

Uniper Technologies

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UTG/16/APT/TM/590/R
Job No: 2122.C50700.001
June 2016

**MCERTS REPORT NUMBER –
C50700.001/MP3337SH/V008/UNIPER/CONNAH'S QUAY PS/V1 2016:
EMISSIONS MONITORING FROM AUXILIARY BOILERS AT CONNAH'S QUAY
Uniper, Connah's Quay Power Station, Kelsterton Road, Connah's Quay, Clwyd,
N Wales, CH5 4BP
prepared for
MR M FELGATE, PLANT MANAGER, CONNAH'S QUAY POWER STATION
by
M C Muter**

SUMMARY

This report covers the spot emissions monitoring tests from Auxiliary Boilers 1,2,3,4 and 5 at Connah's Quay Power Station, testing was carried out by Uniper Technologies Ltd in June 2016.

Prepared by

Approved for publication

Master report signed by B Morley (pp) & H D Jones, 30 June 2016

**M C Muter
Testing & Measurement**

**H D Jones
Team Leader
Testing & Measurement**

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EF	Mr I Jones	Connah's Quay PS
EF	Mr J Murphy	Connah's Quay PS
EF	Mr W Smith	Connah's Quay PS
EF	Mr A Black	Connah's Quay PS
EF	Dr R G Busby	Environment Manager Upstream, Uniper UK

Report for the Periodic Monitoring of Emissions to Air

Part 1: Executive Summary

Permit Number: MP3337SH/V008

Operator: Uniper

Installation: Connahs Quay Power Station - Auxilliary Boilers

Monitoring dates: 22-Jun-2016



2200

Contract Number: 2122.C50700.001

Client Organisation: Uniper

Address: Connahs Quay Power Station
Kelsterton Road,
Connahs Quay,
Clwyd
North Wales.
CH5 4BP

Monitoring Organisation: Uniper Technologies Limited

Address: Technology Centre
Ratcliffe on Soar
Nottinghamshire
NG11 0EE

Date of Report: 23-Jun-2016

Report Approved By: Mark Muter

MCERTS Registration Number: MM02098

Function: Team Leader

Signed:

Part 1: Executive Summary

- * Monitoring Objectives
- * Monitoring Results
- * Operating Information
- * Monitoring Deviations

Part 2: Supporting Information

Appendix 1: General Information

- * Monitoring organisation staff details
- * Monitoring organisation method details
- * Monitoring organisation equipment check list references

Appendix 2: Emission Point Reference

- * Auxiliary Boiler gas measurements
- * Gas analyser calibrations.
- * Gas Bottle Certificates
- * Uncertainty Calculations
- * 2200 Testing multiple

Objectives of Monitoring

The gaseous (NO_x,CO,O₂) emissions from the auxiliary boilers 1,2,3,4 and 5 exhausts at Connaught Quay Power Station were tested in accordance with the sites licence to operate using standard reference methods. This report details the findings of the test programme and the associated test results.

Substances to be monitored	Emission Point Identification
	<i>Reference Number - MP3337SH/V008</i>
	<i>Source - Auxiliary boilers 1,2,3,4 and 5</i>
	<i>Grid Reference - NA</i>
NO _x	*
Oxygen	*
CO	*

Special requirements

NA

Monitoring Results**Auxiliary Boilers 1,2,3,4 and 5**

Emission Limit Value

The daily emission limit value is that stated in the permit and is expressed as a concentration.

Periodic Monitoring Result

The result given is expressed in the same terms and units as the emission limit value

Uncertainty

The uncertainty associated with the quoted result is at the 95% confidence interval

Reference Conditions

All results are expressed at 273 K and 101.3kPa. The oxygen correction is stated.

Monitoring Method Reference

The method stated is in accordance with the Environment Agency Technical Guidance Note M2.

Accreditation for use of Method

The details indicate the accreditation for the use of the complete monitoring method, e.g.MCERTS, UKAS. If use of the method is not accredited " NA" is stated

Operating Status

The details indicate the loading rate of the plant during monitoring

Emission Point Reference	Substance to be Monitored	Daily Emission Limit Value	Periodic Monitoring Result	Uncertainty (±)	Units	Reference Conditions 273 K, 101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Operating Status
Auxiliary Boiler 1 (BL210)	NOx (as NO ₂)	N/A	91.8	3.9	mg/Nm ³	Dry 3% O ₂	22-Jun-16	14:35-15:35	EN14792	UKAS / MCERTS	Normal
Auxiliary Boiler 1 (BL210)	O ₂	N/A	5.5	0.2	%	Dry	22-Jun-16	14:35-15:35	EN14789	UKAS / MCERTS	Normal
Auxiliary Boiler 1 (BL210)	CO	N/A	1.8	0.1	mg/Nm ³	Dry 3% O ₂	22-Jun-16	14:35-15:35	EN15058	UKAS / MCERTS	Normal
Auxiliary Boiler 2 (BL220)	NOx (as NO ₂)	N/A	90.4	3.9	mg/Nm ³	Dry 3% O ₂	22-Jun-16	13:37-14:25	EN14792	UKAS / MCERTS	Normal
Auxiliary Boiler 2 (BL220)	O ₂	N/A	5.8	0.2	%	Dry	22-Jun-16	13:37-14:25	EN14789	UKAS / MCERTS	Normal
Auxiliary Boiler 2 (BL220)	CO	N/A	0.6	0.0	mg/Nm ³	Dry 3% O ₂	22-Jun-16	13:37-14:25	EN15058	UKAS / MCERTS	Normal
Auxiliary Boiler 3 (BL230)	NOx (as NO ₂)	N/A	90.5	3.9	mg/Nm ³	Dry 3% O ₂	22-Jun-16	13:37-14:25	EN14792	UKAS / MCERTS	Normal
Auxiliary Boiler 3 (BL230)	O ₂	N/A	5.5	0.2	%	Dry	22-Jun-16	13:37-14:25	EN14789	UKAS / MCERTS	Normal
Auxiliary Boiler 3 (BL230)	CO	N/A	0.0	0.0	mg/Nm ³	Dry 3% O ₂	22-Jun-16	13:37-14:25	EN15058	UKAS / MCERTS	Normal
Auxiliary Boiler 4 (BL240)	NOx (as NO ₂)	N/A	100.5	4.3	mg/Nm ³	Dry 3% O ₂	22-Jun-16	12:15-13:15	EN14792	UKAS / MCERTS	Normal
Auxiliary Boiler 4 (BL240)	O ₂	N/A	5.2	0.2	%	Dry	22-Jun-16	12:15-13:15	EN14789	UKAS / MCERTS	Normal
Auxiliary Boiler 4 (BL240)	CO	N/A	2.1	0.1	mg/Nm ³	Dry 3% O ₂	22-Jun-16	12:15-13:15	EN15058	UKAS / MCERTS	Normal
Auxiliary Boiler 5 (BL250)	NOx (as NO ₂)	N/A	91.8	3.9	mg/Nm ³	Dry 3% O ₂	22-Jun-16	12:15-13:15	EN14792	UKAS / MCERTS	Normal
Auxiliary Boiler 5 (BL250)	O ₂	N/A	5.7	0.2	%	Dry	22-Jun-16	12:15-13:15	EN14789	UKAS / MCERTS	Normal
Auxiliary Boiler 5 (BL250)	CO	N/A	0.5	0.0	mg/Nm ³	Dry 3% O ₂	22-Jun-16	12:15-13:15	EN15058	UKAS / MCERTS	Normal

Results in red were below the Limit of Detection (expressed at LOD)

Operating Information

Process Type	Auxiliary Boilers 1,2,3,4 and 5
Process Duration	As required for site process steam demands.
Fuel	Gas
Feedstock	N/A
Abatement	N/A
Load	Variable firing

Emission Point Reference	Date	Process Type	Process Duration	Fuel	Feedstock	Abatement	Load	Comparison of Operator CEMS and Periodic Monitoring Results		
								Substance	CEMS Results	Periodic Monitoring Results - mg/Nm3 @ Ref O ₂ dry gas
Auxiliary Boiler 1 (BL210)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	NOx (as NO2)	NA	91.8
Auxiliary Boiler 1 (BL210)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	O2	NA	5.5
Auxiliary Boiler 1 (BL210)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	CO	NA	1.8
Auxiliary Boiler 2 (BL220)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	NOx (as NO2)	NA	90.4
Auxiliary Boiler 2 (BL220)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	O2	NA	5.8
Auxiliary Boiler 2 (BL220)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	CO	NA	0.6
Auxiliary Boiler 3 (BL230)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	NOx (as NO2)	NA	90.5
Auxiliary Boiler 3 (BL230)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	O2	NA	5.5
Auxiliary Boiler 3 (BL230)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	CO	NA	0.0
Auxiliary Boiler 4 (BL240)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	NOx (as NO2)	NA	100.5
Auxiliary Boiler 4 (BL240)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	O2	NA	5.2
Auxiliary Boiler 4 (BL240)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	CO	NA	2.1
Auxiliary Boiler 5 (BL250)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	NOx (as NO2)	NA	91.8
Auxiliary Boiler 5 (BL250)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	O2	NA	5.7
Auxiliary Boiler 5 (BL250)	22-Jun-16	Auxiliary Boiler	As required	Gas	N/A	N/A	50%	CO	NA	0.5

Monitoring Deviations

Substance Deviations State any substance not monitored during the monitoring campaign, together with the reason for the omission from the monitoring campaign. If not applicable state "NA"

Monitoring Deviations State any deviation from the standard method, the consequences, and the reason for the deviation. If not applicable state "NA"

Other Relevant Issues State any other information relevant to the monitoring campaign. If not applicable state "NA"

Emission Point Reference	Substance Deviations	Monitoring Deviations	Other Relevant Issues
Auxiliary Boiler 1 (BL210)	N/A	N/A	N/A
Auxiliary Boiler 2 (BL220)	N/A	N/A	The testing of Boiler 2 was conducted at <1 hour due to low steam demand from main plant.
Auxiliary Boiler 3 (BL230)	N/A	N/A	The testing of Boiler 3 was conducted at <1 hour due to low steam demand from main plant.
Auxiliary Boiler 4 (BL240)	N/A	N/A	N/A
Auxiliary Boiler 5 (BL250)	N/A	N/A	N/A

Report for the Periodic Monitoring of Emissions to Air

Part 2: Supporting Information

Permit Number: MP3337SH/V008

Operator: Uniper

Installation: Connahs Quay Power Station - Auxilliary Boilers

Monitoring dates: 22-Jun-2016

Appendix 1 - General Information

Section 1: MCERTS Monitoring organisation staff details

Role	Name	MCERTS Registration Number	MCERTS Qualifications
Team Leader:	Mark Muter	MM02098	MCERTS Level 2 TE4
(Certificates Next Page)			

Section 2: Monitoring organisation method details

Substance	Standard Method	Monitoring Organisation Work Instruction
Oxygen	EN14789	TOI_APT_004-1
CO	EN15058	TOI_APT_004-1
NOx	EN14792	TOI_APT_004-1

Section 3: Equipment References

Instrument	Make	Type	IV No
Oxygen analyser	Horiba PG250	Chemiluminescence	T1077/T1191
NOx analyser	Horiba PG250	Zirconia	T1077/T1191
CO analyser	Horiba PG250	ND-IR	T1077/T1191
Data logger	Chessell	4100g	T1006
Gas conditioner	ABB	SCC-C	T1467
Pump	ABB	SCC-F	T1198
Heated line	Winkler	15m/5m	T1234/T1015

Gases	Bottle Number	Concentration
O2 %	T4902	5.97%
CO ppm	139085	510 ppm
NO ppm	147745	253 ppm



Certificate of Personnel Competence

This is to certify that

Mark Muter

has been assessed by Sira Certification Service and
has demonstrated competence to the required standard of

Level 2 (team leader)

as defined in

**MCERTS Personnel Competency Standard
for Manual Stack-Emission Monitoring : October 2014, Version 9**

for the following Technical Endorsements:

TE4 - Gases/vapours by instrumental techniques

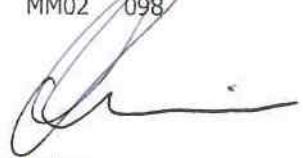
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Certificate issued : Nov 2015
Level 2 renewal date : Nov 2020
H&S renewal date : May 2019

Certificate No : Sira MP03 0307/6
Registration No : MM02 098

Certificate expiry date : May 2019


Joe Prince
Deputy Certification Manager

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Sira Certification Service

Unit 6, Hawarden Industrial Park,
Hawarden, Deeside CH5 3US
Tel: +44 (0)1244 670900

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Appendix 2 - Further Appendices

Section 1:

Auxiliary Boiler gas measurements
Gas analyser calibrations.

