Report for Periodic Monitoring of Emissions to Atmosphere

Part 1:	**Executive Summary**
Permit Number:	**N/A**
Operator:	**Covpress Ltd**
Installation:	**Canley**
Emission Point(s):	**Burn off oven, Gas Burner & Wash Steam Vent**
Monitoring Date(s):	**9th & 11th November 2011**

UKAS TESTING 1709

mCERTS

Contract Reference:	FTBS18427
Operator:	Covpress Ltd
Address:	Canley Coventry CV5 6RT
Monitoring Organisation:	RPS Consultants
Address:	Grafton Building, Caswell Science & Technology Park, Caswell, Towcester, Northamptonshire, NN12 8EQ.
Report Date:	21st December 2011
Report Approved By:	Glyn Harrison
Position:	Principal Consultant
MCERTS Registration Number:	MM 03 228
MCERTS Certification Level:	2
Technical Endorsements:	TE1, TE2, TE3, TE4

Signature: [redacted]

RPS Consultants has produced this report within the term of the contract with the client and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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Monitoring Objectives

At the request of Steve Cottom of Covpress Ltd, RPS Consultants conducted stack emission monitoring at the Canley site in November 2011.

The monitoring programme at this installation was carried out to provide data on emissions to atmosphere for information purposes.

The following tables detail the parameters requested for monitoring at each emission point and the actual monitoring conducted.

Table 1.1

Parameters Requested to be Monitored	Emission Point
	Burn off oven
Total Particulate Matter	✓
Volatile Organic Compounds	✓
Carbon Monoxide	✓
Oxides of Nitrogen	✓
Specific Requirements	Normal

Notes:
✓ *Represents pollutants sampled*

Table 1.2

Parameters Requested to be Monitored	Emission Point
	Gas Burner
Carbon Monoxide	✓
Oxides of Nitrogen	✓
Specific Requirements	Normal

Notes:
✓ *Represents pollutants sampled*

Table 1.3

Parameters Requested to be Monitored	Emission Point Wash Steam Vent
Total Particulate Matter	✓
Specific Requirements	Normal

Notes:
✓ *Represents pollutants sampled*

Monitoring Results

Table 2.1 Monitoring results for emission point Burn off oven, Carried out on 11/11/2011

Substance Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Uncertainty (Expressed expanded k=2)	Reference Conditions 273K, 101.3kPa	Sampling Date	Sampling Times	Monitoring Reference Method	Accreditation Status	Operating Status
Carbon Monoxide	No ELV	219	mg/m^3	+/- 11	273K, 101.3kPa, Dry, 11% Oxygen	11/11/2011	09:19 - 13:26	EN 15058:2006	MCERTS	Normal
Oxides of Nitrogen	No ELV	81	mg/m^3	+/- 4.4	273K, 101.3kPa, Dry, 11% Oxygen	11/11/2011	09:19 - 13:26	BS EN 14792:2005	MCERTS	Normal
Total Particulate Matter	No ELV	14	mg/m^3	+/- 0.61	273K, 101.3kPa, Dry, 11% Oxygen	11/11/2011	09:22 - 13:32	BS EN 13284-1:2002	MCERTS	Normal
Volatile Organic Compounds (as Carbon)	No ELV	7.2	mg/m^3	+/- 1.6	273K, 101.3kPa, Dry, 11% Oxygen	11/11/2011	09:18 - 13:32	BS EN 13526	MCERTS	Normal

Table 2.2 Monitoring results for emission point Gas Burner, Carried out on 09/11/2011

Substance Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Uncertainty (Expressed expanded k=2)	Reference Conditions 273K, 101.3kPa	Sampling Date	Sampling Times	Monitoring Reference Method	Accreditation Status	Operating Status
Carbon Monoxide	No ELV	12	mg/m^3	+/- 0.40	273K, 101.3kPa, Dry	09/11/2011	13:52 - 14:52	EN 15058:2006	MCERTS	Normal
Oxides of Nitrogen	No ELV	16	mg/m^3	+/- 0.54	273K, 101.3kPa, Dry	09/11/2011	13:52 - 14:52	BS EN 14792:2005	MCERTS	Normal

Table 2.3 Monitoring results for emission point Wash Steam Vent, Carried out on 09/11/2011

Substance Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Uncertainty (Expressed expanded k=2)	Reference Conditions 273K, 101.3kPa	Sampling Date	Sampling Times	Monitoring Reference Method	Accreditation Status	Operating Status
Total Particulate Matter	No Limit	3.4	mg/m^3	+/- 0.27	273K, 101.3kPa, Wet	09/11/2011	13:46 - 14:46	BS EN 13284-1:2002	MCERTS	Normal

Operating Information

Table 3.1 Operating conditions during the monitoring of emission point Burn off oven carried out on 11/11/2011

Parameter	Result
Sample Date	11/11/2011
Process Type	Batch
Process Duration	4-5 Hour
If 'Batch', was monitoring carried out over the whole batch?	No
Abatement/Operational?	Not Installed

Comparison of Operator CEM and Periodic Monitoring Results		
Substance	**CEMs Results (mg/m^3)**	**Periodic Monitoring Results (mg/m^3)**
No CEMS Installed/Data Available		

Table 3.2 Operating conditions during the monitoring of emission point Gas Burner carried out on 09/11/2011

Parameter	Result
Sample Date	09/11/2011
Process Type	Continuous
Process Duration	N/A
If 'Batch', was monitoring carried out over the whole batch?	N/A
Abatement/Operational?	Not Installed

Comparison of Operator CEM and Periodic Monitoring Results		
Substance	**CEMs Results (mg/m^3)**	**Periodic Monitoring Results (mg/m^3)**
No CEMS Installed/Data Available		

Table 3.3 Operating conditions during the monitoring of emission point Wash Steam Vent carried out on 09/11/2011

Parameter	Result
Sample Date	09/11/2011
Process Type	Continuous
Process Duration	N/A
If 'Batch', was monitoring carried out over the whole batch?	N/A
Abatement/Operational?	Not Installed

Comparison of Operator CEM and Periodic Monitoring Results		
Substance	**CEMs Results (mg/m^3)**	**Periodic Monitoring Results (mg/m^3)**
No CEMS Installed/Data Available		

Monitoring Deviations

Table 4.1 Monitoring Deviations for Emission Point Burn off oven

Pollutant	Substance Deviations	Monitoring Deviations	Other Relevant Issues
Carbon Monoxide, Oxides of Nitrogen, & Volatile Organic Compounds	None	None	None
Total Particulate Matter	None	Monitoring conducted from a single traverse line as only one sample port was cut into the stack. This was due to the health and safety concerns of cutting an additional open hole into a stack with a duct temperature of 750 deg C.	None

Table 4.2 Monitoring Deviations for Emission Point Gas Burner

Pollutant	Substance Deviations	Monitoring Deviations	Other Relevant Issues
Carbon Monoxide & Oxides of Nitrogen	None	Measured oxygen concentrations in the duct were predominantly close to or at ambient levels. Oxygen correction to 3% as stated in the SSP would have an significant effect on the magnitude of the results. Therefore, correction for oxygen conctent has not been carried out.	None

Table 4.3 Monitoring Deviations for Emission Point Wash Steam Vent

Pollutant	Substance Deviations	Monitoring Deviations	Other Relevant Issues
Total Particulate Matter	None	None	None

Report for Periodic Monitoring of Emissions to Atmosphere

Part 2:	**Supporting Information**
Permit Number:	**N/A**
Operator:	**Covpress Ltd**
Installation:	**Canley**
Emission Point(s):	**Burn off oven, Gas Burner & Wash Steam Vent**
Monitoring Date(s):	**9th & 11th November 2011**

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APPENDIX 1: General Information

Monitoring Organisation Staff Details

Table 5.1 Sampling Personnel

Sampling Personnel	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Carl Redgrove	Senior Consultant	Level 2	TE1, TE2, TE3, TE4	MM 03 173
Richard Carter	Consultant	Level 2	TE1, TE2, TE3, TE4	MM 07 861

Table 5.2 Report Author

Report Author	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Carl Redgrove	Senior Consultant	Level 2	TE1, TE2, TE3, TE4	MM 03 173

Table 5.3 Report Reviewer

Report Reviewer	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Glyn Harrison	Principal Consultant	Level 2	TE1, TE2, TE3, TE4	MM 03 228

