Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

EMISSIONS MONITORING TEST REPORT

CANLEY CREMATORIUM
Cannon Hill Road
Coventry
CV4 7DF

11th & 12th November 2019

Cremators 1 & 2 & Abatement System

Report Authorised by [redacted] Date 2nd January 2020

Mr J L Boyce
Emissions Monitoring Team Leader
MCertS level 2 + TE1,3,4
MM 06 707

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MCERTS CERTIFIED STAFF

SOURCE TESTING STA ASSOCIATION MEMBER

Davies & Co. (Environmental) Ltd
Moor Road
Leeds, LS10 2DD, England
Tel: +44 (0) 113 270 4651
Email: info@davies-co-ltd.com

Member of the Facultatieve Group
Registered in England, No. 715014
VAT Registration No. GB 758435595
Registered office: Moor Road, Leeds, LS10 2DD

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1. INTRODUCTION

Two of the four cremators, numbers 1 & 2 and their associated flue gas treatment systems at Canley Crematorium, Cannon Hill Road, Coventry, CV4 7DF were monitored on the 11th & 12th November 2019 to the requirements given in Process Guidance Note PG5/2 (2012) for emission releases to atmosphere.

The work was carried out on site by the following staff of Davies & Co (Engineering) Limited:

Mr J L Boyce
EA MCertS Level 2 + TE1,3,4
MM 06 707

Davies & Co does not hold company UKAS / MCertS accreditation at this time, as the company specialises in cremator and incinerator testing that are Part B processes. Air Quality Guidance Note AQ12 (04) states that UKAS / MCertS accreditation is not a mandatory requirement for the testing of Part B processes. Davies & Co are members of the Source Testing Association, and have extensive knowledge of crematoria testing. All analysis was conducted using UKAS approved laboratories, methods and calibrated equipment.

The work on site involved monitoring the flue gas components after the flue gas abatement system fitted to the cremator with the plant operating normally.

The plant comprises four Cremators designated as the Evans Universal series 300/2 model. The cremators are fitted with three nozzle mix burners utilising gas as the support fuel.

The waste gases from cremators 1 and 2 combine, and are ducted to a common flue gas treatment plant which is referred to as stream 1 throughout this report. The treatment plant comprises a shell and tube boiler to cool the flue gases, a reagent feeder station that introduces a blend of activated carbon/sodium bicarbonate to react with the cooled gases, and a bag filter to clean the treated gases. The waste heat from the boiler in the form of warm water is dissipated to atmosphere via a finned tube air blast cooler situated outside the crematory.

The waste Gases from cremators 3 and 4 also combine and are ducted into a 2nd flue gas treatment plant operating in the same manner as with the plant attached to cremators 1 and 2. This stream wasn't tested during this measuring campaign as it was found to be compliant with the requirements of the guidance note when previously tested in July 2019.

Both plants operate under full microprocessor based automatic control that requires little manual intervention.

The cremators and flue gas abatement system were manufactured, installed and commissioned by Facultatieve Technologies Limited to meet the requirements of the Environmental Permitting (England & Wales) Regulations 2016 (EPR 2016) as relevant to new crematoria installations, summarised in Process Guidance Note PG5/2 (2012).

The flue ducting and test points were in accordance with the requirements of EA TGN M1.

Measurements were undertaken to enable comparisons to be made of the operation of the cremators and associated abatement system with the requirements of the Guidance Note in terms of emission releases to air.

The two plant was tested in normal operation, and “as found”. The operating patterns of the cremators are dictated by the number of cremations to be completed during the working day, and the times the Funeral services take place. It follows that either one or both cremators can be operational at any one time during the working day, and these are served by the common abatement plant being tested.

This report details the monitoring procedures used and the results obtained from this test work along with comparisons with the requirements and comments where appropriate.

Relevant procedures were followed to enable quality control to be maintained throughout the test preparation, site test work, laboratory analysis, calculations and reporting.