Section 2:

Gas Bottle Certificates
Uncertainty Calculations
2200 Testing multiple

Appendix 2 - Section 1

Connahs Quay						
BL210 data		ppm	mg/Nm3	ppm	mg/Nm3	%
Auxiliary boiler		NOx BL210	NOx BL210	CO BL210	CO BL210	O2 BL210
22/06/2016	14:35:50	37.09	91.28	11.39	17.06	5.98
22/06/2016	14:36:20	37.44	91.59	10.11	15.05	5.89
22/06/2016	14:36:50	37.76	91.95	10.5	15.56	5.82
22/06/2016	14:37:20	38.03	92.61	10.59	15.70	5.82
22/06/2016	14:37:50	37.92	92.52	6.91	10.26	5.85
22/06/2016	14:38:20	37.97	92.58	7.87	11.68	5.84
22/06/2016	14:38:50	38.46	93.65	6.91	10.24	5.82
22/06/2016	14:39:20	39.14	94.56	6.78	9.97	5.7
22/06/2016	14:39:50	39.46	95.02	8.98	13.16	5.65
22/06/2016	14:40:20	37.49	90.75	2.18	3.21	5.73
22/06/2016	14:40:50	35.73	86.38	0.72	1.06	5.71
22/06/2016	14:41:20	35.73	86.27	0.47	0.69	5.69
22/06/2016	14:41:50	36.52	87.89	0.5	0.73	5.64
22/06/2016	14:42:20	37.53	89.67	0.41	0.60	5.53
22/06/2016	14:42:50	38.45	91.28	0.89	1.29	5.43
22/06/2016	14:43:20	38.5	91.34	0.61	0.88	5.42
22/06/2016	14:43:50	38.48	91.24	0.5	0.72	5.41
22/06/2016	14:44:20	38.17	90.62	0.69	1.00	5.43
22/06/2016	14:44:50	37.77	90.02	0.52	0.75	5.49
22/06/2016	14:45:20	37.7	89.85	0.49	0.71	5.49
22/06/2016	14:45:50	37.94	90.48	0.7	1.02	5.5
22/06/2016	14:46:20	38.18	90.88	0.55	0.80	5.47
22/06/2016	14:46:50	38.75	91.82	0.16	0.23	5.4
22/06/2016	14:47:20	38.89	92.03	0.63	0.91	5.38
22/06/2016	14:47:50	39.03	92.30	0.62	0.89	5.37
22/06/2016	14:48:20	39	92.23	0.23	0.33	5.37
22/06/2016	14:48:50	38.74	91.74	0.54	0.78	5.39
22/06/2016	14:49:20	38.72	91.69	0.68	0.98	5.39
22/06/2016	14:49:50	38.45	91.11	0.62	0.89	5.4
22/06/2016	14:50:20	38.57	91.33	0.59	0.85	5.39
22/06/2016	14:50:50	38.71	91.61	0.53	0.76	5.38
22/06/2016	14:51:20	38.89	91.97	0.58	0.83	5.37
22/06/2016	14:51:50	39.18	92.54	0.62	0.89	5.35
22/06/2016	14:52:20	39.1	92.35	0.61	0.88	5.35
22/06/2016	14:52:50	38.64	91.50	0.72	1.04	5.39
22/06/2016	14:53:20	37.72	89.95	0.57	0.83	5.5
22/06/2016	14:53:50	37.35	89.59	0.47	0.69	5.59
22/06/2016	14:54:20	37.14	89.26	0.24	0.35	5.62
22/06/2016	14:54:50	36.87	88.73	0.7	1.03	5.64
22/06/2016	14:55:20	36.71	88.57	0.77	1.13	5.68
22/06/2016	14:55:50	36.81	88.64	0.64	0.94	5.65
22/06/2016	14:56:20	36.88	88.98	0.56	0.82	5.68
22/06/2016	14:56:50	36.94	89.07	0.72	1.06	5.67
22/06/2016	14:57:20	36.68	88.50	0.44	0.65	5.68
22/06/2016	14:57:50	36.85	88.85	0.44	0.65	5.67
22/06/2016	14:58:20	37.12	89.33	0.31	0.45	5.64
22/06/2016	14:58:50	36.9	88.92	0.49	0.72	5.66

22/06/2016	14:59:20	36.96	89.18	0.58	0.85	5.68
22/06/2016	14:59:50	36.95	89.10	0.21	0.31	5.67
22/06/2016	15:00:20	36.93	88.99	0.88	1.29	5.66
22/06/2016	15:00:50	36.98	89.05	0.47	0.69	5.65
22/06/2016	15:01:20	37.13	89.30	0.24	0.35	5.63
22/06/2016	15:01:50	37.11	89.07	0.73	1.07	5.6
22/06/2016	15:02:20	37.17	89.28	0.55	0.80	5.61
22/06/2016	15:02:50	37.03	89.00	0.2	0.29	5.62
22/06/2016	15:03:20	37.1	89.17	0.27	0.39	5.62
22/06/2016	15:03:50	37.3	89.47	0.35	0.51	5.59
22/06/2016	15:04:20	37.34	89.57	-0.08	-0.12	5.59
22/06/2016	15:04:50	37.03	88.82	0.21	0.31	5.59
22/06/2016	15:05:20	37.07	88.92	0.64	0.93	5.59
22/06/2016	15:05:50	37.34	89.51	0.68	0.99	5.58
22/06/2016	15:06:20	36.97	88.68	0.41	0.60	5.59
22/06/2016	15:06:50	37	88.75	0.67	0.98	5.59
22/06/2016	15:07:20	37.12	88.98	0.47	0.69	5.58
22/06/2016	15:07:50	37.16	89.02	0.8	1.17	5.57
22/06/2016	15:08:20	37.18	89.18	0.45	0.66	5.59
22/06/2016	15:08:50	36.92	88.73	0.46	0.67	5.62
22/06/2016	15:09:20	36.92	88.62	0.19	0.28	5.6
22/06/2016	15:09:50	37.02	88.86	0.35	0.51	5.6
22/06/2016	15:10:20	37.03	88.94	0.29	0.42	5.61
22/06/2016	15:10:50	37.45	89.83	0.02	0.03	5.59
22/06/2016	15:11:20	37.66	90.34	0.26	0.38	5.59
22/06/2016	15:11:50	37.72	90.48	0.36	0.53	5.59
22/06/2016	15:12:20	37.76	90.63	-0.12	-0.18	5.6
22/06/2016	15:12:50	37.68	90.38	0.51	0.74	5.59
22/06/2016	15:13:20	37.39	89.69	0.67	0.98	5.59
22/06/2016	15:13:50	37.63	90.32	0.28	0.41	5.6
22/06/2016	15:14:20	39.1	93.01	0.72	1.04	5.46
22/06/2016	15:14:50	40.52	95.22	0.7	1.00	5.27
22/06/2016	15:15:20	40.02	94.10	0.4	0.57	5.28
22/06/2016	15:15:50	39.03	92.60	0.59	0.85	5.42
22/06/2016	15:16:20	38.64	92.03	0.48	0.70	5.48
22/06/2016	15:16:50	38.63	92.01	0.58	0.84	5.48
22/06/2016	15:17:20	38.99	92.68	0.46	0.67	5.45
22/06/2016	15:17:50	39.57	93.70	0.9	1.30	5.39
22/06/2016	15:18:20	40.02	94.59	1.03	1.48	5.36
22/06/2016	15:18:50	40.45	95.36	0.77	1.10	5.32
22/06/2016	15:19:20	40.73	95.83	1.05	1.50	5.29
22/06/2016	15:19:50	40.01	94.56	0.27	0.39	5.36
22/06/2016	15:20:20	39.12	92.99	0.16	0.23	5.45
22/06/2016	15:20:50	39.17	93.23	0.36	0.52	5.47
22/06/2016	15:21:20	39.72	94.18	0.63	0.91	5.41
22/06/2016	15:21:50	39.88	94.31	0.77	1.11	5.37
22/06/2016	15:22:20	39.67	93.82	0.85	1.22	5.37
22/06/2016	15:22:50	38.94	92.74	-0.08	-0.12	5.48
22/06/2016	15:23:20	39.01	92.91	0.43	0.62	5.48
22/06/2016	15:23:50	39.03	93.08	0.34	0.49	5.5

22/06/2016	15:24:20	38.91	92.73	0.53	0.77	5.49
22/06/2016	15:24:50	39.71	94.40	0.66	0.95	5.45
22/06/2016	15:25:20	40.11	94.86	0.61	0.88	5.37
22/06/2016	15:25:50	40.16	94.86	0.63	0.91	5.35
22/06/2016	15:26:20	40.13	94.72	0.77	1.11	5.34
22/06/2016	15:26:50	40.23	94.96	0.65	0.93	5.34
22/06/2016	15:27:20	40.11	94.62	0.49	0.70	5.33
22/06/2016	15:27:50	40.24	94.80	0.65	0.93	5.31
22/06/2016	15:28:20	40.07	94.46	0.47	0.67	5.32
22/06/2016	15:28:50	40.57	95.58	0.55	0.79	5.31
22/06/2016	15:29:20	41.31	96.95	0.67	0.96	5.25
22/06/2016	15:29:50	41.3	96.81	0.96	1.37	5.23
22/06/2016	15:30:20	41.38	96.93	1.11	1.58	5.22
22/06/2016	15:30:50	41.79	97.77	0.73	1.04	5.2
22/06/2016	15:31:20	41.62	97.31	0.91	1.30	5.19
22/06/2016	15:31:50	41.72	97.54	0.58	0.83	5.19
22/06/2016	15:32:20	41.51	97.11	0.79	1.13	5.2
22/06/2016	15:32:50	41.5	97.03	0.92	1.31	5.19
22/06/2016	15:33:20	41.25	96.57	0.91	1.30	5.21
22/06/2016	15:33:50	41.25	96.87	0.76	1.09	5.26
22/06/2016	15:34:20	41.14	96.49	0.97	1.38	5.24
22/06/2016	15:34:50	40.1	94.96	0.63	0.91	5.39
Average		38.51	91.82	1.19	1.75	5.50

Connahs Quay						
BL220		ppm	mg/Nm3	ppm	mg/Nm3	%
Auxiliary boilers		NOx BL220	NOx BL220	CO BL220	CO BL220	O2 BL220
22/06/2016	13:37:20	39.61	94.89	-1.22	-1.78	5.57
22/06/2016	13:37:50	39.67	94.97	-1.09	-1.59	5.56
22/06/2016	13:38:20	39.92	95.51	-1.01	-1.47	5.55
22/06/2016	13:38:50	40.18	96.01	-1.31	-1.91	5.53
22/06/2016	13:39:20	35.88	87.26	0.05	0.07	5.8
22/06/2016	13:39:50	35.64	86.84	0.22	0.33	5.83
22/06/2016	13:40:20	35.77	87.33	0.58	0.86	5.86
22/06/2016	13:40:50	35.64	87.07	-0.03	-0.04	5.87
22/06/2016	13:41:20	35.47	86.83	0.61	0.91	5.9
22/06/2016	13:41:50	35.55	86.97	0.35	0.52	5.89
22/06/2016	13:42:20	35.81	87.31	0.76	1.13	5.84
22/06/2016	13:42:50	35.9	87.48	0.42	0.62	5.83
22/06/2016	13:43:20	36.09	87.82	0.51	0.76	5.81
22/06/2016	13:43:50	36.26	88.18	0.67	0.99	5.8
22/06/2016	13:44:20	36.01	87.63	0.08	0.12	5.81
22/06/2016	13:44:50	36.17	88.02	0.54	0.80	5.81
22/06/2016	13:45:20	35.95	87.48	0.36	0.53	5.81
22/06/2016	13:45:50	36.3	88.33	0.47	0.70	5.81
22/06/2016	13:46:20	36.22	88.20	0.31	0.46	5.82
22/06/2016	13:46:50	36.24	88.13	0.69	1.02	5.8
22/06/2016	13:47:20	36.31	88.36	0.7	1.04	5.81
22/06/2016	13:47:50	36.39	88.50	0.55	0.81	5.8
22/06/2016	13:48:20	36.16	88.11	0.48	0.71	5.83
22/06/2016	13:48:50	36.46	88.61	0.33	0.49	5.79
22/06/2016	13:49:20	36.57	88.87	0.38	0.56	5.79
22/06/2016	13:49:50	36.59	88.92	0.68	1.01	5.79
22/06/2016	13:50:20	36.73	89.20	0.53	0.78	5.78
22/06/2016	13:50:50	37.05	89.98	0.89	1.32	5.78
22/06/2016	13:51:20	36.83	89.45	0.45	0.67	5.78
22/06/2016	13:51:50	36.91	89.64	0.77	1.14	5.78
22/06/2016	13:52:20	36.95	89.68	0.4	0.59	5.77
22/06/2016	13:52:50	37.01	90.00	0.37	0.55	5.8
22/06/2016	13:53:20	36.87	89.60	0.74	1.09	5.79
22/06/2016	13:53:50	36.8	89.49	0.67	0.99	5.8
22/06/2016	13:54:20	36.95	89.86	0.32	0.47	5.8
22/06/2016	13:54:50	37.14	90.26	0.62	0.92	5.79
22/06/2016	13:55:20	37.02	89.97	0.4	0.59	5.79
22/06/2016	13:55:50	37.27	90.58	0.8	1.18	5.79
22/06/2016	13:56:20	37.42	90.88	0.56	0.83	5.78
22/06/2016	13:56:50	37.66	91.28	0.54	0.80	5.75
22/06/2016	13:57:20	37.55	91.02	0.4	0.59	5.75
22/06/2016	13:57:50	37.3	90.53	0.64	0.95	5.77
22/06/2016	13:58:20	37.79	91.48	0.45	0.66	5.73
22/06/2016	13:58:50	37.67	91.31	0.61	0.90	5.75
22/06/2016	13:59:20	37.17	90.33	0.52	0.77	5.79
22/06/2016	13:59:50	37.27	90.64	0.59	0.87	5.8
22/06/2016	14:00:20	37.23	90.54	0.39	0.58	5.8
22/06/2016	14:00:50	37.35	90.83	0.77	1.14	5.8

