or 6B or USEPA (1996) Method 6C or ISO (1989) Method 7934 or ISO (1992) Method 7935 or ISO (1993) Method 10396 or ISO (1998) Method 11632 (as appropriate)	Determination of Sulfur Dioxide (SO_2) emissions from stationary sources
NSW EPA TM-9	USEPA (2000) Method 13A or 13B (as appropriate)	Determination of total fluoride emissions from stationary sources
NSW EPA TM-11	USEPA (2000) Method 7 or 7A or 7B or 7C or 7D or USEPA (1990) Method 7E or USEPA (1996) Method 20 or ISO (1993) Method 10396 (as appropriate). NO_x analysers may be substituted in Method 7E provided the performance Specifications of the method are met. Both NO and NO_x must be directly measured.	Nitrogen dioxide (NO_2) or nitric oxide (NO)
NSW EPA TM-12	USEPA (2000) Method 29 or USEPA (2000) Method 102 (for mercury only in hydrogen rich streams) (as appropriate)	Type 1 substances (elements antimony (Sb), arsenic (As), cadmium (Cd), lead (Pb) or mercury (Hg) or any compound containing one or more of those elements)

Table 2 Continued AECOM NATA Endorsed Methods

NSW EPA Approved Methods	USEPA Methods	Method Title
NSW EPA TM-13	USEPA (2000) Method 29 (Analysis for tin and vanadium to be done by Inductively Coupled Argon Plasma Emission Spectroscopy (ICAP) as defined in USEPA Method 29) or USEPA (1986) Method 7910 (for vanadium only) or USEPA (1986) Method 7911 (for vanadium only) (as appropriate)	Type 2 substances (elements beryllium (Be), chromium (Cr), cobalt (Co), manganese (Mn), nickel (Ni), selenium (Se), tin (Sn) or vanadium (V) or any compound containing one or more of those elements)
NSW EPA TM-14	USEPA (2000) Method 29	Cadmium (Cd) or mercury (Hg) or any compound containing one or more of those elements
NSW EPA TM-22	USEPA (2000) Method 4	Determination of moisture content in stack gases
NSW EPA TM-23	USEPA (2000) Method 3	Gas analysis for the determination of dry molecular weight
NSW EPA OM-5	USEPA (1997) Method 201 or 201A (as appropriate)	Determination of PM_{10} emissions

4.0 Sampling Location

Table 3 provides a summary of the locations sampled by AECOM at the National Ceramic Industries Australia Rutherford Site during September 2014, March & June 2015.

Table 3 Sampling Location Summary

Discharge Description	Clay Preparation (CP1) (EPL 1)	Pressing and Drying (PD1) (EPL2)	Dryer (D1) (EPL5)	Dryer (D2) (EPL6)	Glaze Line (EPL9)
Duct Shape	Circular	Circular	Circular	Circular	Circular
Construction Material	Metal	Metal	Metal	Metal	Metal
Duct Dimensions (mm)	995	1000	490	490	1000
Minimum No. Sampling Points	12	12	8	8	12
Sampling Ports	2	2	2	2	2
Min. Points/Traverse	6	6	4	4	6
Disturbance	No	Yes	No	No	Yes
Distance from Upstream Disturbance[1]	6	4	10	8	4
Type of Disturbance	Junction	Junction	Fan	Fan	Junction
Distance from Downstream Disturbance[1]	15	15	8	20	15
Type of Disturbance	Stack Exit	Stack Exit	Stack Exit	Stack Exit	Stack Exit
Ideal Sampling Location	Yes	No	Yes	Yes	No
Correction Factors Applied	No	Yes	No	No	Yes
Total No. Points Sampled	12	16	8	8	16
Points/Traverse	6	8	4	4	8
Sampling Performed to Standard [2]	Yes[3]	Yes[4]	Yes[3]	Yes[3]	Yes[4]

Notes
[1] Expressed in equivalent stack diameters
[2] AS 4323.1 (1995) Stationary source emissions Method 1 – Selection of sampling positions
[3] AS 4323.1 (1995) Section 4.1
[4] AS 4323.1 (1995) Section 4.2

Emission Source Sampling Location Summary (continued)