Monitoring Organisation Method Details

Table 6.1 Monitoring Methods

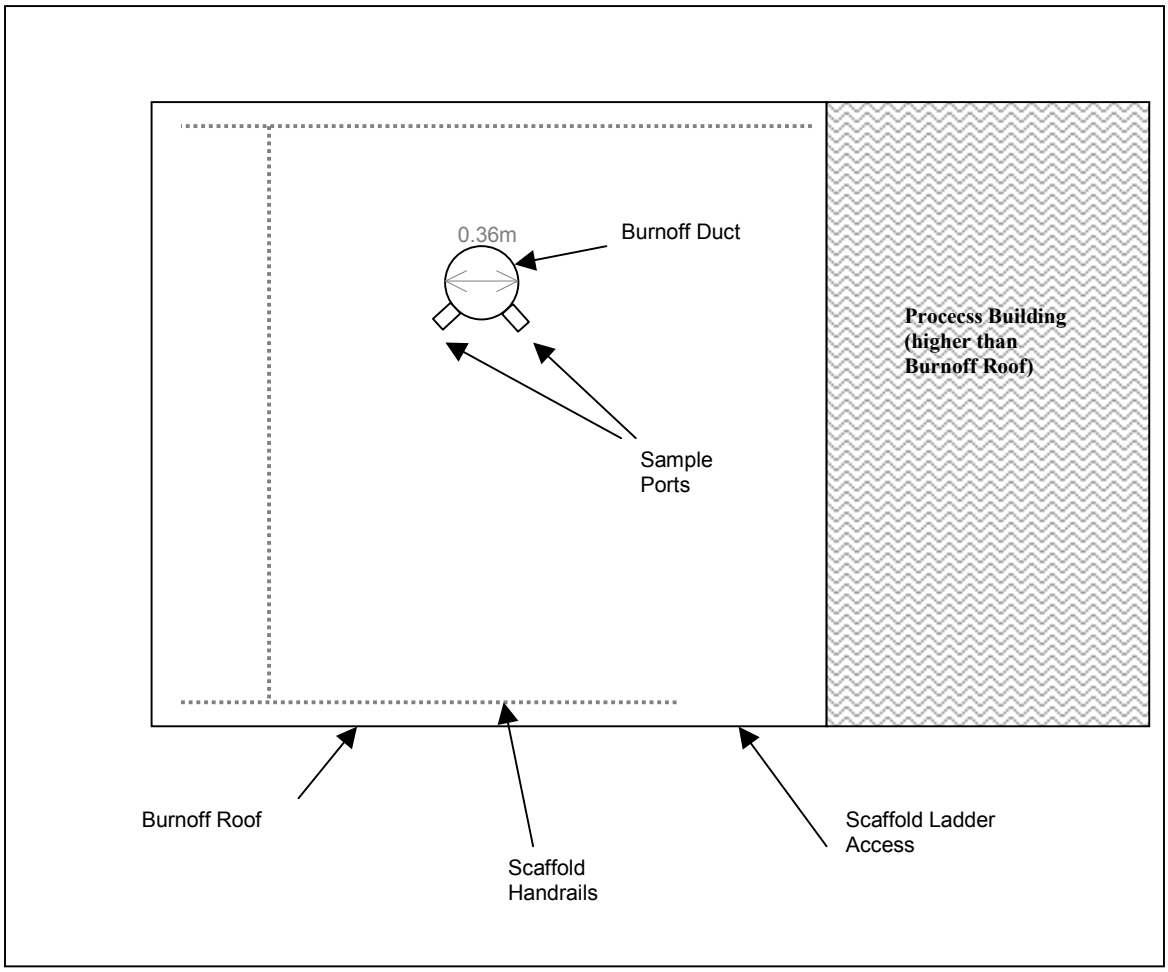
Emission Parameter	Standard Method	Monitoring Procedure No.	Monitoring Accreditation	Analysis	Analysis Procedure No.	Analytical Laboratory	Analysis Accreditaton
Practical Considerations Prior to Monitoring	N/A	RPSCE/1/1	UKAS	N/A	N/A	N/A	N/A
Gas Flows	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Gas Temperatures	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Carbon Monoxide	EN 15058:2006	RPSCE/1/21h	MCERTS	NDIR	N/A	N/A	N/A
Oxides of Nitrogen	EN 14792:2005	RPSCE/1/21f	MCERTS	Chemiluminescence	N/A	N/A	N/A
Low Concentration Total Particulate Matter	BS EN 13284-1:2002	RPSCE/1/7c	MCERTS	Gravimetric	D9	RPS Laboratories	UKAS
TOCs at high concentrations	BS EN 13526	RPSCE/1/4c	MCERTS	Flame Ionisation Detector	N/A	N/A	N/A

Table 7.1 – Checklist Used

Equipment Checklist Used	File Location Address
FTBS18427 Checklist	FTBS18427 Electronic & Work File

APPENDIX 2:
Burn off oven Sampling, Analysis & Uncertainty Data

Sampling Platform Diagram



Company Name: Covpress Ltd
Site Ref: Coventry
Stack Ref: Burn off oven

Date: 11/11/11
Run: Comb Gases

Static Press, mm H_2O:	-1.2	Stack Diamter (m)	0.4
Barometric (mm Hg) Start	745	Pitot Tube Constant:	0.826

Traverse Point No.	Port A				Port B			
	Δ p, mmH2O	Conversion for pitot coefficient and to Pa	Root Δ p,	Stack Temp °C	Δ p, mmH2O	Conversion for coefficient and t	Root Δ p,	Stack Temp °C
1	0.8	5.5	2.337	750				
2	0.8	5.5	2.337	750				
3								
4								
5								
6								
7								
8								
9								
10								
Minimum	0.8	5.5	2.337	750.0	0.0	0.0	0.000	0.0
Maximum	0.8	5.5	2.337	750.0	0.0	0.0	0.000	0.0
Average	0.8	5.5	2.337	750.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sum	1.6	10.9	4.673	1500.0	0.0	0.0	0.000	0.0
Total Sum								

Max. pitot press. =	5.5	Max. Temp.=	750.0
Min. pitot press. =	5.5	Min. Temp.=	750.0
Ratio Max:Min =	1.0 :1	Mean Temp.=	750.0

Mean Root D p	2.337
Mean Stack Temperature, °C	750.00
Traverse Stack Velocity, m/s	5.605
Stack Area, m^2	0.102
Stack Gas Volume Flow Rate, m^3/s (acms)	0.571
Stack Gas Volume Flow Rate, m^3/s (scms wet)	0.149
Stack Gas Volume Flow Rate, m3/s (scms DRY) O2 Corrected	0.114
Moisture	1
Stack Pressure, mm Hg	744.91

Gas Data

Oxygen %	13.27158465
CO_2 %	4.83

Oxygen Correction

Required Correction Value (%)	11
Oxygen Factor	1.298
Enter 0 if correction is not required	

Barometric Pressure (mmHg)	
Min	
Max	

Ambient Temperature (C)	
Min	
Max	

Is the angle of gas flow to duct axis <15° at every sample point?	Y
Is measured flow at every sample point positive?	Y
Is the measured differential pressure at every sample point >5Pa (0.5mm H_2O)?	Y
Are the highest to lowest ΔP <9:1	Y

Company Name: Covpress Ltd
Site Ref: Coventry
Stack Ref: Burn off oven

Date: 11/11/11
Run: Comb Gases

	O2 %	CO2 %	CO mg/m³	CO kg/hr	NOx mg/m³	NOx kg/hr	SO2 mg/m³	SO2 kg/hr
Average	13.27	4.83	218.96	0.09	80.95	0.03	0.00	0.00
Max	14.96	17.76	1162.57	0.48	208.08	0.09	0.00	0.00
Min	0.31	3.66	18.18	0.01	0.00	0.00	0.00	0.00
Emission Limit			No ELV		No ELV			
Moisture, %	1.0		Baromteric (mmHg) Start			745		
Oxygen Reference, %	11.0		Baromteric (mmHg) End			745		

Stack Gas Volume Flow Rate, m3/s (scms DRY) O2 Corrected	0.1137683

Calibrations	O_2 %	CO_2 %	CO ppm	NO ppm	SO2 ppm
Analyser - Start Zero	0.00	0.06	0.5	0.2	
Analyser - Start Span	14.98	8.04	112.4	35.3	
Analyser - Zero Check	0.00	0.05	0.5	0.3	
System - Zero Check	0.12	0.07	0.6	0.2	
System - Span Check	14.91	7.98	111.6	35.2	
System - End Zero Check	0.20	0.06	0.0	0.5	
System - End Span Check	14.95	7.99	111.5	34.2	
Cylinder Number					
Span Value	14.99	8.01	112.8	35	

Uncertainty calculation for Gaseous Measurement of Carbon Monoxide EN 15058

Measured concentration - CO	219.0	**mg/m³ (O_2 & H_2O uncorrected)**	**Analyser Make/Model**	Horiba PG250
Range (Max Value)	**250.0**	**mg/m³**	**ID Number**	**0928**

Performance Characteristics		**Value**			**specification**
Response time			seconds		< 200 s
Logger sampling interval		20	seconds		
Measurement period		248	minutes		
Number of readings in measurement		744	Assuming 20 Second Readings over 4.13333333333333 hour period		
Repeatability at zero		0	% of Range		< 1% Range
Repeatability at span level		0	% of Range		< 2% of Range
Deviation from linearity		0	% of Range		< 2% of Range
Zero drift (during measurement period)		-0.531915	% of Range		< 2% of Range
Span drift (during measurement period)		-0.088652	% of Range		< 2% of Range
volume or pressure flow dependence		0	% of fs / 10l/h		< 1% range
atmospheric pressure dependence		0	% of Range/kPa		< 1.5 % range
ambient temperature dependence		-0.07	% of Range /K		<0.3 % range /K
CO_2 (% vol)	15		% by volume per		
CH4 (mg/m³)	57		mg/m³		
N_2O (mg/m³)	42		mg/m³		
	Total	0	% of Range		< 4% of Range (Total)
Dependence on voltage		0.1	% by volume /10V	+- 5%	< 2% of Range/10 volt
Losses in the line (leak)		2	% of value		< 2% of value
Uncertainty of calibration gas		2	% of value		

Performance characteristic			**Uncertainty**	**Value of uncertainty quantity**			**% vol**
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.000
Lack of fit			u_{fit}				0.000
Drift			u_{0dr}				-0.880
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.000
NO							0.000
NO_2							0.000
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				2.89
Uncertainty of calibration gas			u_{calib}				2.89

Measurement Concentration	**218.96**	**mg/m³**	
Combined uncertainty Coverage factor k = 2	4.18	**mg/m³**	
Expanded uncertainty (as measured)	8.35	mg/m³	**(expressed with a level of confidence of 95%)**
Expanded uncertainty (Corrected to Ref Conditions)	**10.84**	mg/m³	