22/06/2016	14:01:20	37.41	90.98	0.82	1.21	5.8
22/06/2016	14:01:50	37.6	91.38	0.72	1.07	5.79
22/06/2016	14:02:20	37.55	91.14	0.14	0.21	5.77
22/06/2016	14:02:50	37.54	91.17	0.15	0.22	5.78
22/06/2016	14:03:20	37.59	91.35	0.37	0.55	5.79
22/06/2016	14:03:50	37.65	91.50	0.46	0.68	5.79
22/06/2016	14:04:20	37.54	91.17	0.78	1.15	5.78
22/06/2016	14:04:50	37.58	91.33	0.73	1.08	5.79
22/06/2016	14:05:20	37.61	91.34	0.62	0.92	5.78
22/06/2016	14:05:50	37.68	91.39	0.79	1.17	5.76
22/06/2016	14:06:20	37.36	90.85	0.26	0.38	5.8
22/06/2016	14:06:50	37.4	90.95	0.49	0.73	5.8
22/06/2016	14:07:20	37.53	91.27	0.87	1.29	5.8
22/06/2016	14:07:50	37.48	91.09	0.52	0.77	5.79
22/06/2016	14:08:20	37.68	91.63	0.3	0.44	5.8
22/06/2016	14:08:50	37.8	91.74	0.5	0.74	5.77
22/06/2016	14:09:20	37.95	91.93	0.75	1.11	5.74
22/06/2016	14:09:50	37.77	91.55	0.37	0.55	5.75
22/06/2016	14:10:20	37.6	91.26	0.51	0.75	5.77
22/06/2016	14:10:50	37.52	91.12	0.28	0.41	5.78
22/06/2016	14:11:20	37.46	90.98	0.3	0.44	5.78
22/06/2016	14:11:50	37.36	90.85	0.63	0.93	5.8
22/06/2016	14:12:20	37.41	90.92	0.46	0.68	5.79
22/06/2016	14:12:50	37.72	91.55	0.56	0.83	5.77
22/06/2016	14:13:20	37.66	91.40	0.49	0.72	5.77
22/06/2016	14:13:50	37.3	90.71	0.52	0.77	5.8
22/06/2016	14:14:20	37.57	91.24	0.77	1.14	5.78
22/06/2016	14:14:50	37.72	91.49	0.45	0.66	5.76
22/06/2016	14:15:20	37.55	91.20	0.42	0.62	5.78
22/06/2016	14:15:50	37.67	91.49	0.63	0.93	5.78
22/06/2016	14:16:20	37.74	91.66	0.64	0.95	5.78
22/06/2016	14:16:50	37.88	91.88	0.36	0.53	5.76
22/06/2016	14:17:20	37.9	91.81	0.62	0.91	5.74
22/06/2016	14:17:50	37.53	91.09	0.36	0.53	5.77
22/06/2016	14:18:20	37.46	90.80	0.57	0.84	5.75
22/06/2016	14:18:50	37.29	90.56	0.55	0.81	5.78
22/06/2016	14:19:20	37.62	91.19	0.48	0.71	5.75
22/06/2016	14:19:50	37.5	90.96	0.49	0.72	5.76
22/06/2016	14:20:20	37.46	90.92	0.66	0.98	5.77
22/06/2016	14:20:50	37.47	90.94	0.36	0.53	5.77
22/06/2016	14:21:20	37.52	91.06	0.73	1.08	5.77
22/06/2016	14:21:50	37.6	91.20	0.61	0.90	5.76
22/06/2016	14:22:20	37.7	91.38	0.72	1.06	5.75
22/06/2016	14:22:50	37.34	90.69	0.23	0.34	5.78
22/06/2016	14:23:20	37.25	90.47	0.15	0.22	5.78
22/06/2016	14:23:50	37.41	90.68	0.32	0.47	5.75
22/06/2016	14:24:20	37.54	90.87	0.28	0.41	5.73
22/06/2016	14:24:50	37.79	91.42	0.68	1.00	5.72
22/06/2016	14:25:20	37.63	91.15	-0.06	-0.09	5.74
22/06/2016	14:25:50	37.59	91.17	0.39	0.58	5.76
Average		37.24	90.41	0.43	0.64	5.78

Connahs Quay						
BL230		ppm	mg/Nm3	ppm	mg/Nm3	%
Auxiliary boilers		NOx BL230	NOx BL230	CO BL230	CO BL230	O2 BL230
22/06/2016	13:37:20	38.34	93.71	-0.209	-0.31	5.876
22/06/2016	13:37:50	39.332	94.68	-2.675	-3.92	5.644
22/06/2016	13:38:20	39.716	95.26	-2.835	-4.14	5.589
22/06/2016	13:38:50	40.024	96.03	-2.978	-4.35	5.594
22/06/2016	13:39:20	36.689	87.79	-2.507	-3.65	5.552
22/06/2016	13:39:50	35.53	85.08	-1.326	-1.93	5.564
22/06/2016	13:40:20	35.717	85.45	-1.399	-2.04	5.55
22/06/2016	13:40:50	35.899	85.93	-1.707	-2.49	5.557
22/06/2016	13:41:20	36.083	86.29	-1.108	-1.61	5.543
22/06/2016	13:41:50	36.212	86.56	-1.596	-2.32	5.537
22/06/2016	13:42:20	36.268	86.69	-1.602	-2.33	5.535
22/06/2016	13:42:50	36.402	86.97	-1.616	-2.35	5.529
22/06/2016	13:43:20	36.488	87.21	-1.282	-1.87	5.534
22/06/2016	13:43:50	36.68	87.53	-1.373	-1.99	5.51
22/06/2016	13:44:20	36.567	87.18	-1.08	-1.57	5.496
22/06/2016	13:44:50	36.885	87.79	-1.566	-2.27	5.47
22/06/2016	13:45:20	37.063	88.24	-1.845	-2.67	5.474
22/06/2016	13:45:50	36.921	87.95	-1.822	-2.64	5.483
22/06/2016	13:46:20	36.946	88.10	-1.891	-2.74	5.498
22/06/2016	13:46:50	36.988	88.13	-1.974	-2.86	5.486
22/06/2016	13:47:20	37.078	88.25	-1.68	-2.43	5.47
22/06/2016	13:47:50	37.472	89.12	-2.222	-3.22	5.457
22/06/2016	13:48:20	37.584	89.43	-1.539	-2.23	5.465
22/06/2016	13:48:50	37.534	89.36	-1.663	-2.41	5.473
22/06/2016	13:49:20	37.521	89.33	-1.806	-2.62	5.474
22/06/2016	13:49:50	37.576	89.41	-1.386	-2.01	5.466
22/06/2016	13:50:20	37.986	90.36	-1.36	-1.97	5.461
22/06/2016	13:50:50	37.813	90.07	-1.412	-2.05	5.482
22/06/2016	13:51:20	37.585	89.47	-1.238	-1.79	5.471
22/06/2016	13:51:50	37.435	89.13	-1.179	-1.71	5.475
22/06/2016	13:52:20	37.449	89.20	-1.509	-2.19	5.481
22/06/2016	13:52:50	37.526	89.30	-1.358	-1.97	5.466
22/06/2016	13:53:20	37.899	90.11	-1.701	-2.46	5.454
22/06/2016	13:53:50	37.854	89.94	-1.395	-2.02	5.442
22/06/2016	13:54:20	38.01	90.33	-1.267	-1.83	5.446
22/06/2016	13:54:50	37.881	90.07	-1.985	-2.87	5.453
22/06/2016	13:55:20	38.074	90.48	-2.144	-3.10	5.446
22/06/2016	13:55:50	37.949	90.26	-1.938	-2.81	5.458
22/06/2016	13:56:20	38.04	90.45	-1.804	-2.61	5.455
22/06/2016	13:56:50	38.185	90.82	-1.697	-2.46	5.459
22/06/2016	13:57:20	38.172	90.75	-1.69	-2.45	5.451
22/06/2016	13:57:50	38.275	90.94	-1.853	-2.68	5.443
22/06/2016	13:58:20	38.188	90.74	-1.836	-2.66	5.443
22/06/2016	13:58:50	38.2	90.81	-1.981	-2.87	5.45
22/06/2016	13:59:20	38.241	90.80	-1.723	-2.49	5.433
22/06/2016	13:59:50	38.204	90.72	-1.829	-2.64	5.433
22/06/2016	14:00:20	38.134	90.67	-1.96	-2.84	5.454
22/06/2016	14:00:50	38.232	90.85	-1.593	-2.30	5.445

22/06/2016	14:01:20	38.315	91.11	-1.767	-2.56	5.455
22/06/2016	14:01:50	38.269	91.00	-1.793	-2.60	5.455
22/06/2016	14:02:20	38.217	90.79	-1.508	-2.18	5.44
22/06/2016	14:02:50	38.367	91.18	-1.623	-2.35	5.446
22/06/2016	14:03:20	38.529	91.53	-1.5	-2.17	5.44
22/06/2016	14:03:50	38.429	91.31	-1.958	-2.83	5.443
22/06/2016	14:04:20	38.517	91.41	-1.627	-2.35	5.424
22/06/2016	14:04:50	38.541	91.46	-1.557	-2.25	5.423
22/06/2016	14:05:20	38.405	91.08	-1.519	-2.19	5.414
22/06/2016	14:05:50	38.565	91.48	-1.793	-2.59	5.417
22/06/2016	14:06:20	38.583	91.56	-1.641	-2.37	5.423
22/06/2016	14:06:50	38.573	91.60	-1.72	-2.49	5.434
22/06/2016	14:07:20	38.794	92.09	-1.774	-2.56	5.428
22/06/2016	14:07:50	38.811	92.05	-1.698	-2.45	5.414
22/06/2016	14:08:20	38.607	91.62	-1.771	-2.56	5.424
22/06/2016	14:08:50	38.626	91.72	-2.095	-3.03	5.434
22/06/2016	14:09:20	38.6	91.70	-1.845	-2.67	5.441
22/06/2016	14:09:50	38.563	91.64	-1.52	-2.20	5.445
22/06/2016	14:10:20	38.526	91.43	-1.714	-2.48	5.424
22/06/2016	14:10:50	38.608	91.59	-2.012	-2.91	5.419
22/06/2016	14:11:20	38.681	91.85	-2.084	-3.01	5.433
22/06/2016	14:11:50	38.567	91.61	-1.864	-2.70	5.439
22/06/2016	14:12:20	38.218	90.91	-2.006	-2.90	5.46
22/06/2016	14:12:50	38.277	91.02	-1.804	-2.61	5.456
22/06/2016	14:13:20	38.387	91.23	-1.999	-2.89	5.447
22/06/2016	14:13:50	38.579	91.65	-2.045	-2.96	5.44
22/06/2016	14:14:20	38.409	91.34	-1.787	-2.59	5.456
22/06/2016	14:14:50	38.413	91.20	-1.85	-2.67	5.431
22/06/2016	14:15:20	38.471	91.31	-1.673	-2.42	5.426
22/06/2016	14:15:50	38.558	91.53	-1.846	-2.67	5.428
22/06/2016	14:16:20	38.503	91.49	-1.783	-2.58	5.444
22/06/2016	14:16:50	38.488	91.37	-1.741	-2.52	5.429
22/06/2016	14:17:20	38.676	91.84	-1.633	-2.36	5.434
22/06/2016	14:17:50	38.372	91.15	-1.762	-2.55	5.439
22/06/2016	14:18:20	38.627	91.68	-1.979	-2.86	5.426
22/06/2016	14:18:50	38.524	91.34	-1.868	-2.70	5.41
22/06/2016	14:19:20	38.792	91.91	-1.774	-2.56	5.398
22/06/2016	14:19:50	38.767	91.87	-1.993	-2.87	5.402
22/06/2016	14:20:20	38.758	91.97	-2.146	-3.10	5.422
22/06/2016	14:20:50	39.086	92.61	-2.241	-3.23	5.399
22/06/2016	14:21:20	38.855	92.08	-2.049	-2.96	5.403
22/06/2016	14:21:50	38.963	92.29	-1.946	-2.81	5.394
22/06/2016	14:22:20	38.779	91.93	-1.412	-2.04	5.407
22/06/2016	14:22:50	38.951	92.25	-1.633	-2.35	5.393
22/06/2016	14:23:20	38.865	92.14	-1.934	-2.79	5.408
22/06/2016	14:23:50	38.818	92.00	-1.578	-2.28	5.404
22/06/2016	14:24:20	38.745	91.82	-1.71	-2.47	5.403
22/06/2016	14:24:50	38.781	91.92	-1.711	-2.47	5.405
22/06/2016	14:25:20	38.676	91.81	-1.532	-2.21	5.428
22/06/2016	14:25:50	38.677	90.50	-2.168	-3.09	5.202
Average		38.07	90.54	-1.75	-2.53	5.46