Discharge Description	Selection Line (SL1,2,3,4) (EPL10)	Spray Dryer (SD1) (EPL12)	Kiln (KP1) (EPL14)[5]	Kiln (KP2) (EPL15)[5]	Hot Air Cooler (HAC1) (EPL18)	Hot Air Cooler (HAC2) (EPL19)
Duct Shape	Circular	Circular	Circular	Circular	Circular	Circular
Construction Material	Metal	Metal	Metal	Metal	Metal	Metal
Duct Dimensions (mm)	490	1385	980	980	1000	1200
Minimum No. Sampling Points	8	12	12	12	12	12
Sampling Ports	2	2	2	2	2	2
Min. Points/Traverse	4	6	6	6	6	6
Disturbance	Yes	Yes	Yes	Yes	Yes	Yes
Distance from Upstream Disturbance[1]	4	7	3	3	3	4
Type of Disturbance	Fan	Bend	Change in Diameter	Change in Diameter	Bend	Fan
Distance from Downstream Disturbance[1]	6	5	5	5	3	4
Type of Disturbance	Stack Exit	Stack Exit	Bend	Bend	Stack Exit	Stack Exit
Ideal Sampling Location	No	No	No	No	No	No
Correction Factors Applied	Yes	Yes	Yes	Yes	Yes	Yes
Total No. Points Sampled	12	16	16	16	16	16
Points/Traverse	6	8	8	8	8	8
Sampling Performed to Standard [2]	Yes[4]	Yes[4]	Yes[4]	Yes[4]	Yes[4]	Yes[4]

Notes [1] Expressed in equivalent stack diameters

[2] AS 4323.1 (1995) Stationary source emissions Method 1 – Selection of sampling positions

[3] AS 4323.1 (1995) Section 4.1

[4] AS 4323.1 (1995) Section 4.2

[5] Sampling occurred prior to the baghouse as per client request

5.0 Equipment Calibration

AECOM has a calibration schedule to ensure the emission testing equipment is maintained in good order and with known calibration. Equipment used in this project was calibrated according to the procedures and frequency identified in the AECOM Calibration Schedule. Details of the schedule and the calibration calculations are available on request.

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6.0 Results

A summary of results obtained from stack emissions testing performed during September 2014, March & June 2015, is provided in **Tables 4 & 5**. Calculated gaseous emissions results and mass emission rates are presented in **Table 6 & 7** respectively.

Emission data particular to each emission source investigated is presented in **Tables 8 - 23**. Element Hazardous Substances (metals) results are presented in **Table 24** and **25**. All emission concentrations are converted to standard conditions of 0°C, dry gas and 1 atmosphere pressure for comparison with appropriate regulatory limits.

For comparison with EPL requirements Oxides of Nitrogen, Total Particulate and Fine Particulate (PM_{10}) emission concentrations determined within the Kiln stacks (EPL Points 14 & 15) exhausts have been corrected to 18% O_2 based on the measured oxygen content within the sampling plane during the testing period.

AECOM has a calculated limit of uncertainty in regards to results. The estimation of measurement uncertainty in source testing is conducted to provide an indication of the precision of the measurement result and a degree of confidence in the range of values the reported result may represent. The measurement of uncertainty has been calculated at ±13.6%.

Field sheets and final calculations can be referred to in **Appendix A**. Raw and Calculated Oxides of Nitrogen data is attached in **Appendix B**. Analytical laboratory result certificates are provided in **Appendix C**.

Table 4 Summary Particulate Emission Monitoring Results, September 2014 & March 2015

Stack	Fine Particulate (PM_{10}) (mg/m^3)	Total Particulate (mg/m^3)	Regulatory Limit (mg/m^3)*
Clay Preparation (CP1) (EPL 1)	0.76	4.3	20
Pressing and Drying (PD1) (EPL 2)	4.7	6.9	20
Dryer (D1) (EPL 5)	2.3	3.3	20
Dryer (D2) (EPL 6)	4.2	7.5	20
Glaze Line (EPL 9)	<0.21	0.41	20
Selection Line (SL 1,2,3,4) (EPL 10)	<0.3	<0.3	20
Spray Dryer (SD1) (EPL 10)	0.55	3.4	20
Hot Air Cooler (HAC 1) (EPL 18)	0.30	0.75	5
Hot Air Cooler (HAC 2) (EPL 19)	0.19	0.21	5

*Note: Regulatory limit only applies to Total Particulate.