Uncertainty calculation for Gaseous Measurement of Oxygen EN14789

Measured concentration	13.27	%vol
Range (Max Value)	25	%vol

Analyser Make/Model	Horiba PG250
ID Number	0928

Performance Characteristics		**Value**			**specification**
Response time		12	seconds		< 200 s
Logger sampling interval		20	seconds		
Measurement period		248	minutes		
Number of readings in measurement		744	Assuming 20 Second Readings over 4.13333333333333 hour period		
Repeatability at zero		0.02	% by volume	stdev	<0.2 % range
Repeatability at span level		0.02	% by volume	stdev	<0.4 % range
Deviation from linearity		0.14	% vol	+/-	<0.3 % volume
Zero drift (during measurement period)		0.5336891	% vol at zero level	+/-	<2% of volume / 24hr
Span drift (during measurement period)		0.2668446	% vol at span level	+/-	<2% volume/24hr
volume or pressure flow dependence		0	% of fs / 10l/h	+- 5 l/h	<1% range
atmospheric pressure dependence		0	% of fs/kPa	+- 2kPa	< 1.5 % range
ambient temperature dependence		-0.07	% by volume /10K	+- 15K	<0.3% volume 10 K
CO_2 (% vol)	10	0.1	% by volume per	10	
NO (mg/m3)	300	0	% by volume per	300	
NO_2 (mg/m3)	30	0	% by volume per	30	
Combined interference			% range		<2% range
Dependence on voltage		0.1	% by volume /10V	+- 5%	< 0.1%vol /10 volt
Losses in the line (leak)		2	% of value		< 2% of value
Uncertainty of calibration gas		2	% of value		

Performance characteristic			**Uncertainty**		**Value of uncertainty quantity**		**% vol**
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.001
Lack of fit			u_{fit}				0.081
Drift			u_{0dr}				0.445
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.115
NO							0.000
NO_2							0.000
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				0.15
Uncertainty of calibration gas			u_{calib}				0.15

Measurement Concentration	**13.27**	**%vol**	
Combined uncertainty	0.51	%vol	
% of value	3.87	%	
Coverage factor k = 2			
Expanded uncertainty	7.75	% of value	**(expressed with a level of confidence of 95%)**
Expanded uncertainty		**1.03 % vol**	

Uncertainty calculation for Gaseous Measurement of Oxides of Nitrogen BS EN 14792

Measured concentration - NOx	80.9	**mg/m³ (O_2 & H_2O uncorrected)**	**Analyser Make/Model**	Horiba PG250
Range (Max Value)	513.4	**mg/m³**	**ID Number**	**0928**

Performance Characteristics		**Value**			**specification**
Response time		13	seconds		< 180 s
Logger sampling interval		20	seconds		
Measurement period		248	minutes		
Number of readings in measurement		744	Assuming 20 Second Readings over 4.13333333333333 hour period		
Repeatability at zero		0.02	% full range		0.2
Repeatability at span level		0.02	% full range		2.0
Deviation from linearity		0.14	% of Value		2
Zero drift (during measurement period)		0.7714286	% full range		2
Span drift (during measurement period)		-2.857143	% full range		2
volume or pressure flow dependence		0	% of fs / kPa		0.033
atmospheric pressure dependence		0	% of fs/kPa		0.75
ambient temperature dependence		-0.07	% by volume /10K		0.3
CO_2 (% vol)	15		% by volume per		
CH_4 (mg/m³)	57		mg/m³		
NH_3 (mg/m³)	20		mg/m³		
Converter Efficiency		98.76	%		95%
Dependence on voltage		0.1	% by volume /10V		2% Full Scale /10 volt
Losses in the line (leak)		2	% of value		2% of value
Uncertainty of calibration gas		2	% of value		2% of value

Performance characteristic			**Uncertainty**	**Value of uncertainty quantity**			**% vol**
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.001
Lack of fit			u_{fit}				0.415
Drift			u_{0dr}				-0.975
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.000
NO							0.000
NO_2							0.000
Converter Efficiency			u_{cerr}				0.01
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				0.93
Uncertainty of calibration gas			u_{calib}				0.93

Measurement Concentration (as measured)	**80.95**	**mg/m³**	
Combined uncertainty	1.69	mg/m³	
Coverage factor k = 2			
Expanded uncertainty (as measured)	3.39	mg/m³	**(expressed with a level of confidence of 95%)**
Expanded uncertainty (Corrected to Ref Conditions)	**4.40**	**mg/m³**	

Uncertainty calculation for Gaseous Measurement of Carbon Dioxide ISO12039

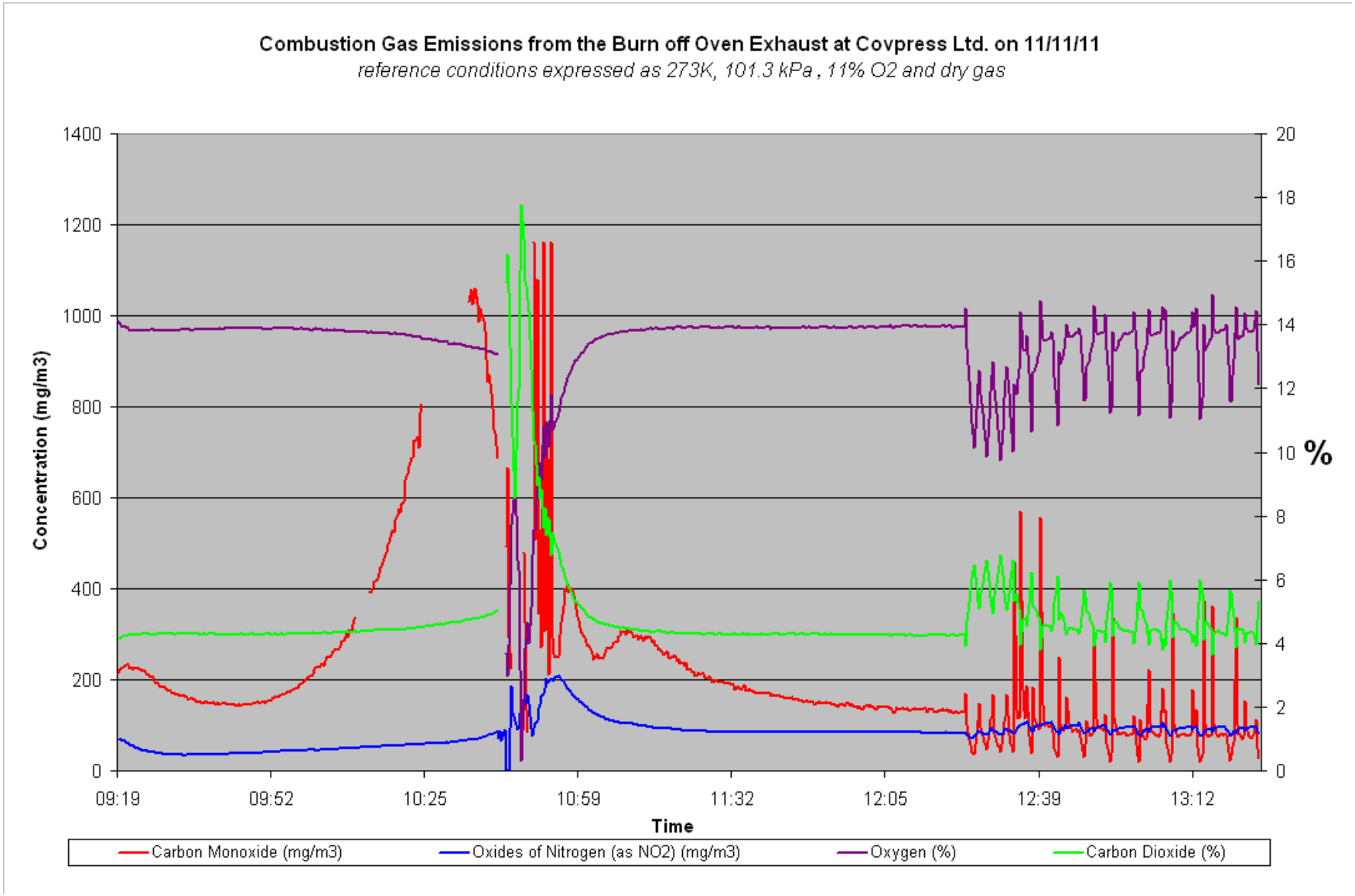
Measured concentration	4.83	%vol
Range (Max Value)	20	%vol

Analyser Make/Model	Horiba PG250
ID Number	0928

Performance Characteristics		Value			specification
Response time		15	seconds		< 200 s
Logger sampling interval		20	seconds		
Measurement period		248	minutes		
Number of readings in measurement		744	Assuming 20 Second Readings over 4.13333333333333 hour period		
Repeatability at zero		0.02	% by volume	stdev	<0.2 % range
Repeatability at span level		0.02	% by volume	stdev	<0.4 % range
Deviation from linearity		0.14	% vol	+/-	<0.3 % volume
Zero drift (during measurement period)		0	% vol at zero level	+/-	<2% of volume / 24hr
Span drift (during measurement period)		-0.62422	% vol at span level	+/-	<2% volume/24hr
volume or pressure flow dependence		0	% of fs / 10l/h	+- 5 l/h	<1% range
atmospheric pressure dependence		0	% of fs/kPa	+- 2kPa	< 1.5 % range
ambient temperature dependence		-0.07	% by volume /10K	+- 15K	<0.3% volume 10 K
NO (ppm)	100	0.1	% by volume per	100	
SO2 (ppm)	100	0	% by volume per	100	
CO (ppm)	100	0	% by volume per	100	
Combined interference			% range		<2% range
Dependence on voltage		0.1	% by volume /10V	+- 5%	< 0.1%vol /10 volt
Losses in the line (leak)		2	% of value		< 2% of value
Uncertainty of calibration gas		2	% of value		