Connahs Quay						
BL240		ppm	mg/Nm3	ppm	mg/Nm3	%
Auxiliary boilers		NOx BL240	NOx BL240	CO BL240	CO BL240	O2 BL240
22/06/2016	12:15:50	32.24	85.31	-1.12	-1.80	7.03
22/06/2016	12:16:20	32.48	85.82	-0.88	-1.42	7.01
22/06/2016	12:16:50	32.83	86.68	-0.64	-1.03	7
22/06/2016	12:17:20	32.93	86.70	-0.85	-1.36	6.96
22/06/2016	12:17:50	33.09	86.93	-0.81	-1.30	6.93
22/06/2016	12:18:20	33.23	86.93	-0.58	-0.92	6.87
22/06/2016	12:18:50	33.34	87.09	-0.9	-1.43	6.85
22/06/2016	12:19:20	33.64	87.69	-0.82	-1.30	6.82
22/06/2016	12:19:50	33.76	88.07	-1.1	-1.75	6.83
22/06/2016	12:20:20	34.29	89.39	-1.13	-1.79	6.82
22/06/2016	12:20:50	34.67	90.19	-0.87	-1.38	6.79
22/06/2016	12:21:20	34.5	89.68	-1.13	-1.79	6.78
22/06/2016	12:21:50	34.91	90.81	-1.08	-1.71	6.79
22/06/2016	12:22:20	35.85	92.73	-0.95	-1.50	6.71
22/06/2016	12:22:50	41.57	97.87	1.19	1.71	5.3
22/06/2016	12:23:20	41.9	98.15	1.54	2.20	5.22
22/06/2016	12:23:50	42.14	98.40	1.56	2.22	5.17
22/06/2016	12:24:20	42.33	98.59	1.42	2.01	5.13
22/06/2016	12:24:50	42.55	98.98	1.26	1.78	5.11
22/06/2016	12:25:20	42.75	99.32	1.22	1.73	5.09
22/06/2016	12:25:50	42.83	99.57	1.73	2.45	5.1
22/06/2016	12:26:20	43.03	99.91	1.56	2.20	5.08
22/06/2016	12:26:50	42.92	99.72	1.45	2.05	5.09
22/06/2016	12:27:20	43.2	100.18	1.42	2.00	5.06
22/06/2016	12:27:50	43.43	100.65	1.56	2.20	5.05
22/06/2016	12:28:20	43.56	101.01	1.94	2.74	5.06
22/06/2016	12:28:50	43.57	100.97	1.31	1.85	5.05
22/06/2016	12:29:20	43.25	100.30	1.55	2.19	5.06
22/06/2016	12:29:50	43.47	100.81	1.7	2.40	5.06
22/06/2016	12:30:20	43.49	100.92	1.75	2.47	5.07
22/06/2016	12:30:50	43.8	101.51	1.27	1.79	5.05
22/06/2016	12:31:20	43.86	101.52	1.39	1.96	5.03
22/06/2016	12:31:50	44.02	101.89	1.7	2.40	5.03
22/06/2016	12:32:20	43.92	101.53	1.74	2.45	5.01
22/06/2016	12:32:50	43.96	101.62	1.48	2.08	5.01
22/06/2016	12:33:20	43.98	101.67	1.5	2.11	5.01
22/06/2016	12:33:50	44.03	101.66	1.78	2.50	4.99
22/06/2016	12:34:20	44.01	101.61	1.71	2.40	4.99
22/06/2016	12:34:50	44	101.65	2.02	2.84	5
22/06/2016	12:35:20	44.16	101.96	1.93	2.71	4.99
22/06/2016	12:35:50	44.27	102.34	1.82	2.56	5.01
22/06/2016	12:36:20	44.5	102.81	1.34	1.88	5
22/06/2016	12:36:50	44.48	102.76	1.34	1.88	5
22/06/2016	12:37:20	44.42	102.62	1.97	2.77	5
22/06/2016	12:37:50	44.43	102.65	1.73	2.43	5
22/06/2016	12:38:20	44.6	102.91	1.52	2.13	4.98
22/06/2016	12:38:50	44.67	103.14	1.65	2.32	4.99

22/06/2016	12:39:20	44.81	103.59	1.6	2.25	5.01
22/06/2016	12:39:50	44.94	103.89	1.78	2.50	5.01
22/06/2016	12:40:20	44.88	103.75	1.45	2.04	5.01
22/06/2016	12:40:50	44.84	103.53	1.74	2.45	4.99
22/06/2016	12:41:20	44.95	103.78	1.21	1.70	4.99
22/06/2016	12:41:50	45.04	103.99	1.61	2.26	4.99
22/06/2016	12:42:20	45.11	104.15	1.59	2.23	4.99
22/06/2016	12:42:50	44.85	103.62	1.69	2.38	5
22/06/2016	12:43:20	45.08	104.08	1.78	2.50	4.99
22/06/2016	12:43:50	45.3	104.59	1.72	2.42	4.99
22/06/2016	12:44:20	45.11	104.15	1.63	2.29	4.99
22/06/2016	12:44:50	45.4	104.82	1.5	2.11	4.99
22/06/2016	12:45:20	45.43	104.82	1.86	2.61	4.98
22/06/2016	12:45:50	45.11	104.22	1.48	2.08	5
22/06/2016	12:46:20	45.21	104.38	1.81	2.54	4.99
22/06/2016	12:46:50	45.04	104.05	1.59	2.24	5
22/06/2016	12:47:20	45.14	104.22	1.6	2.25	4.99
22/06/2016	12:47:50	45.29	104.50	1.24	1.74	4.98
22/06/2016	12:48:20	45.12	104.11	1.55	2.18	4.98
22/06/2016	12:48:50	44.82	103.55	1.57	2.21	5
22/06/2016	12:49:20	44.99	103.81	1.73	2.43	4.98
22/06/2016	12:49:50	44.86	103.57	1.78	2.50	4.99
22/06/2016	12:50:20	45.03	103.84	1.55	2.18	4.97
22/06/2016	12:50:50	45.04	103.73	2.31	3.24	4.95
22/06/2016	12:51:20	44.87	103.02	2.31	3.23	4.9
22/06/2016	12:51:50	44.28	101.92	1.59	2.23	4.94
22/06/2016	12:52:20	44.71	102.65	2.54	3.55	4.9
22/06/2016	12:52:50	44.39	101.98	1.82	2.55	4.91
22/06/2016	12:53:20	44.36	101.91	2.13	2.98	4.91
22/06/2016	12:53:50	44.31	101.73	2.14	2.99	4.9
22/06/2016	12:54:20	44.1	101.31	2.28	3.19	4.91
22/06/2016	12:54:50	44.02	101.19	1.64	2.29	4.92
22/06/2016	12:55:20	43.93	101.05	1.64	2.30	4.93
22/06/2016	12:55:50	44.06	101.47	1.55	2.17	4.95
22/06/2016	12:56:20	43.92	101.15	1.6	2.24	4.95
22/06/2016	12:56:50	43.97	101.27	1.82	2.55	4.95
22/06/2016	12:57:20	43.85	100.99	1.79	2.51	4.95
22/06/2016	12:57:50	43.99	101.19	1.43	2.00	4.93
22/06/2016	12:58:20	43.68	100.41	2.06	2.88	4.92
22/06/2016	12:58:50	43.84	100.65	1.98	2.77	4.9
22/06/2016	12:59:20	43.82	100.73	2.02	2.83	4.92
22/06/2016	12:59:50	43.73	100.65	1.75	2.45	4.94
22/06/2016	13:00:20	43.9	100.85	2.08	2.91	4.91
22/06/2016	13:00:50	44.12	101.17	2.32	3.24	4.88
22/06/2016	13:01:20	44.28	101.35	2.47	3.44	4.85
22/06/2016	13:01:50	44.44	101.59	2.43	3.38	4.83
22/06/2016	13:02:20	44.22	101.15	2.53	3.52	4.84
22/06/2016	13:02:50	44.13	100.88	2.08	2.89	4.83
22/06/2016	13:03:20	44.42	101.48	2.28	3.17	4.82
22/06/2016	13:03:50	44.65	102.07	1.99	2.77	4.83

22/06/2016	13:04:20	44.7	102.12	2.29	3.18	4.82
22/06/2016	13:04:50	44.7	102.06	1.68	2.33	4.81
22/06/2016	13:05:20	44.61	101.85	2.3	3.20	4.81
22/06/2016	13:05:50	44.73	102.25	2.7	3.76	4.83
22/06/2016	13:06:20	44.6	102.08	2.25	3.13	4.85
22/06/2016	13:06:50	44.83	102.42	2.5	3.48	4.82
22/06/2016	13:07:20	44.72	102.23	2.3	3.20	4.83
22/06/2016	13:07:50	45.04	102.77	2.53	3.51	4.8
22/06/2016	13:08:20	44.98	102.63	2.27	3.15	4.8
22/06/2016	13:08:50	44.88	102.47	1.86	2.58	4.81
22/06/2016	13:09:20	44.87	102.45	2.82	3.92	4.81
22/06/2016	13:09:50	44.93	102.58	2.08	2.89	4.81
22/06/2016	13:10:20	44.91	102.60	2.32	3.23	4.82
22/06/2016	13:10:50	45.17	103.07	2.52	3.50	4.8
22/06/2016	13:11:20	45.13	103.10	2.13	2.96	4.82
22/06/2016	13:11:50	45.15	103.21	2.5	3.48	4.83
22/06/2016	13:12:20	45.03	103.07	2.11	2.94	4.85
22/06/2016	13:12:50	44.89	102.81	1.91	2.66	4.86
22/06/2016	13:13:20	44.91	102.98	2.42	3.38	4.88
22/06/2016	13:13:50	44.79	102.71	2.1	2.93	4.88
22/06/2016	13:14:20	44.79	102.71	2.3	3.21	4.88
22/06/2016	13:14:50	44.79	102.71	2.1	2.93	4.88
22/06/2016	13:15:20	44.79	102.71	2.1	2.93	4.88
average		43.08	100.48	1.52	2.12	5.18