2. PROCEDURES

2.1 Total Particulate Matter

A flue gas sample was extracted and filtered to collect total particulate matter. A Whatman QM-A filter paper was used with a particle retention of not less than 99.5% at a particle size of 0.3 micron. The flue gas extraction employed techniques given in BS EN 13284 Part 1.

The method employed was BS EN 13284 Part 1.

The sampling was conducted using apparatus in accordance with the requirements of BS EN 13284 Part 1.

This consisted of a heated known dimension Pyrex glass nozzle, heated Pyrex glass probe liner, heated Pyrex glass filter housing with Titanium frit containing quartz microfibre filter (all heaters set to 160°C), PTFE sample line, dreschel absorption bottles, gas dryer (silica gel), sample line to pump, pump, gas meter, rotameter, pitot and impulse lines, electronic manometer, type K thermocouple, balance (for gravimetric moisture) and datalogger. Settings tables were pre-prepared to enable isokinetic flow to be maintained (based on online measurements of flue gas velocity and temperature to set nozzle flow / pump rate (l/min)).

Particulate matter analysis was carried out by weighing the filter and probe rinse collection on a calibrated balance, with the media being dried and weighed prior to and following the test.

Standard BS EN 13284 Part 1 was deviated from only in so far as a consequence of conducting tests in accordance with the requirements of PG5/2(12) that requires total particulate matter to be sampled for one hour of cremation. This therefore implies that only one sampling line can be used for each test run as sampling on 2 lines would require a stop half way through the test to move the probe out of one port and into another thus losing a period within the allotted one hour needed to obtain an hourly average as required by PG5/2(12). This is contrary to BS EN 13284 Part 1 that requires 2 sample lines to be used during an isokinetic test i.e. four point sampling (2 points x 2 lines) for a duct of this diameter.

The effect on uncertainty of using only one sample line is not considered to be significant and assumed to be within the calculated uncertainties stated in this report. These assumptions are on the basis that the preliminary pitot traverses confirmed the gas velocity profiles were well within required limits, and the duct dimensions were relatively small (350 mm diameter) considering the scope of BS EN 13284 Part 1. The duct was compliant with the requirements of the Standard in terms of duct dimensions and length measurements as well as meeting all requirements of Environment Agency Technical Guidance Note M1. In accordance with the Standard flue gas was sampled at 2 representative points along the sample line and as such there is no reason to suspect that the gas sampled from only one sampling line is not representative of the duct as a whole.

This recommended deviation is a reflection that cremation is a batch process, and that changing sampling ports part-way through a cremation could introduce more errors due to fact that a period of each cremation would not be sampled during the changeover process.

The tests reported herein were conducted to prove the performance of the cremators relative to PG5/2(2012).

2.2 Hydrogen Chloride

A flue gas sample was extracted and filtered. A Whatman QM-A filter paper was used with a particle retention of not less than 99.5% at a particle size of 0.3 micron. The flue gas extraction employed techniques given in BS EN 13284 Part 1.

The sampling was conducted using apparatus in accordance with the requirements of BS EN 13284 Part 1.

The method employed was BS EN 1911 Parts 1-3.

Laboratory analysis for hydrogen chloride was carried out on the absorption medium using Ion Chromatography (IC).

2.3 Mercury

A flue gas sample was extracted and filtered to collect solid phase mercury.
A Whatman QM-A filter paper was used with a particle retention of not less than 99.5% at a particle size of 0.3 micron. The flue gas extraction employed techniques given in BS EN 13284 Part 1.

The gas sample was then passed through an absorption medium of acidified potassium dichromate to collect vapour phase mercury.

The method employed was BS EN 13211.

Laboratory analysis for solid and vapour phase mercury was carried out on the filter and absorption medium using Inductively Cold Vapour Atomic Fluorescence Spectroscopy (CVAFS).

2.4 Carbon Monoxide

A flue gas sample was continuously extracted, filtered and dried before being passed through a pre-calibrated Siemens Ultramat 23 infrared analyser for the on-line measurement of carbon monoxide.

The method employed was BS EN 15058.

The analyser has a fixed range of 0-1250 mg/Nm^3 and was zeroed with air and calibrated with a nominal 800 ppmv carbon monoxide in balance nitrogen gas.