Performance characteristic			Uncertainty		Value of uncertainty quantity		% vol
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.001
Lack of fit			u_{fit}				0.081
Drift			u_{0dr}				-0.116
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.011
NO							0.000
NO_2							0.000
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				0.06
Uncertainty of calibration gas			u_{calib}				0.06

Measurement Concentration	**4.83**	**%vol**	
Combined uncertainty	0.16	%vol	
% of value	3.36	%	
Coverage factor k = 2			
Expanded uncertainty	**0.32**	**% vol**	**(expressed with a level of confidence of 95%)**
Expanded uncertainty		0.02 % of value	


Combustion Gas Emissions from the Burn off Oven Exhaust at Covpress Ltd. on 11/11/11
reference conditions expressed as 273K, 101.3 kPa , 11% O2 and dry gas
Concentration (mg/m3)
%
Time
09:19
09:52
10:25
10:59
11:32
12:05
12:39
13:12
Carbon Monoxide (mg/m3)
Oxides of Nitrogen (as NO2) (mg/m3)
Oxygen (%)
Carbon Dioxide (%)

Company Name: Covpress Ltd	In-stack Filter?		Bar. Press.mm Hg	745	K Factor	8.28	Ambient Temp.		Leak Rate (fin / %)	0.4
Site Ref: Coventry										
Sampling Point Ref: Burn off oven	Outstack Filter?	yes	Cp	0.826	Dn used	10.8	Start Time	09:22	Leak Rate (start / %)	0.4
Date: 11/11/11										
Run: TPM	Operators	CR/RC	Bws%	10	Nozzle No.		Stop Time	13:32	Box/Probe setting	160 +/- 5 oC
Project Ref: FTBS18427										
					Meter Correction Yd	0.977				

Sample Filter Weights

	Reference	Laboratory	Increase, mg
Filter	78462	RPS	12.3
Probe Washings	T122728	RPS	9.9

Sample Filter Blank Weighings

	Reference	Laboratory	Increase, mg
Filter	77939	RPS	0.6
Probe Wash	T122727	RPS	1.5

Impinger Weights

Weights	Initial	Final	Increase, g
Impinger 1	816.4	959.5	143.1
Impinger 2	627	644.1	17.1
Impinger 3	890.4	913.7	23.3
Impinger 4			0.0
Impinger 5			0.0
Silica Gel			0.0
		Total	183.5

Sample Point	Clock Time min	Pitot Δ p, mm H_2O	Stack Temp, °C	Orifice Δ H, mm H_2O		Gas Meter Reading m^3	Temp at Gas Meter Outlet °C	Condenser Temp, °C	Filter Box Temp °C	Probe Temp °C	Pump Vacuum Inches Hg	Impinger Stem Temp. °C	Root Δ p,
				Desired	Actual								
	0	1.0	480	8.3	8.3	1701880	12		120		0	10	1.000
	15	1.0	571	8.3	8.3		13		120		0	10	1.000
	30	1.0	606	8.3	8.3		14		120		0	11	1.000
	45	1.0	630	8.3	8.3		16		120		0	11	1.000
	60	1.0	667	8.3	8.3		17		120		0	11	1.000
	75	1.0	660	8.3	8.3		17		120		0	12	1.000
	90	1.0	686	8.3	8.3		17		120		0	12	1.000
	105	1.0	664	8.3	8.3		18		120		0	12	1.000
	120	1.0	659	8.3	8.3		18		120		0	13	1.000
	135	1.0	657	8.3	8.3		18		120		0	13	1.000
	150	1.0	655	8.3	8.3		18		120		0	13	1.000
	165	1.0	660	8.3	8.3		18		120		0	12	1.000
	180	1.0	682	8.3	8.3		18		120		0	11	1.000
	195	1.0	680	8.3	8.3		18		120		0	11	1.000
	210	1.0	670	8.3	8.3		19		120		0	12	1.000
	225	1.0	675	8.3	8.3		19		120		0	12	1.000
Endpoint	240					1704171							
	240.00	**1.0**	**643.9**	**8.3**	**8.3**	**2.291**	**16.9**	**#DIV/0!**	**120.0**	**#DIV/0!**	**0.0**	**11.6**	**1.0**

Company Name: Covpress Ltd
Site Ref: Coventry
Project Ref: FTBS18427

Date: 11/11/11

Sampling Point Ref: Burn off oven	Run: TPM
Meter Volume Sampled, acm	2.291
Sample Run Start Time	9:22
Sample Run End Time	13:32
Total Actual Sampling Time, min	240.0
Barometric Pressure, mm Hg	745.00
Stack Pressure, mm Hg	744.91
Average Stack Temp, °C	643.9
Meter Volume at STP, scm	2.067
Stack Moisture Content, %	10.0
Average Stack Velocity, m/sec	6.035
Stack Flow Rate, scms dry,STP	0.124
Nozzle Diameter, mm	10.80
% Isokinetic Variation	**98.6**
Total Mass of Particulate, mg	22.2
Percentage of Total Particulate Collected on Filter	55.4
Stack Particulate Concentration, mg/m^3	**13.9**
Particulate Mass rate, kg/hour	0.0062
Emission Limit value	**No ELV**

Sample Train Blank Results	
Sample Blank Particulate Concentration, mg/m^3	1.2
Total Weight Gain, mg (Sample Train Blank)	2.1
Blank Result Less than 10% of Limit Value	N/A

Uncertainty Calculation for Total Particulate Matter to BS EN 13284-1

Determined Concentration	13.9	mg/m3 (at Reference Cond)

Measured Values

Sampled Volume	2.291	m^3
Sampled gas Temperature	289.875	k
Sampled gas Pressure	99.32	kPa
Sampled gas Humidity	0	% by volume
Oxygen content	13.27	% by volume
Mass	22.2	mg

Leak	0.40	%
Uncollected Mass	0	mg

Standard Uncertainties for Measured Values

Sampled Volume	0.001	m3
Sampled gas Temperature	2	k
Sampled gas Pressure	1	kPa
Sampled gas Humidity	1	% by volume
Oxygen content	0.1	% by volume
Mass	0.14152385	mg

Uncertainty Calculation for Volume Correction

Volume Correction Factor	0.923		
	Sensitivity Coefficient		Uncertainty, Uv
Sampled gas Temperature	0.0032		0.0064
Sampled gas Pressure	0.0093		0.0093
Sampled gas Humidity	0.0092		0.0092
		Sqrt (Uv)^2	0.0146
		Total Uv	0.033

Uncertainty Calculation for Oxygen Correction

Oxygen Correction Factor	1.2975		
	Sensitivity Coefficient		Uncertainty, Uo
Oxygen Measurement	0.1687		0.0169
		Total Uo	0.0169

Uncertainty Contributions (Itemised)

	Value		Sensitivity coefficient	Uncertainty Contribution			
				Concentration		%	
Volume Correction	2.067	m3	6.74	0.23	$mg.m^{-3}$	1.62	%
Mass (weighing)	22.20	mg	0.63	0.09	$mg.m^{-3}$	0.64	%
Oxygen Correction	1.2975		10.74	0.18	$mg.m^{-3}$	1.30	%
System Leak	0.03	$mg.m^{-3}$	1.00	0.03	$mg.m^{-3}$	0.23	%
Uncollected Mass	0.00	mg	0.63	0.00	$mg.m^{-3}$	0.00	%
			Total Uncertainty	0.30	$mg.m^{-3}$		

Uncertainty Result (Uncertainty has been expanded with a coveragefactor of 2 (K=2))

Expanded Uncertainty =	0.61	$mg.m^{-3}$
=>	4.36	% of Result
=>	#VALUE!	% of ELV

Company Name: Covpress
Site Ref: Coventry
Stack Ref: Burn off oven

Date: 11/11/11
Run: VOC

	VOC (as Carbon) ppm	VOC (as Carbon) mg/m3	VOC (as Carbon) kg/h	VOC (as Toluene) mg/m3	VOC (as Toluene) kg/h	Oxygen %
Average	8.56	7.21	0.00	7.90	0.00	#DIV/0!
Max	493.73	417.63	0.16	457.40	0.17	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00
Emission Limit						
Moisture, %	10.0					
Oxygen Reference, %	11.0					

Stack Gas Volume Flow Rate, m3/s (scms Dry) O2 Corrected	0.103447209

ISO 14956 Calculation Sheet - TOC (BS EN 13526)

Studied Concentration (mg/m^3 as C)	7.209290242
Range of Instrument (mg/m^3 as C)	160.7142857

Sampling Parameters to be met	Requirement Met?
Response Time < 60s	Yes
Operating temperature (5 - 45°C)	Yes
Atmospheric pressure (700 - 1240 mbar)	Yes
Relative Humidity (10 - 90%, non condensing)	Yes
Altitude (< 2000 m)	Yes
Zero Drift 2% of FS	Yes
Span Drift 4% of FS	Yes