Connahs Quay						
BL250		ppm	mg/Nm3	ppm	mg/Nm3	%
Auxiliary boilers		NOx BL250	NOx BL250	CO BL250	CO BL250	O2 BL250
22/06/2016	12:15:50	34.088	87.56	0.449	0.70	6.61
22/06/2016	12:16:20	34.442	88.33	0.232	0.36	6.587
22/06/2016	12:16:50	34.603	88.79	0.469	0.73	6.594
22/06/2016	12:17:20	34.546	88.72	0.42	0.66	6.606
22/06/2016	12:17:50	34.864	89.14	0.361	0.56	6.542
22/06/2016	12:18:20	34.96	89.46	0.41	0.64	6.554
22/06/2016	12:18:50	34.9	89.26	0.334	0.52	6.548
22/06/2016	12:19:20	34.993	89.48	0.326	0.51	6.545
22/06/2016	12:19:50	35.034	89.58	0.247	0.38	6.544
22/06/2016	12:20:20	34.963	89.52	0.149	0.23	6.564
22/06/2016	12:20:50	35.256	90.08	0.361	0.56	6.532
22/06/2016	12:21:20	35.071	89.60	0.209	0.33	6.531
22/06/2016	12:21:50	35.426	90.36	0.42	0.65	6.508
22/06/2016	12:22:20	34.743	89.43	0.207	0.32	6.64
22/06/2016	12:22:50	34.641	89.14	0.367	0.57	6.635
22/06/2016	12:23:20	34.695	89.32	0.004	0.01	6.642
22/06/2016	12:23:50	34.6	88.89	0.314	0.49	6.612
22/06/2016	12:24:20	34.655	89.01	0.087	0.14	6.609
22/06/2016	12:24:50	34.677	89.15	0.249	0.39	6.622
22/06/2016	12:25:20	35.079	89.89	0.387	0.60	6.575
22/06/2016	12:25:50	34.909	89.60	0.33	0.52	6.598
22/06/2016	12:26:20	35.265	90.42	0.394	0.61	6.584
22/06/2016	12:26:50	35.225	90.55	0.66	1.03	6.621
22/06/2016	12:27:20	35.28	90.64	0.463	0.72	6.613
22/06/2016	12:27:50	35.121	90.33	0.056	0.09	6.628
22/06/2016	12:28:20	35.385	90.87	0.766	1.20	6.606
22/06/2016	12:28:50	35.307	90.73	0.172	0.27	6.616
22/06/2016	12:29:20	35.401	90.78	0.338	0.53	6.585
22/06/2016	12:29:50	35.793	91.64	0.075	0.12	6.562
22/06/2016	12:30:20	35.387	90.74	0.489	0.76	6.584
22/06/2016	12:30:50	35.455	91.09	0.551	0.86	6.612
22/06/2016	12:31:20	35.706	91.54	0.174	0.27	6.581
22/06/2016	12:31:50	35.725	91.74	0.192	0.30	6.606
22/06/2016	12:32:20	35.501	91.09	0.402	0.63	6.594
22/06/2016	12:32:50	35.92	92.05	0.345	0.54	6.576
22/06/2016	12:33:20	35.675	91.47	0.5	0.78	6.584
22/06/2016	12:33:50	35.545	91.08	0.428	0.67	6.575
22/06/2016	12:34:20	35.584	91.22	0.264	0.41	6.581
22/06/2016	12:34:50	35.516	91.31	0.297	0.46	6.623
22/06/2016	12:35:20	35.558	91.35	0.35	0.55	6.612
22/06/2016	12:35:50	35.482	91.25	0.336	0.53	6.627
22/06/2016	12:36:20	35.678	91.58	0.306	0.48	6.6
22/06/2016	12:36:50	35.816	91.85	0.205	0.32	6.586
22/06/2016	12:37:20	36.005	92.39	0.233	0.36	6.594
22/06/2016	12:37:50	35.833	91.86	0.364	0.57	6.581
22/06/2016	12:38:20	38.383	92.03	0.222	0.32	5.583
22/06/2016	12:38:50	38.991	93.24	-0.194	-0.28	5.542

22/06/2016	12:39:20	39.586	93.89	0.493	0.71	5.415
22/06/2016	12:39:50	40.217	95.07	0.398	0.57	5.364
22/06/2016	12:40:20	40.187	94.89	0.168	0.24	5.346
22/06/2016	12:40:50	40.311	94.45	-0.21	-0.30	5.224
22/06/2016	12:41:20	40.755	95.17	0.236	0.34	5.171
22/06/2016	12:41:50	40.594	94.78	0.086	0.12	5.168
22/06/2016	12:42:20	40.932	95.22	0.438	0.62	5.11
22/06/2016	12:42:50	40.742	94.81	0.156	0.22	5.115
22/06/2016	12:43:20	40.701	94.70	0.209	0.30	5.114
22/06/2016	12:43:50	40.824	95.03	0.43	0.61	5.12
22/06/2016	12:44:20	40.915	95.17	-0.074	-0.10	5.109
22/06/2016	12:44:50	40.637	94.55	0.136	0.19	5.113
22/06/2016	12:45:20	40.715	94.80	0.343	0.49	5.125
22/06/2016	12:45:50	40.834	94.94	0.553	0.78	5.102
22/06/2016	12:46:20	40.87	95.02	0.308	0.44	5.101
22/06/2016	12:46:50	40.664	94.61	0.492	0.70	5.112
22/06/2016	12:47:20	40.932	95.07	0.697	0.99	5.086
22/06/2016	12:47:50	40.919	95.02	0.415	0.59	5.082
22/06/2016	12:48:20	40.655	94.41	0.45	0.64	5.083
22/06/2016	12:48:50	40.408	93.97	0.294	0.42	5.105
22/06/2016	12:49:20	40.249	93.69	0.278	0.39	5.12
22/06/2016	12:49:50	40.598	94.16	0.687	0.97	5.062
22/06/2016	12:50:20	40.46	94.10	0.657	0.93	5.106
22/06/2016	12:50:50	39.98	92.88	0.732	1.04	5.089
22/06/2016	12:51:20	39.792	92.48	0.603	0.85	5.095
22/06/2016	12:51:50	40.079	92.84	0.42	0.59	5.042
22/06/2016	12:52:20	39.852	92.32	0.288	0.41	5.044
22/06/2016	12:52:50	39.817	92.26	0.378	0.53	5.048
22/06/2016	12:53:20	39.56	91.74	0.667	0.94	5.06
22/06/2016	12:53:50	39.354	91.28	0.075	0.11	5.064
22/06/2016	12:54:20	39.678	91.80	0.239	0.34	5.024
22/06/2016	12:54:50	39.625	91.73	0.332	0.47	5.032
22/06/2016	12:55:20	39.47	91.45	0.715	1.01	5.047
22/06/2016	12:55:50	39.297	90.98	0.157	0.22	5.034
22/06/2016	12:56:20	39.757	91.90	0.742	1.04	5.008
22/06/2016	12:56:50	39.764	92.21	0.078	0.11	5.06
22/06/2016	12:57:20	38.976	90.55	0.021	0.03	5.09
22/06/2016	12:57:50	39.181	90.84	0.26	0.37	5.057
22/06/2016	12:58:20	39.181	90.72	0.428	0.60	5.035
22/06/2016	12:58:50	39.24	90.95	-0.05	-0.07	5.052
22/06/2016	12:59:20	39.093	90.87	0.067	0.09	5.097
22/06/2016	12:59:50	39.116	90.82	0.32	0.45	5.079
22/06/2016	13:00:20	39.333	90.92	0.082	0.12	5.008
22/06/2016	13:00:50	39.176	90.76	0.418	0.59	5.044
22/06/2016	13:01:20	39.072	90.41	0.431	0.61	5.025
22/06/2016	13:01:50	39.146	90.60	0.591	0.83	5.028
22/06/2016	13:02:20	39.1	90.46	0.366	0.52	5.023
22/06/2016	13:02:50	39.116	90.30	0.628	0.88	4.987
22/06/2016	13:03:20	39.782	91.79	0.493	0.69	4.979
22/06/2016	13:03:50	39.785	91.82	0.414	0.58	4.984

22/06/2016	13:04:20	39.651	91.56	0.361	0.51	4.993
22/06/2016	13:04:50	39.501	91.22	0.527	0.74	4.994
22/06/2016	13:05:20	39.577	91.31	0.449	0.63	4.979
22/06/2016	13:05:50	39.74	91.79	0.35	0.49	4.996
22/06/2016	13:06:20	39.592	91.46	0.412	0.58	4.999
22/06/2016	13:06:50	39.728	91.82	0.459	0.65	5.007
22/06/2016	13:07:20	40.045	92.36	0.304	0.43	4.973
22/06/2016	13:07:50	39.683	91.70	0.348	0.49	5.003
22/06/2016	13:08:20	39.567	91.54	0.168	0.24	5.023
22/06/2016	13:08:50	39.609	91.59	0.21	0.30	5.015
22/06/2016	13:09:20	39.756	91.77	0.188	0.26	4.986
22/06/2016	13:09:50	39.577	91.54	0.314	0.44	5.018
22/06/2016	13:10:20	39.916	92.23	0.689	0.97	5.002
22/06/2016	13:10:50	39.896	92.31	0.539	0.76	5.025
22/06/2016	13:11:20	39.805	91.98	0.161	0.23	5.003
22/06/2016	13:11:50	39.985	92.39	0.012	0.02	5.002
22/06/2016	13:12:20	39.566	91.69	0.521	0.73	5.05
22/06/2016	13:12:50	40.244	92.97	0.503	0.71	4.999
22/06/2016	13:13:20	40.078	92.83	-0.04	-0.06	5.041
22/06/2016	13:13:50	39.951	92.48	0.715	1.01	5.031
22/06/2016	13:14:20	40.246	93.14	0.537	0.76	5.027
22/06/2016	13:14:50	39.866	92.41	0.338	0.48	5.054
22/06/2016	13:15:20	39.839	92.33	0.835	1.18	5.05
average		38.13	91.76	0.34	0.50	5.65

Gas Analyser Calibration Sheet

ST_Form_APT_004-1

Issue 12

All coloured cells require values for conditional formatting to work

SITE:	Uniper Energy Ltd - Connahs Quay	LOCATION:	Steam generator BL240,BL220,BL220
JOB No.:	2122.C50700.001	DATE:	22/06/2016

GAS ANALYSER	Make	Model	IV No.	Power On (date)	Power On (time)
O ₂	Horiba	PG250	T1077	22/06/2016	10:00
NO / NOx	Horiba	PG250	T1077	22/06/2016	10:00
CO	Horiba	PG250	T1077	22/06/2016	10:00
SO ₂					
CO ₂					
TOC					
N ₂ O					
NO ₂					
SAMPLE SYSTEM	Make	Type / Length	IV No.	Power On (date)	Power On (time)
Probe / Filter					
Heated Line (1)	Orbital	15m	T1234	22/06/2016	10:00
Gas Conditioner (1)	ABB	SCC-C	T1467	22/06/2016	10:00
Sample Line (2)					
NOx Converter					
Gas Conditioner (2)					
Pump	ABB	SCC-F	T1198	22/06/2016	10:00
Logger	Chesell	4100g	T1006	22/06/2016	10:00

GAS CYLINDER	No.	Concentration	ELV	Analyser Range	Repeatability at zero
O ₂ (%)	T4902	5.97	25	25	0.1
NO / NOx (ppm)	147745	253	500	500	5
CO (ppm)	139085	510	500	1000	10
SO ₂ (ppm)					
CO ₂ (%)					
TOC (ppm)					
N ₂ O (ppm)					
NO ₂ (ppm)					
N ₂ (%)	N2	99.9999			

			Date:	22/06/2016		
Gas	Time	Zero adjustment	Span adjustment	Zero check	Response Time	Initial
Component					(pto if needed)	
O ₂	11:30	0	5.97	0.01	10	MM
NOx	11:35	0	253	1	11	MM
CO	11:40	0	510	1	11	MM
SO ₂						
CO ₂						
TOC						
N ₂ O						
NO ₂						
Temp °C	20	The maximum allowed difference between the zero adjustment and zero check after span calibration is two times the repeatability at zero				
Pressure mb	1012					
2. Sample system check before measurement:		Difference from readings during calibration of the analyser shall be <2%				
Gas	Time	Zero check	Span check	Pass/Fail	Response Time	Initial
Component					(pto if needed)	
O ₂	11:45	0.03	5.99	Pass	12	MM
NOx	11:47	1	254	Pass	13	MM
CO	11:55	1	512	Pass	14	MM
SO ₂						
CO ₂						
TOC						
N ₂ O						
NO ₂						

Gas	Time	Zero check	Span check	Date:	22/06/2016	Comment	Initial
Component					Pass/Correct/Fail	(pto if needed)	
O ₂	16:30	0.03	5.99		Pass	OK	MM
NOx	16:35	2	257		Pass	OK	MM
CO	16:39	3	517		Pass	OK	MM
SO ₂							
CO ₂							
TOC							
N ₂ O							
NO ₂							
Temp °C	21	If the span or zero drifts are higher than 2% of the span value, it is necessary to correct both for zero and span drifts. The results shall be rejected if the drift in zero or span is higher than 5%					
Pressure mb	1012						

Gas Analyser Calibration Sheet

ST_Form_APT_004-1

Issue 12

All coloured cells require values for conditional formatting to work

SITE:	Uniper Energy Ltd - Connahs Quay	LOCATION:	Steam generator BL250,BL230
JOB No.:	2122.C50700.001	DATE:	22/06/2016