The analyser output was continuously recorded using a Grant 'Squirrel' data logger.

For these tests a relatively high range analyser was used due to the typical pattern of carbon monoxide concentration emissions from cremators being very low (often indicated as zero) for most of the cycle, but with occasional, high, short duration spikes of CO being emitted. The convention since non-

continuous emissions monitoring became a mandatory requirement for cremators during 1990, has been to attempt to monitor the magnitude of spikes, as these are often the main contributor to total CO emissions. If, for example, a mean one minute emission of CO was say 100 mg/Nm³, it would be expected that the peak concentration during that one minute averaging period would be considerably higher than this. It follows that utilising a lower range analyser would frequently understate CO emissions, despite increasing sensitivity at low CO concentrations.

2.5 Total Organic Compounds

A flue gas sample was continuously extracted and filtered before being passed via a heated line through a pre-calibrated Signal 3030PM Flame Ionisation Detection (FID) analyser for the on-line measurement of volatile organic compounds. The analyser was ranged 0-100 ppmv total hydrocarbons and was zeroed

with air passed through a catalytic converter and calibrated with a nominal 50 ppmv propane in balance air gas.

The method employed was BS EN 12619.

The analyser output was continuously recorded using a Grant 'Squirrel' data logger.

Similar comments apply to TOC's as CO, in that the analyser scaling is set to quantify the peaks that are the nature of the emission.

2.6 Oxygen

A flue gas sample was continuously extracted from the same position in the flue as the hydrogen chloride extraction, filtered and dried before being passed through a pre-calibrated Siemens Ultramat 23 electrochemical cell analyser for the on-line measurement of flue oxygen.

The method employed was BS EN 14789.

The analyser was calibrated using a standard reference gas in the laboratory before and after the site visit, and with nitrogen "zero" gas and air at the start and end of each day's testing on site. It was assumed that calibration linearity was maintained during sampling, and the post checks indicated that this was the case.

The output of the analyser was continuously recorded using a Grant 'Squirrel' data logger.

2.7 Moisture

A flue gas sample was extracted and filtered. The gas sample was then passed through an absorption medium to collect any water vapour.

The method employed was BS EN 14790.

Flue gas moisture was determined gravimetrically by weighing the absorption medium and final gas drier prior to and following the test.

This was carried out alongside testing for hydrogen chloride.

2.8 Temperature

Flue gas temperature was measured by the use of a calibrated Type K thermocouple.

The method employed was BS EN 13284 Part 1.

The flue gas temperature was continuously recorded using a Grant 'Squirrel' data logger.

2.9 Velocity and Volumetric Flow

Flue gas velocity was found from inserting a calibrated s-type pitot tube into the flue. The pitot head pressure was then measured using a calibrated electronic manometer.

The method employed was BS EN 13284 Part 1.

The electronic manometer output was continuously recorded using a Grant 'Squirrel' data logger.

Flue gas velocity was then calculated from Bernoulli's equation as the density of the flue gas was known (from measurements of flue gas moisture and temperature).
Flue gas volumetric flow rate was found from the measurement of the flue duct size and hence its area and corrected to normalised conditions (again from measurements of flue gas moisture and temperature).

3. RESULTS

The results are summarised in Tables 1, 2 & 3.

Total Particulate Matter and Hydrogen Chloride determinations are given in Table 1.

Mercury determination is given in Table 2.

Comparison of Test Results with Site Instrumentation is given in table 3.

Carbon Monoxide, Total Organic Compounds, Oxygen, Temperature and Velocity and Volumetric Flow were continuously monitored.

All values in the tables are corrected to the reference conditions of 273K, 101.3kPa, 11%v/v oxygen and dry gas as given in PG5/2(12) where required.

All data logs and calculations can be seen in Appendix 1.