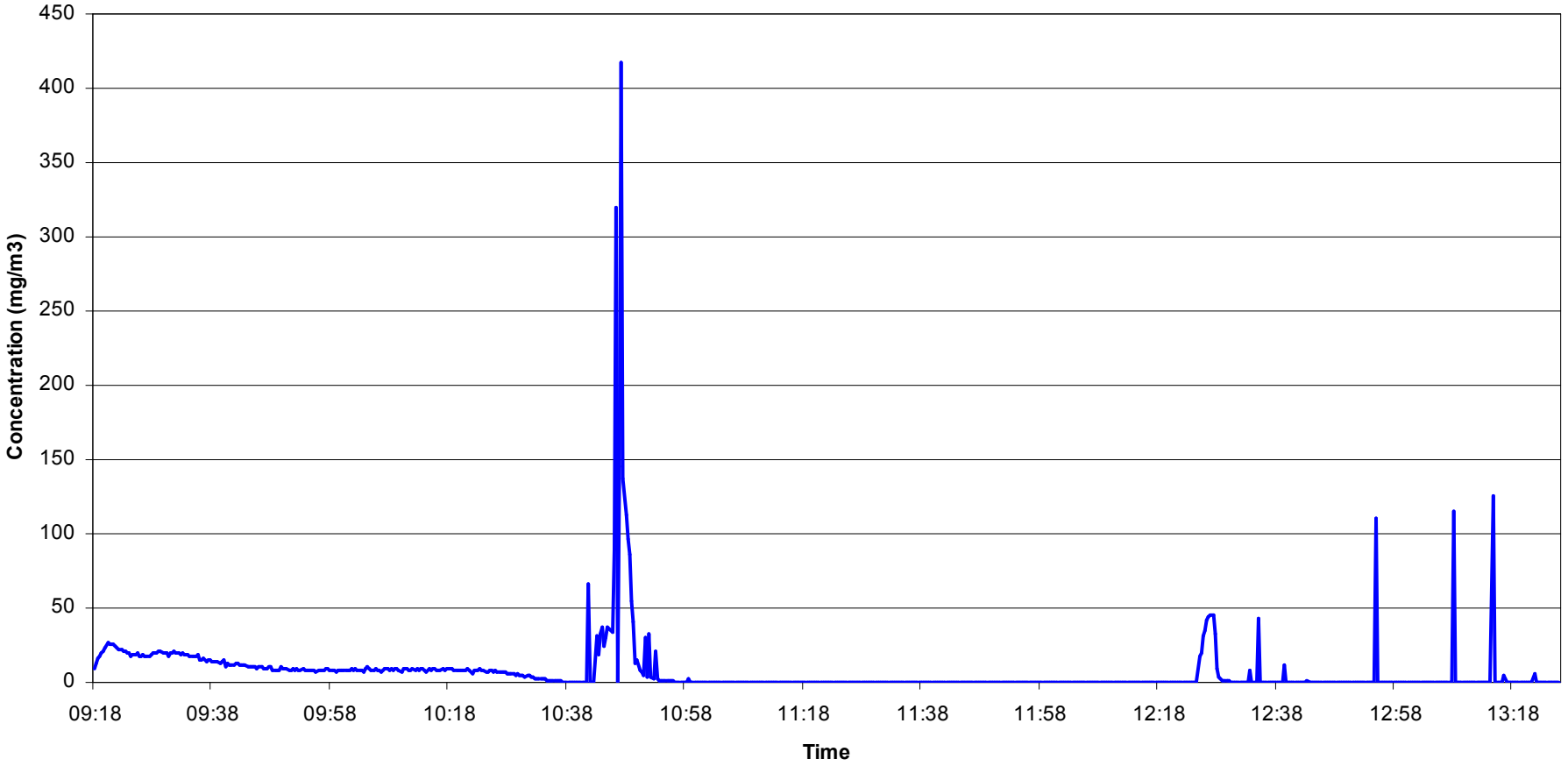
Selected Performance Characteristic	Value of Performance Characteristic			Operating Conditions compared to calibration condition		
	%	Numerical	Units	Required	Variable due to sampling conditions	Units
Deviation from Linearity	1	0.01	% FS	0.01	1	% FS
Repeatability Standard Deviation	1	0.01	% FS	0.01	1	% FS
8 Hour Drift	2	0.02	%	0.02	1	%
Atmospheric Pressure Dependence	0.1	0.001	% kPa	0.001	1	% kPa
Temperature Dependence	0.2	0.002	%K	0.002	1	%K
Sum Interference	2	0.02	%	0.02	2	%
Voltage Supply	0.1	0.001	%V	0.001	1	%V
Uncertainty of Calibration Gas	2	0.02	%	0.02	1	%
Moisture Effect	1	0.01	%Vol H2O Error	0.01	2	%Vol H2O Error
Loss in sample line (Leaks)	2	0.02	%	0.02	2	%

Measurement Performance related to stationary conditions								
			Value of Uncertainty Quantity					
			At Calibration Conditions			At Sampling Conditions		
Performance Characteristic	Uncertainty Quantity		Units	U	U^2	Units	U	U^2
Deviation form Linearity	U_{Fit}		% FS	1.60714286	2.583	% FS	1.6071429	2.583
Repeatability Standard Deviation	U_R		% FS	0.042	0.002	% FS	0.042	0.002
8 Hour Drift	U_{drift}		%	0.0832	0.007	%	0.083	0.007
Atmospheric Pressure Dependence	U_{Atmos}		% / kPa	0.004	0.000	% / kPa	0.004	0.000
Temperature Dependence	U_{Temp}		% / K	0.008	0.000	% / K	0.008	0.000
Sum Interference	$U_{Interference}$		%	0.083	0.007	%	0.004	0.000
Voltage Supply	$U_{Voltage}$		% / V	0.004	0.000	% / V	0.004	0.000
Uncertainty of Calibration Gas	$U_{Calibration\ gas}$		%	0.083	0.007	%	0.083	0.007
Loss in sample line (Leaks)	$U_{Losses,\ leak}$		%	0.083	0.007	%	0.166	0.028
			Sum	1.998	2.612	Sum	2.003	2.626

Measurement Uncertainty at	7.209290242	mg/m^3 C			
U_{tot}	1.621	mg/m^3 C			
U_{tot} /c	22.479	%	U_{limit}	30	%
Pass	Yes				

TOC Emissions Profile from the Burn off Oven on 11/11/11 at Covpress Ltd.

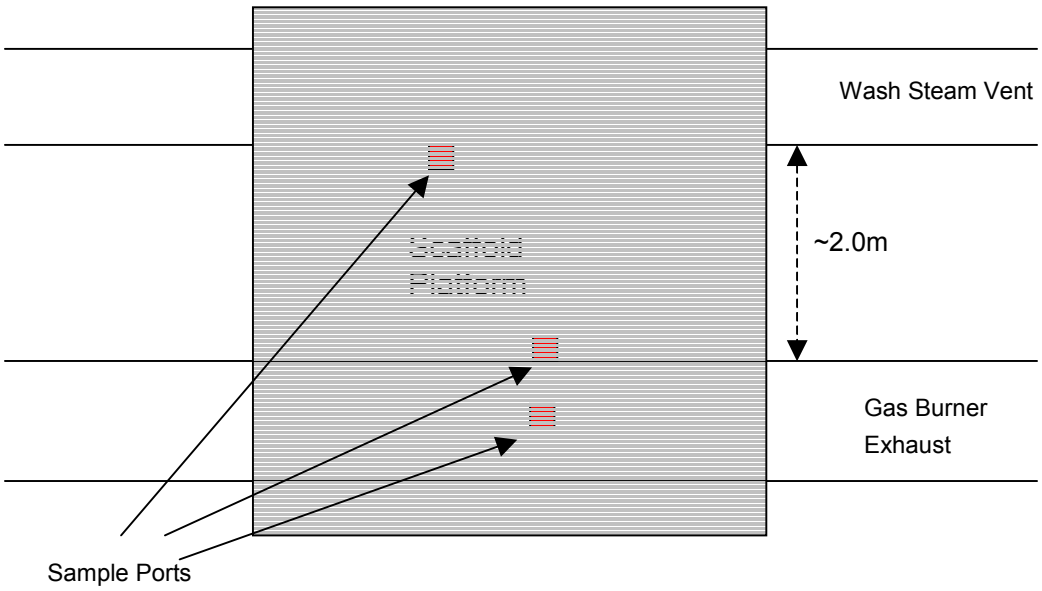
reference conditions expressed as 273K, 101.3 kPa,11% O2 and dry gas



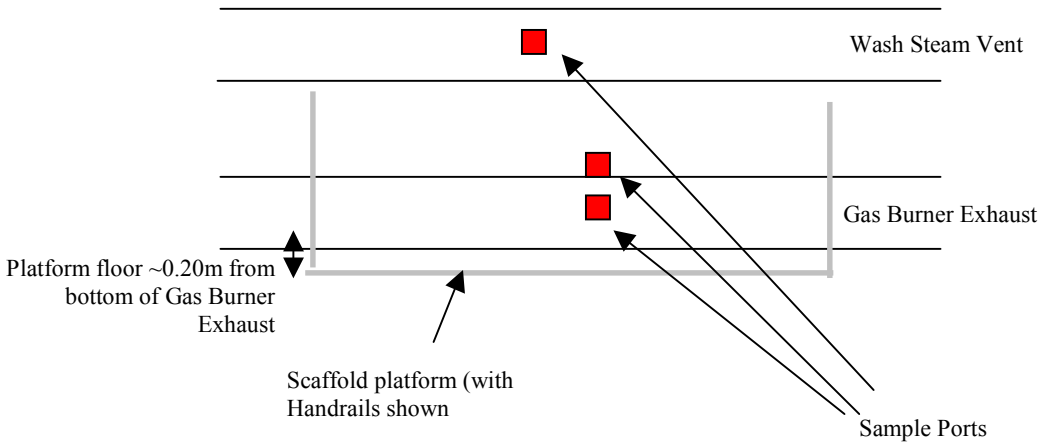
APPENDIX 3:
Gas Burner Sampling, Analysis & Uncertainty Data