Table 5 Kiln 1 and Kiln 2 Emission Monitoring Results Summary, September 2014, March & June 2015

Pollutant	Kiln 1 (EPL 14)	Kiln 2 (EPL 15)	Regulatory Limit
Fine Particulate (at 18% O_2) (PM_{10}) (mg/m^3)	3.1	11	N/A
Total Particulate (at 18% O_2) (mg/m^3)	2.9	14	20
Total Fluoride (as HF) (mg/m^3)	4.8	3.1	5
Sulfuric Acid Mist (H_2SO_4 as SO_3) (mg/m^3)	52	25	100
Sulfur Dioxide (SO_2 as SO_3) (mg/m^3)	160	200	NA
Total Hazardous Substances (Metals) (mg/m^3)	0.031	0.25	1
Cadmium (mg/m^3)	0.0015	0.0089	0.1
Mercury (mg/m^3)	0.00026	0.003	0.1

Table 6 Kiln 1 and 2 Gaseous Data Results, September 2014

Pollutant	Kiln 1 (EPL 14)	Kiln 2 (EPL 15)
Date Sampled	09/08/2014	09/08/2014
Time Sampled	13:19 – 14:19	11:53 – 12:53
Nitrogen Oxide (NO) (mg/m^3) at 18% O_2	25	31
Nitrogen Dioxide (NO2) (mg/m^3) at 18% O_2	1	2
Total Oxides of Nitrogen (NOx) (mg/m^3) at 18% O_2	25	33
Total Oxides of Nitrogen (as Equivalent NO_2) (mg/m^3) at 18% O_2	39 (*100*)	50 (*100*)
Oxygen (O_2) (%)	17.18	16.62

Note – Regulatory Limit in Parentheses

Table 7 Kiln 1 and 2 Mass Emission Rates, September 2014

Pollutant	Kiln 1 (EPL 14)	Kiln 2 (EPL 15)
Date Sampled	09/08/2014	09/08/2014
Time Sampled	13:18 – 14:18	11:53 – 12:53
Stack Gas Flowrate (m^3/s) (0^0C, dry gas, 1atm pressure) at 18% O_2	8.2	10.1
Nitrogen Oxide (NO) (mg/s) at 18% O_2	205	313.1
Nitrogen Dioxide (NO2) (mg/s) at 18% O_2	8.2	20.2
Total Oxides of Nitrogen (NOx) (mg/s) at 18% O_2	205	333.3
Total Oxides of Nitrogen (as Equivalent NO_2) (mg/s) at 18% O_2	319.8	505

Table 8 Clay Prep Stack Total Particulate and Fine Particulate (PM_{10}) Results, 11 September 2014

Sampling Conditions:				
Stack internal diameter at test location	995	mm		
Stack gas temperature (average)	27.4	^{o}C	300.6	K
Stack pressure (average)	1021	hPa		
Stack gas velocity (average, stack conditions)	15	m/s		
Stack gas flowrate (stack conditions)	12	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	11	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	11:23	-	12:25	
Fine Particulate (PM_{10}) Mass	0.6	mg		
Gas Volume Sampled	0.791	m^3		
Fine Particulate (PM_{10}) Emission*[1]	0.76	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	8.3	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	11:23	-	12:25	
Total Particulate Mass	4.3	mg		
Gas Volume Sampled	0.996	m^3		
Total Particulate Emission*[1]	4.3	mg/m^3		
Total Particulate Mass Emission Rate*[2]	47	mg/s		
Regulatory Limit	20	mg/m^3		
Moisture Content (%)	**0.1**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**28.8**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas

*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 9 Pressing and Drying Stack Total Particulate and Fine Particulate (PM_{10}) Results, 11 September 2014

Sampling Conditions:				
Stack internal diameter at test location	1000	mm		
Stack gas temperature (average)	25.9	^{o}C	299.1	K
Stack pressure (average)	1020	hPa		
Stack gas velocity (average, stack conditions)	10	m/s		
Stack gas flowrate (stack conditions)	7.9	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	7.2	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	10:35	-	11:58	
Fine Particulate (PM_{10}) Mass	4.2	mg		
Gas Volume Sampled	0.895	m^3		
Fine Particulate (PM_{10}) Emission*[1]	4.7	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	33	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	10:35	-	11:58	
Total Particulate Mass	8.5	mg		
Gas Volume Sampled	1.23	m^3		
Total Particulate Emission*[1]	6.9	mg/m^3		
Total Particulate Mass Emission Rate*[2]	51	mg/s		
Regulatory Limit	20	mg/m^3		
Moisture Content (%)	**0.7**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**28.8**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas

*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 10 Dryer 1 Stack Total Particulate and Fine Particulate (PM_{10}) Results, 16 September 2014