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TABLE 1
Coventry Cremators 1 & 2 & Abatement System
Emissions Monitoring November 2019
Total Particulate Matter & Hydrogen Chloride Sampling

		Test H1 12 November 2019 09:44-10:44	Test H2 12 November 2019 10:27-11:27	Test H3 12 November 2019 12:54-13:54	**Average**	Requirement to Site Permit & PG5/2 (2012)
Total Particulate Matter	- mg/Nm^{3}c.	10.96 ± 2.76	8.88 ± 2.77	9.49 ± 2.50	**9.78**	<20
Hydrogen Chloride	- mg/Nm^{3}c.	4.64 ± 0.34	5.90 ± 0.40	4.81 ± 0.33	**5.12**	<30
Carbon Monoxide	- mg/Nm^{3}c.	17.19 ± 0.86	4.96 ± 0.01	6.65 ± 0.01	**9.60**	<100
Carbon Monoxide First 30 mins	- mg/Nm^{3}c.	13.99 ± 0.70	5.05 ± 0.01	4.78 ± 0.01	**7.94**	<100
Carbon Monoxide Second 30 mins	- mg/Nm^{3}c.	20.28 ± 0.01	4.88 ± 0.01	8.45 ± 0.01	**11.20**	<100
Organic Compounds	- mg/Nm^{3}c.	0.00 ± 0.01	0.00 ± 0.01	0.00 ± 0.01	**0.00**	<20
Flue Oxygen	- %v/v dry	15.65 ± 0.10	16.09 ± 0.10	15.44 ± 0.10	**15.73**	
Flue Moisture	- %v/v	6.3 ± 0.6	5.8 ± 0.6	5.2 ± 0.5	**5.8**	
	- %w/w	4.0 ± 0.4	3.7 ± 0.4	3.3 ± 0.3	**3.7**	
Flue Temperature	- Deg C	130 ± 2	128 ± 2	125 ± 2	**128**	
Volumetric Flow	- Nm^3/h dry	3049 ± 61	3402 ± 68	2959 ± 59	**3137**	

Note 1: All emissions as concentration levels are given as mg/Nm^3 corrected to 11%v/v oxygen and dry gas

Note 2: All uncertainties (±) are calculated to a 95% confidence interval
Uncertainties estimated using the procedure suggested in the STA Quality Guidance Note QGN001-01

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TABLE 2
Coventry Sream 1 - Cremators 1 & 2 & Abatement System Outlet
Emissions Monitoring November 2019
Mercury Sampling

		Hg Test 11 November 2019 12:44-15:25	Requirement to Site Permit & PG5/2 (2012)
Mercury	- µg/Nm³c.	9.50 ± 0.52	<50

Flue Oxygen	- %v/v dry	15.85 ± 0.10
Flue Moisture	- %v/v	8.4 ± 0.8
	- %w/w	5.4 ± 0.5
Flue Temperature	- Deg C	132 ± 2
Volumetric Flow	- Nm³/h dry	2958 ± 59

Note 1: All emissions as concentration levels are given as µg/Nm^3 or mg/Nm^3 corrected to 11%v/v oxygen and dry gas

Note 2: All uncertainties (±) are calculated to a 95% confidence interval
Uncertainties estimated using the procedure suggested in the STA Quality Guidance Note QGN001-01

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TABLE 3
Coventry Cremators 1 & 2 & Abatement System
Emissions Monitoring November 2019
Comparison of Test Results with Site Instrumentation

Cermator Plant	Test	Date	Averaging Period (mins)	Particulate mg/Nm³		Carbon Monoxide mg/Nm³	
				Davies & Co	Site	Davies & Co	Site
Cremators 1&2 FGT Outlet	1	12 November 2019	2 - 32	10.96	0	14	1
			32 - 62			20	4
Cremators 1&2 FGT Outlet	2	12 November 2019	2 - 62	8.88	0	0	0
			32 - 62			5	0
Cremators 1&2 FGT Outlet	3	12 November 2019	0 - 30	9.49	0	5	1
			30 - 60			8	0

Note 1: All emission concentration levels are given as mg/Nm3 corrected to 11% oxygen, 273K & dry gas
Note 2: Results as emitted from Flue Gas Treatment (FGT) Plant with 2 cremators abated by 1 FGT

4. COMMENTS

The results obtained from this monitoring test work show compliance with the requirements given in Process Guidance Note PG5/2 (2012) for the stream 1, cremators 1 and 2 and their abatement system.