Sampling Platform Diagram

Plan View of Monitoring Location with Sample Ports and Requested Scaffold



Side View of Monitoring Location with Requested Scaffold Platform



Company Name: Covpress Ltd
Site Ref: Coventry
Stack Ref: Gas Burner

Date: 09/11/11
Run: Comb Gases

Static Press, mm H_2O:	-1	Stack Diamter (m)	0.6
Barometric (mm Hg) Start	744	Pitot Tube Constant:	0.826

Traverse Point No.	Port A				Port B			
	Δ p, Pa	Conversion for pitot coefficient	Root Δ p,	Stack Temp °C	Δ p, Pa	Conversion for pitot coefficient	Root Δ p,	Stack Temp °C
1	1.0	0.7	1.000	85	1.0	0.7	0.834	81
2	1.2	0.8	1.200	86	1.2	0.8	0.914	80
3								
4								
5								
6								
7								
8								
9								
10								
Minimum	1.0	0.7	1.000	85.0	1.0	0.7	0.834	80.0
Maximum	1.2	0.8	1.200	86.0	1.2	0.8	0.914	81.0
Average	1.1	0.8	1.100	85.5	1.1	0.8	0.874	80.5
Sum	2.2	1.5	2.200	171.0	2.2	1.5	1.748	161.0
Total Sum								

Max. pitot press. =	0.8	Max. Temp.=	86.0
Min. pitot press. =	0.7	Min. Temp.=	80.0
Ratio Max:Min =	1.2 :1	Mean Temp.=	83.0

Mean Root D p	0.987
Mean Stack Temperature, °C	83.00
Traverse Stack Velocity, m/s	1.397
Stack Area, m^2	0.292
Stack Gas Volume Flow Rate, m^3/s (acms)	0.408
Stack Gas Volume Flow Rate, m^3/s (scms wet)	0.306
Stack Gas Volume Flow Rate, m3/s (scms DRY) O2 Corrected	0.303
Moisture	1
Stack Pressure, mm Hg	743.93

Gas Data

Oxygen %	19.67590231
CO_2 %	0.85

Oxygen Correction

Required Correction Value (%)	0
Oxygen Factor	1.000
Enter 0 if correction is not required	

Barometric Pressure (mmHg)	
Min	
Max	

Ambient Temperature (C)	
Min	
Max	

Is the angle of gas flow to duct axis <15° at every sample point?	Y
Is measured flow at every sample point positive?	Y
Is the measured differential pressure at every sample point >5Pa (0.5mm H_2O)?	Y
Are the highest to lowest ΔP <9:1	Y

Company Name: Covpress Ltd
Site Ref: Coventry
Stack Ref: Gas Burner

Date: 09/11/11
Run: Comb Gases

	O2 %	CO2 %	CO mg/m^3	CO kg/hr	NOx mg/m^3	NOx kg/hr	SO2 mg/m^3	SO2 kg/hr
Average	19.68	0.85	12.28	0.01	16.42	0.02	0.00	0.00
Max	21.04	2.17	46.74	0.05	37.44	0.04	0.00	0.00
Min	17.45	0.08	1.57	0.00	3.87	0.00	0.00	0.00
Emission Limit			No ELV		No ELV			
Moisture, %	1.0		Baromteric (mmHg) Start			744		
Oxygen Reference, %	0.0		Baromteric (mmHg) End			744		

Stack Gas Volume Flow Rate, m3/s (scms DRY) O2 Corrected	0.3031781

Calibrations	O_2 %	CO_2 %	CO ppm	NO ppm	SO2 ppm
Analyser - Start Zero	0.00	0.00	0.0	0.0	
Analyser - Start Span	14.99	8.10	112.9	401.4	
Analyser - Zero Check	0.08	0.06	0.7	0.2	
System - Zero Check	0.18	0.03	0.6	0.2	
System - Span Check	15.02	7.89	111.0	398.4	
System - End Zero Check	0.10	0.07	0.2	0.1	
System - End Span Check	15.03	8.04	113.0	401.7	
Cylinder Number					
Span Value	14.989	8.009	112.8	401.4	
Analyser Range (0 - X)	25	20	200	500	

Uncertainty calculation for Gaseous Measurement of Oxygen EN14789

Measured concentration	19.68	%vol
Range (Max Value)	25	%vol

Analyser Make/Model	Horiba PG250
ID Number	0928

Performance Characteristics		Value			specification
Response time		12	seconds		< 200 s
Logger sampling interval		20	seconds		
Measurement period		60	minutes		
Number of readings in measurement		180	Assuming 20 Second Readings over 1 hour period		
Repeatability at zero		0.02	% by volume	stdev	<0.2 % range
Repeatability at span level		0.02	% by volume	stdev	<0.4 % range
Deviation from linearity		0.14	% vol	+/-	<0.3 % volume
Zero drift (during measurement period)		-0.533725	% vol at zero level	+/-	<2% of volume / 24hr
Span drift (during measurement period)		0.0667156	% vol at span level	+/-	<2% volume/24hr
volume or pressure flow dependence		0	% of fs / 10l/h	+- 5 l/h	<1% range
atmospheric pressure dependence		0	% of fs/kPa	+- 2kPa	< 1.5 % range
ambient temperature dependence		-0.07	% by volume /10K	+- 15K	<0.3% volume 10 K
CO_2 (% vol)	10	0.1	% by volume per	10	
NO (mg/m3)	300	0	% by volume per	300	
NO_2 (mg/m3)	30	0	% by volume per	30	
Combined interference			% range		<2% range
Dependence on voltage		0.1	% by volume /10V	+- 5%	< 0.1%vol /10 volt
Losses in the line (leak)		2	% of value		< 2% of value
Uncertainty of calibration gas		2	% of value		

Performance characteristic			Uncertainty	Value of uncertainty quantity			% vol
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.001
Lack of fit			u_{fit}				0.081
Drift			u_{0dr}				-0.258
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.013
NO							0.000
NO_2							0.000
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				0.23
Uncertainty of calibration gas			u_{calib}				0.23

Measurement Concentration	**19.68**	**%vol**	
Combined uncertainty	0.42	%vol	
% of value	2.13	%	
Coverage factor k = 2			
Expanded uncertainty	4.27	% of value	**(expressed with a level of confidence of 95%)**
Expanded uncertainty	**0.84**	**% vol**	

Uncertainty calculation for Gaseous Measurement of Carbon Monoxide EN 15058

Measured concentration - CO	12.3	**mg/m^3 (O_2 & H_2O uncorrected)**	**Analyser Make/Model**	Horiba PG250
Range (Max Value)	**250.0**	**mg/m^3**	**ID Number**	**0928**

Performance Characteristics		**Value**			**specification**
Response time			seconds		< 200 s
Logger sampling interval		20	seconds		
Measurement period		60	minutes		
Number of readings in measurement		180	Assuming 20 Second Readings over 1 hour period		
Repeatability at zero		0	% of Range		< 1% Range
Repeatability at span level		0	% of Range		< 2% of Range
Deviation from linearity		0	% of Range		< 2% of Range
Zero drift (during measurement period)		-0.35461	% of Range		< 2% of Range
Span drift (during measurement period)		1.7730496	% of Range		< 2% of Range
volume or pressure flow dependence		0	% of fs / 10l/h		< 1% range
atmospheric pressure dependence		0	% of Range/kPa		< 1.5 % range
ambient temperature dependence		-0.07	% of Range /K		<0.3 % range /K
CO_2 (% vol)	15		% by volume per		
CH4 (mg/m^3)	57		mg/m^3		
N_2O (mg/m^3)	42		mg/m^3		
	Total	0	% of Range		< 4% of Range (Total)
Dependence on voltage		0.1	% by volume /10V	+- 5%	< 2% of Range/10 volt
Losses in the line (leak)		2	% of value		< 2% of value
Uncertainty of calibration gas		2	% of value		

Performance characteristic			**Uncertainty**	**Value of uncertainty quantity**			**% vol**
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.000
Lack of fit			u_{fit}				0.000
Drift			u_{0dr}				0.000
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.000
NO							0.000
NO_2							0.000
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				0.14
Uncertainty of calibration gas			u_{calib}				0.14

Measurement Concentration	**12.28**	**mg/m^3**	
Combined uncertainty Coverage factor k = 2	0.20	**mg/m^3**	
Expanded uncertainty (as measured)	0.40	mg/m^3	**(expressed with a level of confidence of 95%)**
Expanded uncertainty (Corrected to Ref Conditions)	**0.40**	mg/m^3	

Uncertainty calculation for Gaseous Measurement of Oxides of Nitrogen BS EN 14792