GAS ANALYSER	Make	Model	IV No.	Power On (date)	Power On (time)
O ₂	Horiba	PG250	T1191	22/06/2016	10:00
NO / NOx	Horiba	PG250	T1191	22/06/2016	10:00
CO	Horiba	PG250	T1191	22/06/2016	10:00
SO ₂					
CO ₂					
TOC					
N ₂ O					
NO ₂					
SAMPLE SYSTEM	Make	Type / Length	IV No.	Power On (date)	Power On (time)
Probe / Filter					
Heated Line (1)	Orbital	5m	T1015	22/06/2016	10:00
Gas Conditioner (1)	ABB	SCC-C	T1467	22/06/2016	10:00
Sample Line (2)					
NOx Converter					
Gas Conditioner (2)					
Pump	ABB	SCC-F	T1198	22/06/2016	10:00
Logger	Chesell	4100g	T1006	22/06/2016	10:00

GAS CYLINDER	No.	Concentration	ELV	Analyser Range	Repeatability at zero
O ₂ (%)	T4902	5.97	25	25	0.1
NO / NOx (ppm)	147745	253	500	500	5
CO (ppm)	139085	510	500	1000	10
SO ₂ (ppm)					
CO ₂ (%)					
TOC (ppm)					
N ₂ O (ppm)					
NO ₂ (ppm)					
N ₂ (%)	N2	99.9999			

			Date:	22/06/2016		
Gas	Time	Zero adjustment	Span adjustment	Zero check	Response Time	Initial
Component					(pto if needed)	
O ₂	11:30	0	5.97	0.02	12	MM
NOx	11:35	0	253	0	12	MM
CO	11:40	0	510	0	13	MM
SO ₂						
CO ₂						
TOC						
N ₂ O						
NO ₂						
Temp °C	20	The maximum allowed difference between the zero adjustment and zero check after span calibration is two times the repeatability at zero				
Pressure mb	1012					
2. Sample system check before measurement:		Difference from readings during calibration of the analyser shall be <2%				
Gas	Time	Zero check	Span check	Pass/Fail	Response Time	Initial
Component					(pto if needed)	
O ₂	11:45	0.02	5.98	Pass	14	MM
NOx	11:47	2	255	Pass	15	MM
CO	11:55	0	509	Pass	15	MM
SO ₂						
CO ₂						
TOC						
N ₂ O						
NO ₂						

Gas	Time	Zero check	Span check	Date:	22/06/2016	Comment	Initial
Component					Pass/Correct/Fail	(pto if needed)	
O ₂	16:30	0.04	5.99		Pass	OK	MM
NOx	16:35	1	255		Pass	OK	MM
CO	16:39	2	515		Pass	OK	MM
SO ₂							
CO ₂							
TOC							
N ₂ O							
NO ₂							
Temp °C	21	If the span or zero drifts are higher than 2% of the span value, it is necessary to correct both for zero and span drifts. The results shall be rejected if the drift in zero or span is higher than 5%					
Pressure mb	1012						

Appendix 2 - Section 2


**Laboratory accredited to
ISO/IEC 17025 & ISO Guide 34**

 BOC Limited
 28 Deer Park Road
 London
 SW19 3UF

Head Office

 BOC Limited
 10 Priestley Road
 Surrey Research Park
 Guildford
 Surrey
 GU2 7XY

UK gas & equipment orders

 Tel: 0800 02 0800
 Fax: 0800 136 601

**Export gas & equipment
orders**

 Tel: 01483 244441
 Fax: 01483 532115

Customer Satisfaction Survey
www.boconline.co.uk/ukas-survey

CERTIFIED REFERENCE MATERIAL CERTIFICATE OF CALIBRATION

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Production Order Number:

2524631

Date of Calibration:

28 November 2013

Date of Issue:

28 November 2013

Cylinder Number:

139085

Date of Expiry:

27 November 2017

Notes:

None

Customer Details:

 E.ON New Build and Technology LTD
 FAO Paul Clark
 Technology Centre Ratcliffe On Soar
 NOTTINGHAM
 NG11 0EE

Nominal Cylinder Contents:
2.83m³ @ 15°C and 1.013 bar
Customer Reference:

4500127932

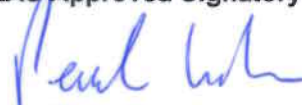
Pressure at Calibration:

195.0 bar gauge @ 20°C

To re-order please quote:

294589-AY-IC

**It is recommended that this product is
not used below 5% of this pressure**

UKAS Approved Signatory:

 Paul Willson

Comments:

Valve outlet: BS341 no.4

The primary intended use of this gas mixture is for the calibration of gas analysis instrumentation. General instructions for the proper use of gas mixtures can be found in ISO 16664 "Gas analysis - handling of calibration gases and gas mixtures".



**Laboratory accredited to
ISO/IEC 17025 & ISO Guide 34**

BOC Limited
28 Deer Park Road
London
SW19 3UF

Head Office

BOC Limited
10 Priestley Road
Surrey Research Park
Guildford
Surrey
GU2 7XY

UK gas & equipment orders

Tel: 0800 02 0800
Fax: 0800 136 601

**Export gas & equipment
orders**

Tel: 01483 244441
Fax: 01483 532115

Customer Satisfaction Survey

www.boconline.co.uk/ukas-survey

CERTIFIED REFERENCE MATERIAL CERTIFICATE OF CALIBRATION

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Production Order Number:

2539860

Date of Calibration:

29 April 2014

Date of Issue:

29 April 2014

Cylinder Number:

147745

Date of Expiry:

28 April 2018

Notes:

None

Customer Details:

E.ON Technologies (Ratcliffe) Ltd FAO
Paul Clark
Technology Centre Ratcliffe On Soar
NOTTINGHAM
NG11 0EE

Nominal Cylinder Contents:

2.83m³ @ 15°C and 1.013 bar

Customer Reference:

4500127932

Pressure at Calibration:

192.0 bar gauge @ 20°C

To re-order please quote:

151151-AY-IC

**It is recommended that this product is
not used below 5% of this pressure**

UKAS Approved Signatory:


Paul Willson

Comments:

Valve outlet: BS341 no.14
The primary intended use of this gas mixture is for the calibration of gas analysis instrumentation. General instructions for the proper use of gas mixtures can be found in "ISO 16664: Gas analysis - handling of calibration gases and gas mixtures".

T4902



Certificate of Analysis

Air Products PLC
Hersham Place Technology Park
Molesey Road
WALTON-ON-THAMES
Surrey
KT12 4RZ
UNITED KINGDOM
Date Printed: 25 APR 2016

Container Type: X20A - 20L Aluminum Cylinder
Outlet Valve Connection: BS3
Net Weight: 4.704 kg
Fill Pressure @ 15 °C: 200.0 bar-g
Fill Pressure @ 15 °C: 203.943 kg/cm²
Contents @ 0°C, 1013 mbar: 3.659 Nm³

Material 344233 Mixture of Gases	Mfg. Date 22 APR 2016	Analysis Date 25 APR 2016	Best if Used By 22 APR 2021
Inspection Lot 040006259107		Source Location 0925	

LOWER LIMIT	UPPER LIMIT	NOMINAL VALUE	ACTUAL VALUE	UNIT	EXPANDED UNCERT.	NO REPS STD DEV	ANALYTICAL		
							PHASE	FREQ	METHOD
Carbon Dioxide		3.5000	3.5260	% mole ± 0.2%rel				I	Grav
Helium		50.00	50.30	ppm mo ± 1%rel				I	Grav
Oxygen		6.000	5.947	% mole ± 0.2%rel				I	Grav
Nitrogen			90.523	% mole ± 0.1%rel				I	Grav

This certificate is issued electronically and is valid without a signature.

REMARKS:

Analytic Freq: I = Individual analysis, B = Batch analysis, C = Calculated value, S = Source.
The suffix (m) in the Unit of Measure refers to mass.

The expanded uncertainty has been calculated with a coverage factor k=2.

This certificate is produced in accordance with ISO 6141.

The results shown above are traceable to national or international standards through a rigorous preparation system in which International Reference Materials, ISO 6142 and ISO 6143 are used.

To obtain details about the applicable traceability, please contact us.

Do not use below a pressure of 3 bar (excluding product supplied at less than 10 bar).
Maintain storage and use temperature between -10 and 50 °C."#

Uncertainty calculation for Gaseous Measurement NOx EN 14792

Analysar Model	PG250	IV Number	T1077
Gas Component	NOx		

Emission Limit value	500	ppm	Calibration gas	253	ppm
Measured concentration NOx	39.01	ppm	Range	500	ppm
Measured Concentration NO		ppm			

Performance characteristics	Value		
Response time	21.7	seconds	
Number of readings in measurement	30	20	zero/span
Repeatability at zero	0.02	ppm	stdev
Repeatability at span level	0	ppm	stdev
Deviation from linearity	1.6	% of value	
Zero drift	1.5	ppm at zero level	
Span drift	2.5	ppm at span level	
Volume or pressure flow dependence	0	% of Range / 10l/h	
Atmospheric pressure dependence	0	% of Range/kPa	
Ambient temperature dependence	Interferent Concentration at Cal	2.9	% Range /10K
CO2 (15%)	15	0	ppm
NH3(20)	20	0	ppm
Dependence on voltage	0	ppm /10V	
Losses in the line (leak)	2	% of value	
Uncertainty of calibration gas	2	% of value	
Drift of Converter Efficiency	0	% (absolute)	
Repeatability of Converter Efficiency	0	% (absolute)	stdev

	Min	Max	Value at Calib
flow	50	70	60
pressure	1012.00	1012	1012
temp	293	294	293
CO2 range			
NH3 range			
Volatge	218.5	241.5	230

Converter Efficiency	95	%
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Uncertainty Contributions from Each Performance Characteristic				
Performance characteristic		NOx	NO	Units
Standard deviation of repeatability at zero	u_0	0.00	0.00	ppm
Standard deviation of repeatability at span level	u_{15}	0.00	0.00	ppm
Lack of fit	u_{lf}	0.36	0.00	ppm
Drift	u_{dr}	0.00	0.00	ppm
volume or pressure flow dependence	u_{spres}	0.00	0.00	ppm
atmospheric pressure dependence	u_{apres}	0.00	0.00	ppm
ambient temperature dependence	u_{temp}	0.84	0.84	ppm
CO2 (15%)		0.00	0.00	ppm
NH3(20)		0.00	0.00	ppm
dependence on voltage	u_{vol}	0.00	0.00	ppm
losses in the line (leak)	u_{leak}	0.45	0.00	ppm
Uncertainty of calibration gas	u_{calib}	0.00	0.00	ppm
Converter efficiency	$u(n)$	0.00		%

For NO Measurement

Measurement uncertainty	ELV	500.00	ppm
Combined uncertainty		0.84	ppm
% of value		0.17	%
Expanded uncertainty	expressed with a level of confidence of 95%	0.33	% of value
Expanded uncertainty	expressed with a level of confidence of 95%	1.67	ppm

For NOx Measurement

Measurement uncertainty	ELV	500.00	ppm
NOx Uncertainty (no converter effect)		1.02	ppm
NOx Uncertainty		1.07	ppm
% of Value		0.21	%
Expanded uncertainty	expressed with a level of confidence of 95%	0.43	% of value
Expanded uncertainty	expressed with a level of confidence of 95%	2.14	ppm

NOx with no NO measurement

Uncertainty calculation for Gaseous Measurement Oxygen EN14789

Analyser Model	PG250	IV Number	T1077
Gas Component	O2		

Limit value	25 %vol	Calibration gas	5.97 %vol
Measured concentration	5.51 %vol	Range	25 %vol

Performance characteristics	Value	
Response time	30.33	seconds
Number of readings in measurement	30	20
Repeatability at zero	0.02	% volume
Repeatability at span level	0	% volume
Deviation from linearity	0.05	% of value
Zero drift	0.0	% vol at zero level
Span drift	0.0	% vol at span level
volume or pressure flow dependence	0	% of Range / 10l/h
atmospheric pressure dependence	0	% of Range/kPa
ambient temperature dependence	Interferent Concentration at Cal	% volume /C
CO2	15	% volume
NO	300	% volume
NO2	30	% volume
dependence on voltage	0	% volume /10V
losses in the line (leak)	2	% of value
Uncertainty of calibration gas	2	% of value

	Ranges		Value at
	Min	Max	Calib
flow	20	30	24
pressure	1012.00	1012	1012
temp	293	294	293
CO2 range			
NO range			
NO2 range			
Volatge	218.5	241.5	230