Sampling Conditions:				
Stack internal diameter at test location	490	mm		
Stack gas temperature (average)	102.6	^{o}C	375.8	K
Stack pressure (average)	1005	hPa		
Stack gas velocity (average, stack conditions)	11	m/s		
Stack gas flowrate (stack conditions)	2	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	1.4	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	11:18	-	12:00	
Fine Particulate (PM_{10}) Mass	1.1	mg		
Gas Volume Sampled	0.473	m^3		
Fine Particulate (PM_{10}) Emission*[1]	2.3	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	3.1	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	11:18	-	12:00	
Total Particulate Mass	1.6	mg		
Gas Volume Sampled	0.484	m^3		
Total Particulate Emission*[1]	3.3	mg/m^3		
Total Particulate Mass Emission Rate*[2]	4.5	mg/s		
Regulatory Limit	20	mg/m^3		
Moisture Content (%)	**5.4**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**28.9**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas

*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 11 Dryer 2 Stack Total Particulate and Fine Particulate (PM_{10}) Results, 26 March 2015

Sampling Conditions:				
Stack internal diameter at test location	490	mm		
Stack gas temperature (average)	113.8	^{o}C	387.0	K
Stack pressure (average)	1012	hPa		
Stack gas velocity (average, stack conditions)	10	m/s		
Stack gas flowrate (stack conditions)	1.9	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	1.3	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	10:13	-	11:13	
Fine Particulate (PM_{10}) Mass	2.3	mg		
Gas Volume Sampled	0.547	m^3		
Fine Particulate (PM_{10}) Emission*[1]	4.2	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	5.3	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	10:13	-	11:13	
Total Particulate Mass	5.0	mg		
Gas Volume Sampled	0.665	m^3		
Total Particulate Emission*[1]	7.5	mg/m^3		
Total Particulate Mass Emission Rate*[2]	9.5	mg/s		
Regulatory Limit	20	mg/m^3		
Moisture Content (%)	**7.5**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**28.8**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas

*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final calculations" for each test.

Table 12 Glaze Line Stack Total Particulate and Fine Particulate (PM_{10}) Results, 11 September 2014

Sampling Conditions:				
Stack internal diameter at test location	1000	mm		
Stack gas temperature (average)	26.3	^{o}C	299.5	K
Stack pressure (average)	1021	hPa		
Stack gas velocity (average, stack conditions)	14	m/s		
Stack gas flowrate (stack conditions)	11	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	9.8	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	12:18	-	13:40	
Fine Particulate (PM_{10}) Mass	<0.2	mg		
Gas Volume Sampled	0.947	m^3		
Fine Particulate (PM_{10}) Emission*[1]	<0.21	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	<2.1	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	12:18	-	13:40	
Total Particulate Mass	0.4	mg		
Gas Volume Sampled	0.971	m^3		
Total Particulate Emission*[1]	0.41	mg/m^3		
Total Particulate Mass Emission Rate*[2]	4	mg/s		
Regulatory Limit	20	mg/m^3		
Moisture Content (%)	**0.5**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**28.8**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas
*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 13 Selection Line Stack Total Particulate and Fine Particulate (PM_{10}) Results, 25 March 2015

Sampling Conditions:				
Stack internal diameter at test location	490	mm		
Stack gas temperature (average)	33.3	^{o}C	306.5	K
Stack pressure (average)	1010	hPa		
Stack gas velocity (average, stack conditions)	4.9	m/s		
Stack gas flowrate (stack conditions)	0.93	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	0.82	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	9:02	-	10:04	
Fine Particulate (PM_{10}) Mass	<0.2	mg		
Gas Volume Sampled	0.67	m^3		
Fine Particulate (PM_{10}) Emission*[1]	<0.3	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	<0.25	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	9:02	-	10:04	
Total Particulate Mass	<0.2	mg		
Gas Volume Sampled	0.702	m^3		
Total Particulate Emission*[1]	<0.3	mg/m^3		
Total Particulate Mass Emission Rate*[2]	<0.23	mg/s		
Regulatory Limit	20	mg/m^3		
Moisture Content (%)	**1.6**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**28.8**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas

*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 14 Spray Dryer Stack Total Particulate and Fine Particulate (PM_{10}) Results, 25 March 2015

Sampling Conditions:				
Stack internal diameter at test location	1385	mm		
Stack gas temperature (average)	95.7	^{o}C	368.9	K
Stack pressure (average)	1008	hPa		
Stack gas velocity (average, stack conditions)	21	m/s		
Stack gas flowrate (stack conditions)	32	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	20	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	13:54	-	15:15	
Fine Particulate (PM_{10}) Mass	0.4	mg		
Gas Volume Sampled	0.731	m^3		
Fine Particulate (PM_{10}) Emission*[1]	0.55	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	11	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	13:54	-	15:15	
Total Particulate Mass	2.9	mg		
Gas Volume Sampled	0.85	m^3		
Total Particulate Emission*[1]	3.4	mg/m^3		
Total Particulate Mass Emission Rate*[2]	67	mg/s		
Regulatory Limit	20	mg/m^3		
Moisture Content (%)	**17.0**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**29**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas

*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 15 Hot Air Cooler 1 Stack Total Particulate and Fine Particulate (PM_{10}) Results, 15 September 2014

Sampling Conditions:				
Stack internal diameter at test location	1000	mm		
Stack gas temperature (average)	142.5	^{o}C	415.7	K
Stack pressure (average)	1010	hPa		
Stack gas velocity (average, stack conditions)	28	m/s		
Stack gas flowrate (stack conditions)	22	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	14	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	10:15	-	11:37	
Fine Particulate (PM_{10}) Mass	0.30	mg		
Gas Volume Sampled	0.992	m^3		
Fine Particulate (PM_{10}) Emission*[1]	0.30	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	4.3	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	10:15	-	11:37	
Total Particulate Mass	1.0	mg		
Gas Volume Sampled	1.34	m^3		
Total Particulate Emission*[1]	0.75	mg/m^3		
Total Particulate Mass Emission Rate*[2]	11	mg/s		
Regulatory Limit	5	mg/m^3		
Moisture Content (%)	**0.3**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**28.8**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas
*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 16 Hot Air Cooler 2 Stack Total Particulate and Fine Particulate (PM_{10}) Results, 15 September 2014

Sampling Conditions:				
Stack internal diameter at test location	1200	mm		
Stack gas temperature (average)	105.7	^{o}C	378.9	K
Stack pressure (average)	1012	hPa		
Stack gas velocity (average, stack conditions)	18	m/s		
Stack gas flowrate (stack conditions)	20	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	14	m^3/s		
Fine Particulate (PM_{10}) Testing				
Test Period	12:15	-	13:36	
Fine Particulate (PM_{10}) Mass	0.2	mg		
Gas Volume Sampled	1.03	m^3		
Fine Particulate (PM_{10}) Emission*[1]	0.19	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2]	2.7	mg/s		
Regulatory Limit	N/A			
Total Particulate Testing				
Test Period	12:15	-	13:36	
Total Particulate Mass	0.2	mg		
Gas Volume Sampled	0.935	m^3		
Total Particulate Emission*[1]	0.21	mg/m^3		
Total Particulate Mass Emission Rate*[2]	3	mg/s		
Regulatory Limit	5	mg/m^3		
Moisture Content (%)	**1.4**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**28.8**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas

*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 17 Kiln 1 Stack Total Particulate and Fine Particulate (PM_{10}) Results, 24 March 2015

Sampling Conditions:				
Stack internal diameter at test location	980	mm		
Stack gas temperature (average)	135.7	^{o}C	408.9	K
Stack pressure (average)	1010	hPa		
Stack gas velocity (average, stack conditions)	11	m/s		
Stack gas flowrate (stack conditions)	8.4	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	5.3	m^3/s		
Fine Particulate (PM10) Testing				
Test Period	9:38	-	11:00	
Fine Particulate (PM_{10}) Mass	4.4	mg		
Gas Volume Sampled	1.03	m^3		
Fine Particulate (PM_{10}) Emission*[1] at 18% O_2	3.1	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2] at 18% O_2	16	mg/s		
Regulatory Limit at 18% O_2	N/A			
Total Particulate Testing				
Test Period	9:38	-	11:00	
Total Particulate Mass	3.3	mg		
Gas Volume Sampled	0.832	m^3		
Total Particulate Emission*[1] at 18% O_2	2.9	mg/m^3		
Total Particulate Mass Emission Rate*[2] at 18% O_2	15	mg/s		
Regulatory Limit at 18% O_2	20	mg/m^3		
Moisture Content (%)	**4.7**			
Gas Density (dry at 1 atmosphere)	**1.30**	**kg/m^3**		
Dry Molecular Weight	**29**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas
*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 18 Kiln 1 Stack Total Fluoride Results, 25 June 2015