The results are expressed in the summary tables as concentration levels as this is understood to be the basis of the permit issued by the regulator

The cremators and flue gas clean up systems operated satisfactorily during testing without any failure or alarm events.

No unusual charges were cremated during these tests. They were all of standard materials.

No visible chimney emissions, other than the expected steam plume during pre-heat, were observed throughout the test work.

PG5/2 (2012) states that the continuous emission monitors (CEMs) should be periodically checked (calibrated) to ensure that the readings being reported are correct.

The CEM's on site are regularly maintained, checked and calibrated in accordance with the manufacturer's recommendations, and were functional at the time of the tests.

The PCME particulate monitor primarily functions as a filter leak detector rather than being calibrated to give qualitative results. This instrument is more than capable of satisfying this function.

Comparisons of carbon monoxide monitoring show a lower measuring sensitivity from the onsite instrumentation.

5. QUALITY CONTROL

All the tests performed were carried out to the methods given in the appropriate listed Standards using calibrated equipment. The gas analyser was calibrated prior to use using suitable calibration gases.

Analysis of the absorber solutions was carried out at an external UKAS laboratory following UKAS approved analysis methods.

For this test work the following external laboratory was used for the given determination:

RPS Laboratories Ltd	}	Hydrogen Chloride Mercury

APPENDIX 1

Data Logs and Calculations

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Coventry Cremators 1 & 2 & Abatement System

Data Log 12 November 2019

Test H1

Time	Flue Gas °C	Meter °C	Flue O_2 %v/v dry	CO mg/Nm^3 c.	VOC mg/Nm^3 c.	Sample Point Pa
09:44	129	21.0	18.07	37.87	0.00	86.2
09:45	129	21.0	13.80	20.32	0.00	78.9
09:46	129	21.0	13.71	13.30	0.00	100.4
09:47	127	21.2	14.91	28.22	0.00	86.9
09:48	128	21.3	14.10	15.63	0.00	75.9
09:49	128	21.5	13.48	7.73	0.00	76.2
09:50	129	21.7	13.27	7.51	0.00	80.2
09:51	129	22.0	13.46	8.22	0.00	75.5
09:52	130	22.3	13.53	8.94	0.00	77.0
09:53	130	22.5	15.21	20.70	0.00	70.5
09:54	130	22.8	13.88	9.96	0.00	82.1
09:55	130	23.1	13.64	8.14	0.00	88.4
09:56	130	23.5	14.41	17.48	0.00	100.0
09:57	130	23.7	14.76	17.87	0.00	91.5
09:58	131	24.0	13.97	8.51	0.00	91.5
09:59	133	24.4	14.18	11.13	0.00	120.0
10:00	134	24.7	15.07	13.93	0.00	124.1
10:01	134	25.1	15.15	12.21	0.00	111.2
10:02	133	25.5	14.91	10.18	0.00	102.5
10:03	133	25.8	14.65	9.05	0.00	113.8
10:04	133	26.1	14.85	8.61	0.00	122.1
10:05	133	26.4	15.67	14.00	0.00	99.7
10:06	134	26.8	16.07	12.97	0.00	102.8
10:07	134	27.1	15.87	8.99	0.00	114.4
10:08	133	27.4	16.38	14.22	0.00	94.6
10:09	133	27.8	16.65	14.86	0.00	88.5
10:10	133	28.1	15.86	9.91	0.00	116.8
10:11	133	28.5	16.94	24.12	0.00	126.0
10:12	133	28.8	16.61	15.25	0.00	137.7
10:13	131	29.1	16.15	10.01	0.00	123.7
10:14	131	29.4	15.83	9.85	0.00	108.6
10:15	134	29.8	16.26	11.44	0.00	84.2
10:16	133	30.0	16.18	11.24	0.00	84.7
10:17	132	30.4	16.38	11.19	0.00	70.0
10:18	131	30.7	17.12	14.08	0.00	83.0
10:19	131	31.0	15.56	8.53	0.00	84.6
10:20	131	31.3	16.29	10.91	0.00	67.6
10:21	131	31.6	16.77	165.53	0.00	65.2
10:22	130	31.8	16.07	62.45	0.00	46.8
10:23	129	32.1	15.95	8.58	0.00	49.0
10:24	130	32.4	13.88	10.61	0.00	70.5
10:25	129	32.7	17.74	20.36	0.00	52.4
10:26	129	32.9	16.59	10.77	0.00	55.5
10:27	129	33.2	15.42	34.44	0.00	54.1
10:28	128	33.5	16.62	10.46	0.00	37.7
10:29	128	33.7	13.60	10.42	0.00	56.2
10:30	128	34.0	15.75	19.46	0.00	56.5
10:31	128	34.2	16.61	9.49	0.00	56.5
10:32	127	34.5	15.39	7.91	0.00	42.9
10:33	126	34.7	14.82	7.73	0.00	29.0
10:34	127	34.9	16.77	11.07	0.00	62.2
10:35	127	35.2	16.15	11.38	0.00	69.8
10:36	127	35.4	17.89	18.40	0.00	57.3
10:37	127	35.7	14.03	5.45	0.00	72.5
10:38	128	35.9	16.05	9.81	0.00	69.8
10:39	127	36.1	18.39	19.71	0.00	67.6
10:40	128	36.3	15.95	7.20	0.00	97.2
10:41	129	36.5	16.08	8.03	0.00	94.9
10:42	129	36.7	16.15	8.58	0.00	90.6
10:43	129	37.0	19.04	19.01	0.00	90.2
10:44	129	37.2	20.29	54.42	0.00	80.3
Average	**130**	**29.1**	**15.65**	**17.19**	**0.00**	**83.1**