Uncertainty Contributions from Each Performance Characteristic		O2	Units
Performance characteristic			
Standard deviation of repeatability at zero	U _{r0}	0.00	%Vol
Standard deviation of repeatability at span level	U _{rs}	0.00	%Vol
Lack of fit	U _{fit}	0.00	%Vol
Drift	U _{dr}	0.00	%Vol
volume or pressure flow dependence	U _{spres}	0.00	%Vol
atmospheric pressure dependence	U _{apres}	0.00	%Vol
ambient temperature dependence	U _{temp}	0.00	%Vol
CO2		0.00	%Vol
NO		0.00	%Vol
NO2		0.00	%Vol
dependence on voltage	U _{volt}	0.00	%Vol
losses in the line (leak)	U _{leak}	0.06	%Vol
Uncertainty of calibration gas	U _{calib}	0.06	%Vol

Measurement uncertainty	ELV	5.51	%vol
Combined uncertainty		0.09	%vol
% of value		1.63	%
Expanded uncertainty	expressed with a level of confidence of 95%	3.27	% of value
Expanded uncertainty	expressed with a level of confidence of 95%	0.18	% vol

Uncertainty calculation for Gaseous Measurement Carbon Monoxide EN15058

Analysar Model	PG250	IV Number	T1077
Gas Component	CO		

Limit value	500	ppm	Calibration gas	510	ppm
Measured concentration	0.35	ppm	Range	1000	ppm

Performance characteristics	Value	
Response time	90	seconds
Number of readings in measurement	30	20
Repeatability at zero	0.14	ppm (stdev)
Repeatability at span level	0	ppm (stdev)
Deviation from linearity	1.1	% of value
Zero drift	2.0	ppm at zero level
Span drift	4.5	ppm at span level
volume or pressure flow dependence	0	% of Range/ 10l/h
atmospheric pressure dependence	0	% of Range/kPa
ambient temperature dependence	Interferent Concentration at Cal	-3.6 % Range /10C
CO2 (10%)	15	-1 ppm
N2O(300)	0	0 ppm
CH4(30)	0	0 ppm
dependence on voltage	0	ppm /10V
losses in the line (leak)	2	% of value
Uncertainty of calibration gas	2	% of value

	Ranges		
	Min	Max	Value at Calib
Flow	50	70	60
Pressure	1012.00	1012	1012
Temp	293	294	293
CO2 range			
N2O range			
CH4 range			
Volatge	218.5	241.5	230

Uncertainty Contributions from Each Performance Characteristic		CO	Units
Performance characteristic			
Standard deviation of repeatability at zero	u _{r0}	0.03	ppm
Standard deviation of repeatability at span level	u _{rs}	0.00	ppm
Lack of fit	u _{fit}	0.00	ppm
Drift	u _{dr}	0.00	ppm
volume or pressure flow dependence	u _{apres}	0.00	ppm
atmospheric pressure dependence	u _{apres}	0.00	ppm
ambient temperature dependence	u _{temp}	-2.08	ppm
CO2 (10%)		0.00	ppm
N2(300)		0.00	ppm
CH4(30)		0.00	ppm
dependence on voltage	u _{volt}	0.00	ppm
losses in the line (leak)	u _{leak}	0.00	ppm
Uncertainty of calibration gas	u _{calib}	0.00	ppm

Measurement uncertainty		ELV	500.00	ppm
Combined uncertainty			2.08	ppm
% of value			0.42	%
Expanded uncertainty	expressed with a level of confidence of 95%		0.83	% of value
Expanded uncertainty	expressed with a level of confidence of 95%		4.16	ppm

Uncertainty calculation for Gaseous Measurement NOx EN 14792

Analysar Model	PG250	IV Number	T1191
Gas Component	NOx		

Emission Limit value	500	ppm	Calibration gas	253	ppm
Measured concentration NOx	39.01	ppm	Range	500	ppm
Measured Concentration NO		ppm			

Performance characteristics	Value		
Response time	21.7	seconds	
Number of readings in measurement	30	20	zero/span
Repeatability at zero	0.02	ppm	stdev
Repeatability at span level	0	ppm	stdev
Deviation from linearity	1.6	% of value	
Zero drift	1.5	ppm at zero level	
Span drift	2.0	ppm at span level	
Volume or pressure flow dependence	0	% of Range / 10l/h	
Atmospheric pressure dependence	0	% of Range/kPa	
Ambient temperature dependence	Interferent Concentration at Cal	2.9	% Range /10K
CO2 (15%)	15	0	ppm
NH3(20)	20	0	ppm
Dependence on voltage	0	ppm /10V	
Losses in the line (leak)	2	% of value	
Uncertainty of calibration gas	2	% of value	
Drift of Converter Efficiency	0	% (absolute)	
Repeatability of Converter Efficiency	0	% (absolute)	stdev

	Ranges	Min	Max	Value at
flow	50	70	60	
pressure	1012.00	1012	1012	
temp	293	294	293	
CO2 range				
NH3 range				
Volatge	218.5	241.5	230	

Converter Efficiency	95	%
----------------------	----	---

Uncertainty Contributions from Each Performance Characteristic				
Performance characteristic		NOx	NO	Units
Standard deviation of repeatability at zero	u_0	0.00	0.00	ppm
Standard deviation of repeatability at span level	u_{15}	0.00	0.00	ppm
Lack of fit	u_{lf}	0.36	0.00	ppm
Drift	u_{dr}	0.00	0.00	ppm
volume or pressure flow dependence	u_{spres}	0.00	0.00	ppm
atmospheric pressure dependence	u_{apres}	0.00	0.00	ppm
ambient temperature dependence	u_{temp}	0.84	0.84	ppm
CO2 (15%)		0.00	0.00	ppm
NH3(20)		0.00	0.00	ppm
dependence on voltage	u_{vol}	0.00	0.00	ppm
losses in the line (leak)	u_{leak}	0.45	0.00	ppm
Uncertainty of calibration gas	u_{calib}	0.00	0.00	ppm
Converter efficiency	$u(n)$	0.00		%

For NO Measurement

Measurement uncertainty	ELV	500.00	ppm
Combined uncertainty		0.84	ppm
% of value		0.17	%
Expanded uncertainty	expressed with a level of confidence of 95%	0.33	% of value
Expanded uncertainty	expressed with a level of confidence of 95%	1.67	ppm

For NOx Measurement

Measurement uncertainty	ELV	500.00	ppm
NOx Uncertainty (no converter effect)		1.02	ppm
NOx Uncertainty		1.07	ppm
% of Value		0.21	%
Expanded uncertainty	expressed with a level of confidence of 95%	0.43	% of value
Expanded uncertainty	expressed with a level of confidence of 95%	2.14	ppm

NOx with no NO measurement

Uncertainty calculation for Gaseous Measurement Oxygen EN14789

Analysers Model	PG250	IV Number	T1191
Gas Component	O2		

Limit value	25 %vol	Calibration gas	5.97 %vol
Measured concentration	5.51 %vol	Range	25 %vol

Performance characteristics	Value	
Response time	30.33	seconds
Number of readings in measurement	30	20
Repeatability at zero	0.02	% volume
Repeatability at span level	0	% volume
Deviation from linearity	0.05	% of value
Zero drift	0.0	% vol at zero level
Span drift	0.0	% vol at span level
volume or pressure flow dependence	0	% of Range / 10l/h
atmospheric pressure dependence	0	% of Range/kPa
ambient temperature dependence	Interferent Concentration at Cal	% volume /C
CO2	15	% volume
NO	300	% volume
NO2	30	% volume
dependence on voltage	0	% volume /10V
losses in the line (leak)	2	% of value
Uncertainty of calibration gas	2	% of value

	Ranges	Max	Value at
	Min		Calib
flow	20	30	24
pressure	1012.00	1012	1012
temp	293	294	293
CO2 range			
NO range			
NO2 range			
Volatge	218.5	241.5	230

Uncertainty Contributions from Each Performance Characteristic		O2	Units
Performance characteristic			
Standard deviation of repeatability at zero	U ₁₀	0.00	%Vol
Standard deviation of repeatability at span level	U ₁₅	0.00	%Vol
Lack of fit	U _{fit}	0.00	%Vol
Drift	U _{drift}	0.00	%Vol
volume or pressure flow dependence	U _{spres}	0.00	%Vol
atmospheric pressure dependence	U _{apres}	0.00	%Vol
ambient temperature dependence	U _{temp}	0.00	%Vol
CO2		0.00	%Vol
NO		0.00	%Vol
NO2		0.00	%Vol
dependence on voltage	U _{volt}	0.00	%Vol
losses in the line (leak)	U _{leak}	0.06	%Vol
Uncertainty of calibration gas	U _{calib}	0.06	%Vol
Measurement uncertainty	ELV	5.51	%vol
Combined uncertainty		0.09	%vol
% of value		1.63	%
Expanded uncertainty	expressed with a level of confidence of 95%	3.27	% of value
Expanded uncertainty	expressed with a level of confidence of 95%	0.18	% vol

Uncertainty calculation for Gaseous Measurement Carbon Monoxide EN15058

Analyser Model	PG250	IV Number	T1191
Gas Component	CO		

Limit value	500	ppm	Calibration gas	510	ppm
Measured concentration	0.35	ppm	Range	1000	ppm

Performance characteristics		Value	
Response time		90	seconds
Number of readings in measurement		30	20
Repeatability at zero		0.14	ppm (stdev)
Repeatability at span level		0	ppm (stdev)
Deviation from linearity		1.1	% of value
Zero drift		1.0	ppm at zero level
Span drift		2.0	ppm at span level
volume or pressure flow dependence		0	% of Range/ 10l/h
atmospheric pressure dependence		0	% of Range/kPa
ambient temperature dependence	Interferent Concentration at Cal	-3.6	% Range /10C
CO ₂ (10%)	15	-1	ppm
N ₂ O(300)	0	0	ppm
CH ₄ (30)	0	0	ppm
dependence on voltage		0	ppm /10V
losses in the line (leak)		2	% of value
Uncertainty of calibration gas		2	% of value

	Ranges		
	Min	Max	Value at Calib
Flow	50	70	60
Pressure	1012.00	1012	1012
Temp	293	294	293
CO ₂ range			
N ₂ O range			
CH ₄ range			
Volatge	218.5	241.5	230

Uncertainty Contributions from Each Performance Characteristic			
Performance characteristic		CO	Units
Standard deviation of repeatability at zero	u _{r0}	0.03	ppm
Standard deviation of repeatability at span level	u _{rs}	0.00	ppm
Lack of fit	u _{fit}	0.00	ppm
Drift	u _{dr}	0.00	ppm
volume or pressure flow dependence	u _{apres}	0.00	ppm
atmospheric pressure dependence	u _{apres}	0.00	ppm
ambient temperature dependence	u _{temp}	-2.08	ppm
CO ₂ (10%)		0.00	ppm
N ₂ (300)		0.00	ppm
CH ₄ (30)		0.00	ppm
dependence on voltage	u _{volt}	0.00	ppm
losses in the line (leak)	u _{leak}	0.00	ppm
Uncertainty of calibration gas	u _{calib}	0.00	ppm

Measurement uncertainty		ELV	500.00	ppm
Combined uncertainty			2.08	ppm
% of value			0.42	%
Expanded uncertainty	expressed with a level of confidence of 95%		0.83	% of value
Expanded uncertainty	expressed with a level of confidence of 95%		4.16	ppm

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 Accredited to ISO/IEC 17025:2005	UNIPER Technologies Limited Issue No: 050 Issue date: 15 April 2016 <table border="1" style="width: 100%;"> <tr> <td style="width: 50%;"> Ratcliffe Power Station Technology Centre Ratcliffe-on-Soar Nottingham NG11 0EE </td><td style="width: 50%;"> Contact: Mr Jon Bentley Tel: +44 (0) 2476 192 397 Fax: +44 (0)115 902 4004 E-Mail: jon.bentley@uniper.energy Website: www.uniper.energy </td></tr> </table>	Ratcliffe Power Station Technology Centre Ratcliffe-on-Soar Nottingham NG11 0EE	Contact: Mr Jon Bentley Tel: +44 (0) 2476 192 397 Fax: +44 (0)115 902 4004 E-Mail: jon.bentley@uniper.energy Website: www.uniper.energy
Ratcliffe Power Station Technology Centre Ratcliffe-on-Soar Nottingham NG11 0EE	Contact: Mr Jon Bentley Tel: +44 (0) 2476 192 397 Fax: +44 (0)115 902 4004 E-Mail: jon.bentley@uniper.energy Website: www.uniper.energy		
Testing performed by the Organisation at the locations specified below			

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address Technology Centre Ratcliffe Power Station Technology Centre Ratcliffe-on-Soar Nottingham NG11 0EE Local contacts Mr J. Bentley Tel: +44 (0) 2476 192 397 Fax: +44 (0) 115 902 4004 Email: jon.bentley@uniper.energy Website: www.uniper.energy	Support functions: Quality System Quality Audit Administration Sampling and Testing: Testing & Measurement Fuel technology Analytical services Physical Testing	A