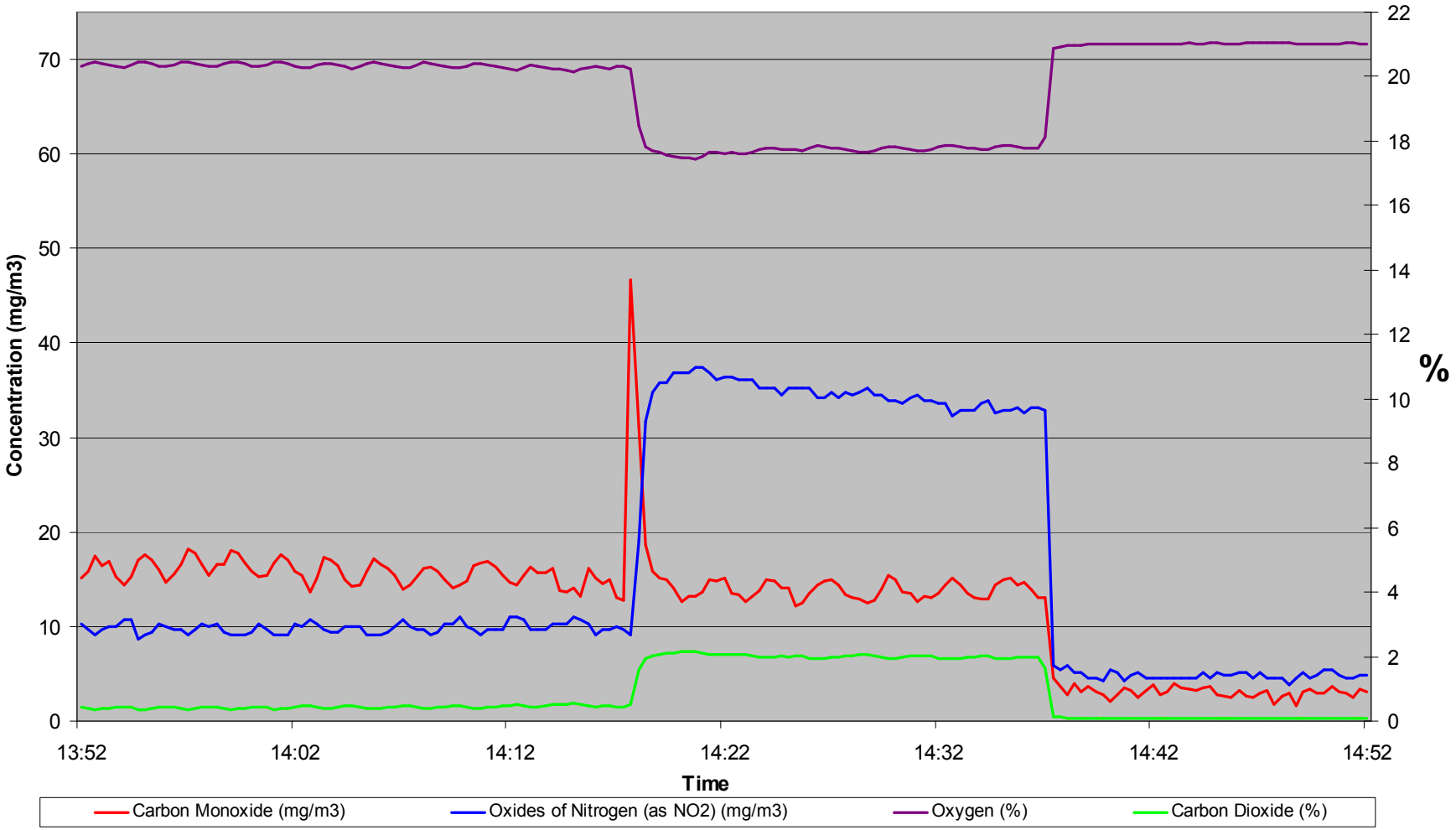
Measured concentration - NOx	16.4	**mg/m^3 (O_2 & H_2O uncorrected)**	**Analyser Make/Model**	Horiba PG250
Range (Max Value)	**1026.8**	**mg/m^3**	**ID Number**	**0928**

Performance Characteristics		**Value**			**specification**
Response time		14	seconds		< 180 s
Logger sampling interval		20	seconds		
Measurement period		60	minutes		
Number of readings in measurement		180	Assuming 20 Second Readings over 1 hour period		
Repeatability at zero		0.02	% full range		0.2
Repeatability at span level		0.02	% full range		2.0
Deviation from linearity		0.14	% of Value		2
Zero drift (during measurement period)		-0.024913	% full range		2
Span drift (during measurement period)		0.8221226	% full range		2
volume or pressure flow dependence		0	% of fs / kPa		0.033
atmospheric pressure dependence		0	% of fs/kPa		0.75
ambient temperature dependence		-0.07	% by volume /10K		0.3
CO_2 (% vol)	15		% by volume per		
CH_4 (mg/m^3)	57		mg/m^3		
NH_3 (mg/m^3)	20		mg/m^3		
Converter Efficiency		98.76	%		95%
Dependence on voltage		0.1	% by volume /10V		2% Full Scale /10 volt
Losses in the line (leak)		2	% of value		2% of value
Uncertainty of calibration gas		2	% of value		2% of value

Performance characteristic			**Uncertainty**	**Value of uncertainty quantity**			**% vol**
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.001
Lack of fit			u_{fit}				0.000
Drift			u_{0dr}				0.000
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.000
NO							0.000
NO_2							0.000
Converter Efficiency			u_{cnv}				0.00
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				0.19
Uncertainty of calibration gas			u_{calib}				0.19

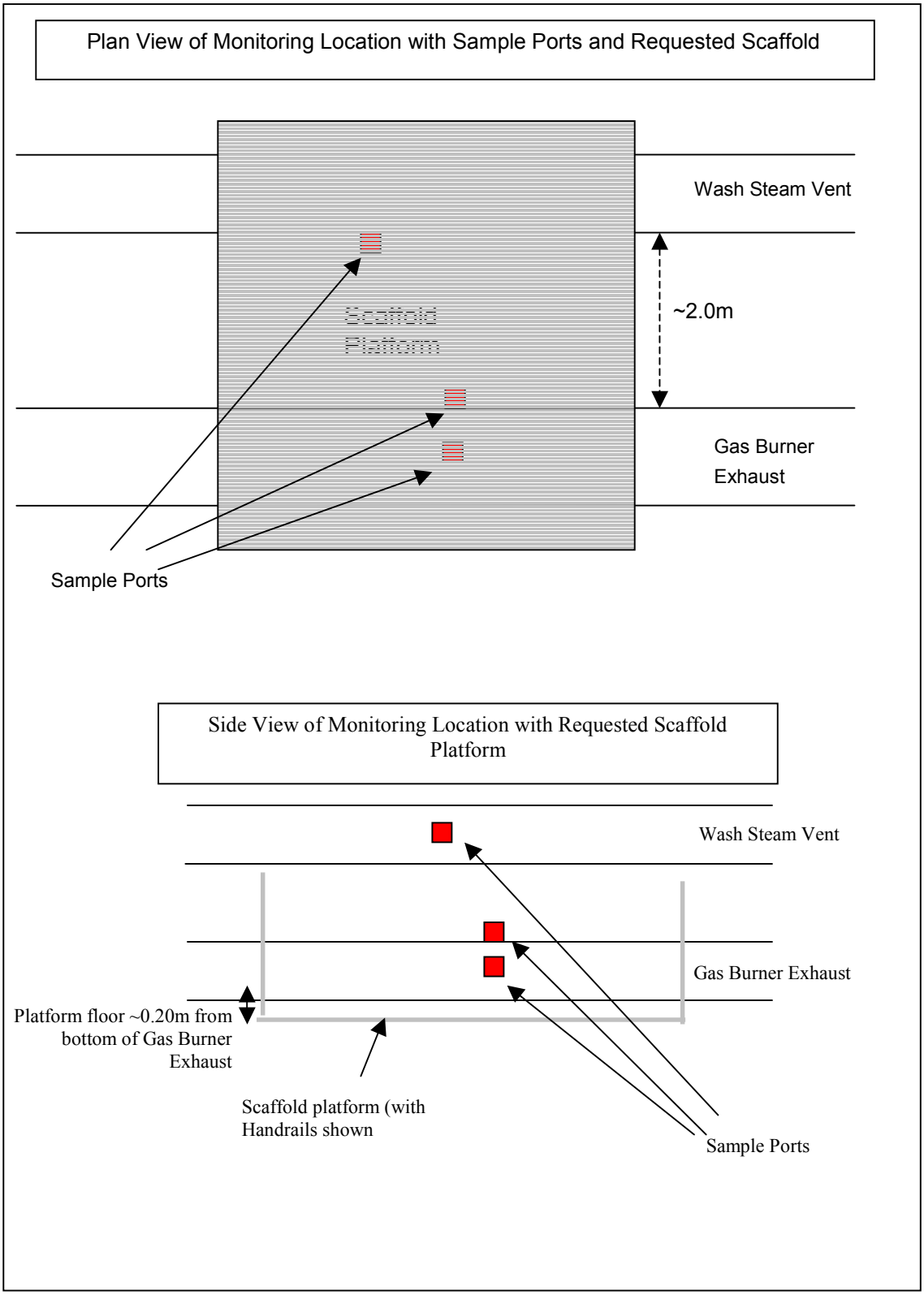
Measurement Concentration (as measured)	**16.42**	**mg/m^3**	
Combined uncertainty	0.27	mg/m^3	
Coverage factor k = 2			
Expanded uncertainty (as measured)	0.54	mg/m^3	**(expressed with a level of confidence of 95%)**
Expanded uncertainty (Corrected to Ref Conditions)	**0.54**	**mg/m^3**	

Combustion Gas Emissions from the Gas Burner at Covpress on 9/11/11
reference conditions expressed as 273K, 101.3 kPa, without correction for oxygen



APPENDIX 4:
Wash Steam Vent Sampling, Analysis & Uncertainty Data

Sampling Platform Diagram



Company Name: Covpress Ltd
Site Ref: Coventry
Sampling Point Ref: Wash Steam Vent
Project Ref: FTBS18427