Sampling Conditions:				
Stack internal diameter at test location	980	mm		
Stack gas temperature (average)	164.8	^{o}C	438.0	K
Stack pressure (average)	1015	hPa		
Stack gas velocity (average, stack conditions)	12	m/s		
Stack gas flowrate (stack conditions)	9	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	5.3	m^3/s		
Gaseous Fluoride Testing				
Test Period	10:37	-	11:57	
Gaseous Fluoride Mass	4.16	mg		
Gas Volume Sampled	0.931	m^3		
Gaseous Fluoride Emission*[1]	4.5	mg/m^3		
Gaseous Fluoride Mass Emission Rate*[2]	24	mg/s		
Regulatory Limit	5	mg/m^3		
Particulate Fluoride Testing				
Test Period	10:37	-	11:57	
Particulate Fluoride Mass	0.28	mg		
Gas Volume Sampled	0.931	m^3		
Particulate Fluoride Emission*[1]	0.3	mg/m^3		
Particulate Fluoride Mass Emission Rate*[2]	1.6	mg/s		
Regulatory Limit	5	mg/m^3		
Moisture Content (%)	**6.3**			
Gas Density (dry at 1 atmosphere)	**1.30**	**kg/m^3**		
Dry Molecular Weight	**29**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas
*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 19 Kiln 1 Hazardous Substances (Metals), Sulfuric Acid Mist (H_2SO_4 as SO_3) and Sulfur Dioxide (SO_2 as SO_3) Results, 8 September 2014

Sampling Conditions:				
Stack internal diameter at test location	980	mm		
Stack gas temperature (average)	179.1	^oC	452.3	K
Stack pressure (average)	1023	hPa		
Stack gas velocity (average, stack conditions)	15	m/s		
Stack gas flowrate (stack conditions)	12	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	6.7	m^3/s		
Hazardous Substances (Metals) Testing				
Test Period	11:00	-	12:30	
Hazardous Substances (Metals) Mass	0.041	mg		
Gas Volume Sampled	1.31	m^3		
Hazardous Substances (Metals) Emission*[1]	0.031	mg/m^3		
Hazardous Substances (Metals) Mass Emission Rate*[2]	0.21	mg/s		
Regulatory Limit	1	mg/m^3		
Sulfuric Acid Mist (H2SO4 as SO3) Testing				
Test Period	11:00	-	12:30	
Sulfuric Acid Mist (H_2SO_4 as SO_3) Mass	30	mg		
Gas Volume Sampled	0.577	m^3		
Sulfuric Acid Mist (H_2SO_4 as SO_3) Emission*[1]	52	mg/m^3		
Sulfuric Acid Mist (H_2SO_4 as SO_3) Mass Emission Rate*[2]	340	mg/s		
Regulatory Limit	100	mg/m^3		
Sulfur Dioxide (SO2 as SO3) Testing				
Test Period	11:00	-	12:30	
Sulfur Dioxide (SO_2 as SO_3) Mass	90	mg		
Gas Volume Sampled	0.577	m^3		
Sulfur Dioxide (SO_2 as SO_3) Emission*[1]	160	mg/m^3		
Sulfur Dioxide (SO_2 as SO_3) Mass Emission Rate*[2]	1100	mg/s		
Regulatory Limit	N/A			
Moisture Content (%)	**3.1**			
Gas Density (dry at 1 atmosphere)	**1.30**	**kg/m^3**		
Dry Molecular Weight	**29**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas
*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 20 Kiln 2 Stack Total Particulate and Fine Particulate (PM_{10}) Results, 25 June 2015

Sampling Conditions:				
Stack internal diameter at test location	980	mm		
Stack gas temperature (average)	174.3	^{o}C	447.5	K
Stack pressure (average)	1015	hPa		
Stack gas velocity (average, stack conditions)	16	m/s		
Stack gas flowrate (stack conditions)	12	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	6.7	m^3/s		
Fine Particulate (PM10) Testing				
Test Period	12:50	-	14:10	
Fine Particulate (PM_{10}) Mass	12.9	mg		
Gas Volume Sampled	0.868	m^3		
Fine Particulate (PM_{10}) Emission*[1] at 18% O_2	14	mg/m^3		
Fine Particulate (PM_{10}) Mass Emission Rate*[2] at 18% O_2	91	mg/s		
Regulatory Limit at 18% O_2	N/A			
Total Particulate Testing				
Test Period	12:50	-	14:10	
Total Particulate Mass	15.8	mg		
Gas Volume Sampled	1.29	m^3		
Total Particulate Emission*[1] at 18% O_2	11	mg/m^3		
Total Particulate Mass Emission Rate*[2] at 18% O_2	76	mg/s		
Regulatory Limit at 18% O_2	20	mg/m^3		
Moisture Content (%)	**6.5**			
Gas Density (dry at 1 atmosphere)	**1.30**	**kg/m^3**		
Dry Molecular Weight	**29**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas

*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 21 Kiln 2 Stack Total Fluoride Results, 9 September 2014