Carbon Monoxide First 30 mins	**13.99**
Carbon Monoxide Second 30 mins	**20.28**

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Coventry Cremators 1 & 2 & Abatement System

Data Log 12 November 2019

Test H2

Time	Flue Gas °C	Meter °C	Flue O_2 %v/v dry	CO mg/Nm^3 c.	VOC mg/Nm^3 c.	Sample Point Pa
11:27	137	43.8	16.43	11.78	0.00	113.7
11:28	126	43.9	15.64	10.55	0.00	82.1
11:29	80	43.8	15.09	10.20	0.00	95.3
11:30	107	43.8	14.24	5.41	0.00	112.6
11:31	91	43.8	14.63	11.15	0.00	109.1
11:32	137	43.8	13.77	5.58	0.00	151.6
11:33	134	43.7	15.48	5.69	0.00	116.3
11:34	131	43.8	15.61	4.36	0.00	88.8
11:35	134	43.7	15.28	7.19	0.00	87.5
11:36	137	43.7	14.62	5.63	0.00	99.8
11:37	136	43.7	15.91	8.84	0.00	103.3
11:38	136	43.6	15.25	5.04	0.00	116.9
11:39	135	43.6	15.85	8.08	0.00	92.3
11:40	135	43.7	15.53	9.44	0.00	95.2
11:41	135	43.6	14.64	2.96	0.00	86.8
11:42	134	43.7	15.53	5.38	0.00	62.5
11:43	133	43.7	15.53	2.96	0.00	56.4
11:44	133	43.7	14.19	2.58	0.00	64.6
11:45	133	43.7	16.10	4.29	0.00	86.6
11:46	134	43.7	16.02	2.26	0.00	120.9
11:47	134	43.7	17.28	2.01	0.00	102.8
11:48	134	43.8	17.62	2.51	0.00	95.6
11:49	135	43.8	17.04	1.88	0.00	124.5
11:50	136	43.8	17.00	1.69	0.00	121.2
11:51	136	43.8	17.19	1.85	0.00	116.2
11:52	133	43.8	16.32	1.81	0.00	117.4
11:53	132	43.9	17.27	2.38	0.00	108.4
11:54	125	44.0	16.12	1.73	0.00	98.6
11:55	129	44.0	16.84	3.15	0.00	108.5
11:56	125	43.9	17.61	3.13	0.00	103.1
11:57	115	44.0	16.50	2.73	0.00	98.0
11:58	128	44.0	16.17	3.12	0.00	88.1
11:59	130	44.1	17.65	10.43	0.00	87.4
12:00	126	44.0	15.61	2.14	0.00	69.2
12:01	129	44.0	15.70	1.08	0.00	71.6
12:02	131	44.0	18.26	1.07	0.00	78.5
12:03	130	44.1	16.12	0.80	0.00	70.5
12:04	129	44.2	16.01	2.46	0.00	62.6
12:05	132	44.2	17.45	1.99	0.00	71.2
12:06	133	44.2	14.51	0.45	0.00	65.5
12:07	132	44.2	17.37	3.03	0.00	65.9
12:08	132	44.3	18.19	5.41	0.00	76.5