Date: 09/11/11
Run: TPM

Stack Diamter (m): 0.56
Stack Area (m2): 0.246

Stack Static press.mm H_2O: 0.8

Traverse Point No.	Port A			Port B		
	Δ p, mm H_2O	Root Δ p	Stack Temp °C	Δ p, mm H_2O	Root Δ p	Stack Temp °C
1	1.8	1.342	30	2.2	1.483	33
2	1.8	1.342	32	2.2	1.483	34
3						
4						
5						
6						
7						
8						
9						
10						
Minimum	1.8	1.342	30	2.2	1.483	33
Maximum	1.8	1.342	32	2.2	1.483	34
Mean	**1.8**	**1.342**	**31.0**	**2.2**	**1.483**	**33.5**
Sum	3.6	2.683	62	4.4	2.966	67
Total Sum						

Max. pitot press. =	2.2
Min. pitot press. =	1.8
Ratio Max:Min =	1.2 :1

Gas Data

Oxygen %	21.0
CO_2 %	0.04
CO %	

Oxygen Correction

Required Correction Value	0
Actual Oxygen Factor	1
Enter 0 if correction is not required	

Is the angle of gas flow to duct axis <15° at every sample point?	Y
Is measured flow at every sample point positive?	Y
Is the measured differential pressure at every sample point >5Pa (0.5mm H_2O)?	Y
Are the highest to lowest ΔP <9:1	Y

Company Name: Covpress Ltd	In-stack Filter?		Bar. Press.mm Hg	744	K Factor	24.85	Ambient Temp.		Leak Rate (fin / %)	0.9
Site Ref: Coventry										
Sampling Point Ref: Wash Steam Vent	Outstack Filter?	yes	Cp	0.826	Dn used	10.8	Start Time	13:46	Leak Rate (start / %)	0.45
Date: 09/11/11										
Run: TPM	Operators	CR, RC	Bws%	3.3	Nozzle No.		Stop Time	14:46	Box/Probe setting	160 +/- 5 oC
Project Ref: FTBS18427										
					Meter Correction Yd	0.997				

Sample Filter Weights

	Reference	Laboratory	Increase, mg
Filter	78463	RPS	0.1
Probe Washings	T122726	RPS	3.8

Sample Filter Blank Weighings

	Reference	Laboratory	Increase, mg
Filter	78461	RPS	0.1
Probe Wash	T122725	RPS	0.5

Impinger Weights

Weights	Initial	Final	Increase, g
Impinger 1	819	816.4	-2.6
Impinger 2	618.3	627	8.7
Impinger 3	866.4	890.4	24.0
Impinger 4			0.0
Impinger 5			0.0
Silica Gel			0.0
		Total	30.1

Sample Point	Clock Time min	Pitot Δ p, mm H_2O	Stack Temp, °C	Orifice Δ H, mm H_2O		Gas Meter Reading m^3	Temp at Gas Meter Outlet °C	Condenser Temp, °C	Filter Box Temp °C	Probe Temp °C	Pump Vacuum Inches Hg	Impinger Stem Temp. °C	Root Δ p,
				Desired	Actual								
	0	1.8	27	44.7	44.7	758537.9	22		120	120	-2	18	1.342
	5	1.8	28	44.7	44.7		24		120	120	-2	18	1.342
	10	1.8	28	44.7	44.7		24		120	120	-2	17	1.342
	15	1.8	29	44.7	44.7		26		120	121	-2	16	1.342
	20	1.8	30	44.7	44.7		25		120	120	-2	16	1.342
	25	1.8	31	44.7	44.7		26		119	120	-2	17	1.342
Endpoint	30												0.000
	0	1.8	32	44.7	44.7		27		120	121	-2	17	1.342
	5	1.8	34	44.7	44.7		27		120	119	-2	18	1.342
	10	2.0	37	49.7	44.7		27		121	120	-2	18	1.414
	15	2.0	37	49.7	49.7		27		119	120	-2	18	1.414
	20	2.0	38	49.7	49.7		28		119	120	-2	18	1.414
	25	2.0	38	49.7	49.7		29		119	120	-2	17	1.414
Endpoint	30					759780.9							0.000
	60.00	**1.9**	**32.4**	**46.4**	**46.0**	**1.243**	**26.0**	**#DIV/0!**	**119.8**	**120.1**	**-2.0**	**17.3**	**1.2**

Company Name: Covpress Ltd
Site Ref: Coventry
Project Ref: FTBS18427

Date: 09/11/11

Sampling Point Ref: Wash Steam Vent	Run: TPM
Meter Volume Sampled, acm	1.243
Sample Run Start Time	13:46
Sample Run End Time	14:46
Total Actual Sampling Time, min	60.0
Barometric Pressure, mm Hg	744.00
Stack Pressure, mm Hg	744.06
Average Stack Temp, °C	32.4
Meter Volume at Wet STP, scm	1.150
Stack Moisture Content, %	3.3
Average Stack Velocity, m/sec	4.058
Stack Flow Rate, scms wet, STP	0.874
Nozzle Diameter, mm	10.80
% Isokinetic Variation	**98.0**
Total Mass of Particulate, mg	3.9
Percentage of Total Particulate Collected on Filter	2.6
Stack Particulate Concentration, mg/m^3	**3.4**
Particulate Mass rate, kg/hour	0.011
Emission Limit value	**No Limit**

Sample Train Blank Results	
Sample Blank Particulate Concentration, mg/m^3	0.5
Total Weight Gain, mg (Sample Train Blank)	0.6
Blank Result Less than 10% of Limit Value	N/A

Uncertainty Calculation for Total Particulate Matter to BS EN 13284-1

Determined Concentration	3.4	mg/m3 (at Reference Cond)

Measured Values

Sampled Volume	1.243	m^3
Sampled gas Temperature	299	k
Sampled gas Pressure	99.21	kPa
Sampled gas Humidity	0	% by volume
Oxygen content	21	% by volume
Mass	3.9	mg

Leak	0.68	%
Uncollected Mass	0	mg

Standard Uncertainties for Measured Values

Sampled Volume	0.001	m3
Sampled gas Temperature	2	k
Sampled gas Pressure	1	kPa
Sampled gas Humidity	1	% by volume
Oxygen content	0.1	% by volume
Mass	0.14152385	mg

Uncertainty Calculation for Volume Correction

Volume Correction Factor	0.894		
	Sensitivity Coefficient		Uncertainty, Uv
Sampled gas Temperature	0.0030		0.0060
Sampled gas Pressure	0.0090		0.0090
Sampled gas Humidity	0.0089		0.0089
		Sqrt (Uv)^2	0.0140
		Total Uv	0.017

Uncertainty Calculation for Oxygen Correction

Oxygen Correction Factor	1.0000		
	Sensitivity Coefficient		Uncertainty, Uo
Oxygen Measurement	N/A		N/A
		Total Uo	N/A

Uncertainty Contributions (Itemised)

	Value		Sensitivity coefficient	Uncertainty Contribution			
				Concentration		%	
Volume Correction	1.112	m3	3.05	0.05	$mg.m^{-3}$	1.57	%
Mass (weighing)	3.90	mg	0.87	0.12	$mg.m^{-3}$	3.63	%
Oxygen Correction	N/A		0.00	0.00	$mg.m^{-3}$	0.00	%
System Leak	0.01	$mg.m^{-3}$	1.00	0.01	$mg.m^{-3}$	0.39	%
Uncollected Mass	0.00	mg	0.87	0.00	$mg.m^{-3}$	0.00	%
			Total Uncertainty	0.13	$mg.m^{-3}$		

Uncertainty Result (Uncertainty has been expanded with a coveragefactor of 2 (K=2))

Expanded Uncertainty =	0.27	$mg.m^{-3}$
=>	7.95	% of Result
=>	#VALUE!	% of ELV

RPS Laboratories

Test Certificate

Date 26/11/2011

Client	RPS Towcester Grafton Building Caswell Science & Technology Park Caswell, Towcester Northants NN12 8EQ	Order No.	FTBS 18427
		Certificate No.	WK11-7008
		Issue No.	1
Contact	Richard Carter	Date Received	16/11/2011
Description	8x samples for TPM	Technique	Gravimetric

Parameter	Analysis Method	Accreditation	Method LOD	Uncertainty
Total particulate matter	D9	UKAS	0.1 mg	-
Total particulate matter	D9	UKAS	0.5 mg	-

Sample No.	672665	077939	Method
Total particulate matter	0.6 mg		D9(U)
Sample No.	672666	T122727	Method
Total particulate matter	1.5 mg		D9(U)
Sample No.	672667	078462	Method
Total particulate matter	12.3 mg		D9(U)
Sample No.	672668	T122728	Method
Total particulate matter	9.9 mg		D9(U)
Sample No.	672669	078461	Method
Total particulate matter	<0.1 mg		D9(U)
Sample No.	672670	T122726	Method
Total particulate matter	<0.5 mg		D9(U)
Sample No.	672671	078463	Method
Total particulate matter	<0.1 mg		D9(U)

"Damaged Filter"

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RPS Laboratories Ltd. Unit 12, Waters Edge Business Park, Modwen Road, Salford, M5 3EZ
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Test Certificate

Date 26/11/2011

Client	RPS Towcester	Certificate No.	WK11-7008
		Issue No.	1

Sample No.	672672	T122726	Method
Total particulate matter	3.8 mg		D9(U)

Tested By John McKeown Date 24/11/2011

Approved By [redacted] Date 25/11/2011

Operations Manager

For and on authority of RPS Laboratories Ltd.
RPS Laboratories terms and conditions apply - a copy is available on request.

Method Symbols (U) Analysis is UKAS Accredited
(N) Analysis is not UKAS Accredited

Concentration values (mg/m3 and ppm) are provided to assist with interpretation only, they are not covered by the scope of UKAS accreditation

Analysis carried out on samples 'as received'

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