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Premises including commercial and industrial	Coal Stock Density Testing	B
Customer Sites requiring Stack emissions Testing	Stack Emissions Testing	C
Customer Sites requiring Continuous Emissions Monitoring Systems (CEMS) Functional Testing	On Site Testing	D



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DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
Pollutants and Effluents: Atmospheric	<u>Physical Tests</u>	National, International and other recognised standards using documented in-house methods and procedures shown in brackets	
Filter papers and rinse solutions	Weight of particulate matter	BS EN 13284-1:2002 BS ISO 9096:2003 (TOI_APT_001_1)	A
Filter papers and rinse solutions	Weighing of Particulate Matter <10 micron (PM ₁₀ and PM _{2.5})	BS EN ISO 23210:2009 (TOI_APT_001_3)	A
Solid Fuels	<u>Physical Measurements</u>		
Coal	Density of coal stock	Documented In-House Methods TOI_APA_CSD_003	B
Solid Fuels	<u>Chemical Tests</u>	Documented In-House Methods:	
	Aluminium Barium Beryllium Chromium Cobalt Copper Iron Manganese Molybdenum Nickel Vanadium Zinc	Methods TOI_APA_OE_0.0114, TOI_APA_OE_0.0062 and TOI_APA_OE_0.0006 using ICP-OES	A
	Cadmium Lead	Methods TOI_APA_OE_0.0012 using Graphite Furnace AAS	A
Coal, Petcoke, & Biomass	Air dried moisture	Method TOI_APA_FT_009	A
Coal, Petcoke, & Biomass	Analysis moisture	Method TOI_APA_FT_002	A
Coal, Petcoke, & Biomass	Equilibrium moisture	Method TOI_APA_FT_001	A
Coal, Petcoke, & Biomass	Ash	Method TOI_APA_FT_003	A



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
Solid Fuels (cont'd)	<u>Chemical Tests</u> (cont'd)		
Coal, Petcoke, & Biomass	Loss on Ignition (By calculation)	Method TOI_APA_FT_002 & Method TOI_APA_FT_003	A
Coal, Petcoke, & Biomass	Volatile matter	Method TOI_APA_FT_004	A
Coal & Petcoke	Chlorine	Method TOI_APA_FT_007 using X-ray Fluorescence	A
Coal & Petcoke	Mercury	Methods TOI_APA_OE_0.0034 and TOI_APA_OE_0.0083 using Flow Injection Mercury System	A
Coal & Petcoke	Antimony Arsenic Selenium	Methods TOI_APA_OE_0.0062, TOI_APA_OE_0.0034 and TOI_APA_OE_0.0106 using ICP-OES, hydride method	A
Coal & Petcoke	Fluoride	Methods TOI_APA_OE_0.0034 and TOI_APA_OE_0.0014 using Ion Selective Electrode	A
Solid fuels and Fuel oils	Calorific value	TOI_APA_FT_005 using calorimeter	A
Coal, Petcoke, & Biomass	Chlorine	TOI_APA_FT_008 using bomb combustion and potentiometric titration	A
Coal, Petcoke, & Biomass	Sulphur	TOI_APA_FT_006 using Leco analyser	A



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
Environmental Samples Natural and waste waters	<u>Chemical Tests</u> (cont'd) Aluminium Barium Beryllium Calcium Chromium Cobalt Copper Iron Magnesium Manganese Molybdenum Nickel Titanium Vanadium Zinc	Method TOI_APA_OE_0.0006 using ICP-OES	A
Natural and waste waters	Antimony Arsenic Selenium	Method TOI_APA_OE_0.0106 using ICP-OES, hydride method	A
Natural and waste waters	Cadmium Lead	Method TOI_APA_OE_0.0012 using Graphite Furnace AAS	A
Natural and waste waters	Mercury	Methods TOI_APA_OE_0.0037 and TOI_APA_OE_0.0083 using Flow Injection Mercury System	A
Natural and waste waters	Fluoride	Method TOI_APA_OE_0.0014 using Ion Selective Electrode	A
Potable (non-regulatory), Groundwater, river water and waste waters	Chloride Phosphate Nitrate Sulphate	Method TOI_APA_OE_0.0013 based on BS EN ISO 10304- 1:2009 Part1 and ISO 10301- 1:2007 using Ion chromatography	A
Ash	Aluminium Barium Chromium Cobalt Copper Iron Manganese Nickel Vanadium Zinc	Methods TOI_APA_OE_0.0062 and TOI_APA_OE_0.0006 using ICP-OES	A



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	<u>Chemical Tests</u> (cont'd)		
Ash	Cadmium Lead	Methods TOI_APA_OE_0.0062 and TOI_APA_OE_0.0012 using Graphite Furnace AAS	A
Fuel ash, aluminosilicate and high silicate materials	Lead	Microwave Digestion by method TOI_APA_OE_0.00136 based on BS EN 13656:2002 and using Graphite Furnace AAS by in house method TOI_APA_OE_0.0012	
Ash	Antimony Arsenic Selenium	Methods TOI_APA_OE_0.0062, TOI_APA_OE_0.0034 and TOI_APA_OE_0.0106 using ICP-OES, hydride method	A
Fuel ash, aluminosilicate and high silicate materials	Antimony	Microwave Digestion by method TOI_APA_OE_0.00136 based on BS EN 13656:2002 and using ICP-OES hydride method by in house method TOI_APA_OE_0.0106	
Ash	Mercury	Methods TOI_APA_OE_0.0062 and TOI_APA_OE_0.0083 using Flow Injection Mercury System	A
Fuel ash, aluminosilicate and high silicate materials	Calcium Titanium Chromium Copper Iron Manganese Molybdenum Potassium Sodium Nickel Thallium, Vanadium Zinc Fe ₂ O ₃ CaO Na ₂ O K ₂ O SiO ₂ TiO ₂ ,	Microwave Digestion by method TOI_APA_OE_0.00136 based on BS EN 13656:2002 and using ICP-OES by in house method TOI_APA_OE_0.0006	A



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	<u>Chemical Tests</u> (cont'd)		
Fuels Coal, Petcoke, Oils & Biomass	Carbon, Hydrogen and Nitrogen	TOI_APA_FT_010 using LECO Analyser	A
Leachates	Aluminium Barium Beryllium Calcium Chromium Cobalt Copper Iron Magnesium Manganese Molybdenum Nickel Titanium Vanadium Zinc	ISO 12457:2002 and Documented In-House Method TOI_APA_OE_0.0108 and TOI_APA_OE_0.0006 using ICP-OES	A
Leachates	Antimony Arsenic Selenium	ISO 12457:2002 and Documented In-House Method TOI_APA_OE_0.0108 and TOI_APA_OE_0.0106 using ICP-OES, hydride method	A
Leachates	Cadmium Lead	ISO 12457:2002 and Documented In-House Method TOI_APA_OE_0.0108 and TOI_APA_OE_0.0012 using Graphite Furnace AAS	A
Leachates	Mercury	ISO 12457:2002 and Documented In-House Method TOI_APA_OE_0.0108 and TOI_APA_OE_0.0083 using Flow Injection Mercury System	A
Leachates	Fluoride	ISO 12457:2002 and Documented In-House Method TOI_APA_OE_0.0108 and TOI_APA_OE_0.0014 using Ion Selective Electrode	A



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/Equipment/Techniques used	Location Code
Stack Emissions - Continuous Emissions Monitoring Systems (CEMS) (excluding dust monitors and cross duct systems)	<u>On-Site Testing</u> Functional Testing: Linearity Zero Span Response time Leak test	Documented in house procedure TOI_APT_005_1 & 005_2 to the requirements of BS EN 14181:2014 and Environment Agency MID 14181 (TGN20 Annex A)	D
The organisation holds a flexible scope of accreditation for this test. Please contact the organisation for details of the individual CEMS they can test using this method.			
Testing of Stack Emissions to Atmosphere	<u>Sampling with subsequent analysis by an ISO/IEC 17025 Accredited Laboratory</u> Total Particulate Matter (20 to 1000 mg/m ³)	National, International and other recognised standards using documented In-House work instructions to meet the requirements of DD CEN/TS 15675:2007/ BS EN 15259:2007 BS ISO 9096:2003 (TOI_APT_001_2)	C



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	<u>Sampling with subsequent analysis by an ISO/IEC 17025 Accredited Laboratory (cont'd)</u>	National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007	
Testing of Stack Emissions to Atmosphere	Total Particulate Matter	BS EN 13284-1:2002 (TOI_APT_001_2)	C
Testing of Stack Emissions to Atmosphere	PM ₁₀ and PM _{2.5}	BS EN ISO 23210:2009 (TOI_APT_001_3)	C
Testing of Stack Emissions to Atmosphere	Hydrogen Chloride	BS EN 1911:2010 (TOI_APT_003_1)	C
Testing of Stack Emissions to Atmosphere	Hydrogen fluoride	BS ISO 15713:2006 (TOI_APT_003_1)	C
Testing of Stack Emissions to Atmosphere	Sulphur dioxide	BS EN 14791:2005 (TOI_APT_003_1)	C
Testing of Stack Emissions to Atmosphere	Ammonia	BS EN 14791:2005 (TOI_APT_003_1)	C
Testing of Stack Emissions to Atmosphere	Metals	BS EN 14385:2004 (TOI_APT_002_1)	C
Testing of Stack Emissions to Atmosphere	Mercury	BS EN 13211:2001 (TOI_APT_002_1)	C
Testing of Stack Emissions to Atmosphere	Dioxins and Furans	BS EN 1948-1:2006 (TOI_APT_002_1)	C
Testing of Stack Emissions to Atmosphere	Dioxin-like Polychlorinated Biphenyls (PCBs)	BS EN 1948-4:2010 (TOI_APT_002_1)	C
Testing of Stack Emissions to Atmosphere	Polycyclic Aromatic Hydrocarbons (PAHs)	BS ISO 11338-1:2003 (TOI_APT_002_1)	C



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	<u>Sampling and On-Site analysis</u>	National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007 (cont'd)	
Testing of Stack Emissions to Atmosphere	Water Vapour	BSEN 14790:2005 (TOI_APT_003_1)	C
	<u>Sampling and On-Line analysis</u>		
Testing of Stack Emissions to Atmosphere	Pressure, Temperature and Velocity (Point Velocity Method)	BS EN 16911-1:2013 (Method TOI_APT_006_1 using differential pressure device (pitot tube) method)	C
		BS EN 16911-1:2013 excluding MID 16911-1 (Method TOI_APT_006_1 using differential pressure device (pitot tube) method)	
Testing of Stack Emissions to Atmosphere	Temperature, Average Velocity and Volume Flow Rate (tracer gas dilution method)	BS EN 16911-1:2013 (Annex C) Tracer Injection and temperature measurement (TOI_APT_006_2)	C
Testing of Stack Emissions to Atmosphere	Carbon Dioxide*	ISO 12039:2001 (TOI_APT_004_1 - NDIR analyser)	C
Testing of Stack Emissions to Atmosphere	Oxygen*	BS EN 14789: 2005 (TOI_APT_004_1 - Paramagnetic analyser) (TOI_APT_004_1 - Validated Zirconium cell analyser)	C
Testing of Stack Emissions to Atmosphere	Carbon Monoxide*	BS EN 15058:2006 (TOI_APT_004_1 - NDIR analyser)	C



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
	<u>Sampling and On-Line analysis</u> (cont'd)	National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007 (cont'd)	
Testing of Stack Emissions to Atmosphere	Oxides of Nitrogen*	BS EN 14792:2005 (TOI_APT_004_1 - Chemiluminescence analyser) (TOI_APT_004_1 - Validated NDUV analyser) (TOI_APT_004_1 - Validated NDIR analyser)	C
Testing of Stack Emissions to Atmosphere	Nitrous Oxide*	BS ISO 21258:2010 (TOI_APT_004_1 - NDIR analyser)	C
Testing of Stack Emissions to Atmosphere	Sulphur Dioxide*	EA TGN M21 (TOI_APT_004_1 - NDIR analyser) (TOI_APT_004_1 - NDUV analyser)	C
Testing of Stack Emissions to Atmosphere	Total Gaseous Organic Carbon (TOC/VOC)* (0 to 1000 mg/m ³)	BS EN 12619:2013 (TOI_APT_004_2 - FID analyser)	C
Stack Emissions - Continuous Emissions Monitoring Systems (CEMS)	QAL 2 and the Annual Surveillance Test (AST) for CEMS	Documented in house procedure TOI_APT_005_3 to meet the requirements of BS EN 14181:2014, Environment Agency MID 14181 (TGN M20 Annex A) and other requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007	A, C
END			

* - The scale range of the analyser used for this test must be that detailed on its current MCERTS certificate or a range validated by the organisation to meet MCERTS requirements.

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