Sampling Conditions:				
Stack internal diameter at test location	980	mm		
Stack gas temperature (average)	219.5	^{o}C	492.7	K
Stack pressure (average)	1015	hPa		
Stack gas velocity (average, stack conditions)	18	m/s		
Stack gas flowrate (stack conditions)	14	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	7.3	m^3/s		
Total Fluoride Testing				
Test Period	10:20	-	11:42	
Total Fluoride Mass	2.0	mg		
Gas Volume Sampled	0.636	m^3		
Total Fluoride Emission*[1]	3.1	mg/m^3		
Total Fluoride Mass Emission Rate*[2]	23	mg/s		
Regulatory Limit	5	mg/m^3		
Moisture Content (%)	**6.4**			
Gas Density (dry at 1 atmosphere)	**1.30**	**kg/m^3**		
Dry Molecular Weight	**29**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas
*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 22 Kiln 2 Hazardous Substances (Metals) Results, 8 September 2014

Sampling Conditions:				
Stack internal diameter at test location	980	mm		
Stack gas temperature (average)	251.5	^{o}C	524.7	K
Stack pressure (average)	1023	hPa		
Stack gas velocity (average, stack conditions)	16	m/s		
Stack gas flowrate (stack conditions)	12	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	5.9	m^3/s		
Hazardous Substances (Metals) Testing				
Test Period	12:45	-	14:10	
Hazardous Substances (Metals) Mass	0.086	mg		
Gas Volume Sampled	0.338	m^3		
Hazardous Substances (Metals) Emission*[1]	0.25	mg/m^3		
Hazardous Substances (Metals) Mass Emission Rate*[2]	1.4	mg/s		
Regulatory Limit	1	mg/m^3		
Moisture Content (%)	**12.0**			
Gas Density (dry at 1 atmosphere)	**1.30**	**kg/m^3**		
Dry Molecular Weight	**29.1**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas
*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 23 Kiln 2 Sulfuric Acid Mist (H_2SO_4 as SO_3) and Sulfur Dioxide (SO_2 as SO_3) Results, 24 March 2015

Sampling Conditions:				
Stack internal diameter at test location	980	mm		
Stack gas temperature (average)	173.0	^oC	446.2	K
Stack pressure (average)	1010	hPa		
Stack gas velocity (average, stack conditions)	16	m/s		
Stack gas flowrate (stack conditions)	12	m^3/s		
Stack gas flowrate (0^0C, dry gas, 1 atm pressure)	7	m^3/s		
Sulfuric Acid Mist (H2SO4 as SO3) Testing				
Test Period	11:30	-	12:52	
Sulfuric Acid Mist (H_2SO_4 as SO_3) Mass	20	mg		
Gas Volume Sampled	0.788	m^3		
Sulfuric Acid Mist (H_2SO_4 as SO_3) Emission*[1]	25	mg/m^3		
Sulfuric Acid Mist (H_2SO_4 as SO_3) Mass Emission Rate*[2]	180	mg/s		
Regulatory Limit	100	mg/m^3		
Sulfur Dioxide (SO2 as SO3) Testing				
Test Period	11:30	-	12:52	
Sulfur Dioxide (SO_2 as SO_3) Mass	160	mg		
Gas Volume Sampled	0.788	m^3		
Sulfur Dioxide (SO_2 as SO_3) Emission*[1]	200	mg/m^3		
Sulfur Dioxide (SO_2 as SO_3) Mass Emission Rate*[2]	1400	mg/s		
Regulatory Limit	N/A			
Moisture Content (%)	**6.4**			
Gas Density (dry at 1 atmosphere)	**1.29**	**kg/m^3**		
Dry Molecular Weight	**29**	**g/g-mole**		

Notes *1 Emission concentration at Standard conditions of 0^0C, 1 atm, dry gas
*2 Mass emission rate determined from pre and post-test sampling flow measurements and the respective test moisture content. See Q_{std} in field sheets and final calculations "Stack Analysis - Final Calculations" for each test.

Table 24 Kiln 1 Elemental Hazardous Substances (Metals) Results, 8 September 2014

Sample	Total Particulate Metals (mg)	Total Particulate Metals (mg/m^3)	Total Gaseous Metals (mg)	Total Gaseous Metals (mg/m^3)	Total Oxidisable Mercury (mg)	Total Oxidisable Mercury (mg/m^3)	Total (mg)	Total (mg/m^3)	Mass Emission Rate (mg/s)
Antimony	<0.0002	<0.00015	<0.0001	<0.000076			<0.0002	<0.00015	<0.001
Arsenic	0.0015	0.0011	0.001	0.00076			0.003	0.0023	0.016
Beryllium	<0.0002	<0.00015	<0.0001	<0.000076			<0.0002	<0.00015	<0.001
Cadmium	0.0005	0.00038	0.0013	0.00099			0.002	0.0015	0.01
Chromium	0.0071	0.0054	0.0036	0.0027			0.01	0.0076	0.052
Cobalt	<0.0002	<0.00015	<0.0001	<0.000076			<0.0002	<0.00015	<0.001
Copper	<0.0015	<0.0011	0.00023	0.00018			0.00023	0.00018	0.0012
Lead	0.0089	0.0068	0.0035	0.0027			0.01	0.0076	0.052
Magnesium	0.053	0.04	0.032	0.024			0.09	0.069	0.47
Manganese	0.0015	0.0011	0.0022	0.0017			0.004	0.003	0.02
Mercury	<0.0002	<0.00015	0.00034	0.00026	0.00085	0.00065	0.00034	0.00026	0.0018
Nickel	0.0002	0.00015	0.0018	0.0014			0.002	0.0015	0.01
Selenium	0.0023	0.0018	0.0022	0.0017			0.005	0.0038	0.026
Thallium	0.0015	0.0011	0.00044	0.00034			0.002	0.0015	0.01
Tin	0.0007	0.00053	<0.0001	<0.000076			0.0007	0.00053	0.0036
Vanadium	0.0021	0.0016	<0.0001	<0.000076			0.0021	0.0016	0.011
Zinc	1.7	1.3	0.061	0.046			2	1.5	10
Total Hazardous Metals*	**0.026**	**0.019**	**0.016**	**0.013**	**0.00085**	**0.00065**	**0.041**	**0.031**	**0.21**
Total Metals	**1.8**	**1.4**	**0.11**	**0.083**			**2.1**	**1.6**	**11**

* Total does not include Copper, Magnesium and Zinc as they are classed non-hazardous

Table 25 Kiln 2 Elemental Hazardous Substances (Metals) Results, 8 September 2014

Sample	Total Particulate Metals (mg)	Total Particulate Metals (mg/m^3)	Total Gaseous Metals (mg)	Total Gaseous Metals (mg/m^3)	Total Oxidisable Mercury (mg)	Total Oxidisable Mercury (mg/m^3)	Total (mg)	Total (mg/m^3)	Mass Emission Rate (mg/s)
Antimony	<0.0002	<0.00059	<0.0001	<0.0003			<0.0002	<0.00059	<0.0033
Arsenic	0.0024	0.0071	0.0012	0.0035			0.004	0.012	0.068
Beryllium	<0.0002	<0.00059	<0.0001	<0.0003			<0.0002	<0.00059	<0.0033
Cadmium	0.0022	0.0065	0.0011	0.0033			0.003	0.0089	0.05
Chromium	0.015	0.044	0.0061	0.018			0.02	0.059	0.33
Cobalt	<0.0002	<0.00059	<0.0001	<0.0003			<0.0002	<0.00059	<0.0033
Copper	0.0004	0.0012	0.0028	0.0083			0.003	0.0089	0.05
Lead	0.018	0.053	0.0092	0.027			0.03	0.089	0.5
Magnesium	0.053	0.16	0.047	0.14			0.1	0.3	1.7
Manganese	0.0028	0.0083	0.0032	0.0095			0.006	0.018	0.1
Mercury	<0.0002	<0.00059	0.001	0.003	0.0015	0.0044	0.001	0.003	0.017
Nickel	0.001	0.003	0.0032	0.0095			0.004	0.012	0.068
Selenium	0.003	0.0089	0.0035	0.01			0.007	0.021	0.12
Thallium	0.0022	0.0065	0.00075	0.0022			0.003	0.0089	0.05
Tin	0.0036	0.011	<0.0001	<0.0003			0.0036	0.011	0.062
Vanadium	0.0046	0.014	<0.0001	<0.0003			0.0046	0.014	0.079
Zinc	2.1	6.2	0.23	0.68			2	5.9	33
Total Hazardous Metals*	**0.051**	**0.15**	**0.029**	**0.086**	**0.0015**	**0.0044**	**0.086**	**0.25**	**1.4**
Total Metals	**2.2**	**6.5**	**0.31**	**0.91**			**2.2**	**6.5**	**37**

* Total does not include Copper, Magnesium and Zinc as they are classed non-hazardous

Appendix A

Field Sheets and Final Calculations (190 pages)

Appendix A Field Sheets and Final Calculations (190 pages)

Appendix B

Laboratory Analytical Reports (30 pages)

Appendix B Laboratory Analytical Reports (30 pages)

Appendix C

Raw and Calculated Gas Data (12 pages)

Appendix C Raw and Calculated Gas Data (12 pages)

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This is the end of the Report