12:09	128	44.3	16.00	0.92	0.00	118.1
12:10	125	44.3	17.58	1.98	0.00	94.9
12:11	126	44.3	17.57	0.85	0.00	83.3
12:12	129	44.5	17.62	0.87	0.00	107.0
12:13	122	44.5	17.55	70.41	0.00	117.3
12:14	78	44.5	15.44	7.40	0.00	100.1
12:15	100	44.6	14.80	4.38	0.00	120.4
12:16	135	44.5	15.32	3.75	0.00	152.9
12:17	135	44.5	16.42	4.13	0.00	125.9
12:18	135	44.6	16.50	2.66	0.00	150.3
12:19	136	44.6	15.81	1.90	0.00	145.1
12:20	135	44.7	16.05	3.19	0.00	123.9
12:21	133	44.7	15.14	2.09	0.00	137.4
12:22	124	44.7	16.03	2.61	0.00	117.4
12:23	115	44.7	16.37	2.43	0.00	110.3
12:24	139	44.8	15.66	1.79	0.00	138.4
12:25	131	44.8	16.25	2.07	0.00	117.5
12:26	128	44.8	15.63	1.44	0.00	95.9
12:27	125	44.8	14.65	1.72	0.00	104.6
Average	**128**	**44.1**	**16.09**	**4.96**	**0.00**	**101.7**

Carbon Monoxide First 30 mins	**5.05**
Carbon Monoxide Second 30 mins	**4.88**

Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

Coventry Cremators 1 & 2 & Abatement System

Data Log 12 November 2019

Test H3

Time	Flue Gas °C	Meter °C	Flue O_2 %v/v dry	CO mg/Nm^3 c.	VOC mg/Nm^3 c.	Sample Point Pa
12:54	124	47.1	15.31	8.94	0.00	65.2
12:55	127	47.0	15.28	6.46	0.00	55.9
12:56	128	47.0	15.16	6.81	0.00	61.5
12:57	131	46.9	14.63	9.64	0.00	71.4
12:58	132	46.8	14.91	6.97	0.00	72.9
12:59	127	46.6	13.57	6.12	0.00	94.9
13:00	120	46.6	13.97	6.96	0.00	98.0
13:01	99	46.5	15.32	8.77	0.00	103.8
13:02	124	46.6	15.03	6.76	0.00	109.9
13:03	134	46.5	13.80	4.75	0.00	118.9
13:04	133	46.3	14.20	4.76	0.00	107.8
13:05	135	46.3	14.02	3.50	0.00	108.7
13:06	137	46.4	14.01	2.85	0.00	108.1
13:07	120	46.3	14.03	3.35	0.00	103.8
13:08	136	46.2	14.47	4.44	0.00	104.9
13:09	124	46.2	14.78	2.98	0.00	99.3
13:10	119	46.2	15.94	3.40	0.00	97.3
13:11	128	46.2	16.06	3.76	0.00	82.1
13:12	116	46.2	14.43	3.04	0.00	69.2
13:13	123	46.2	13.76	3.47	0.00	58.5
13:14	129	46.2	14.63	3.89	0.00	57.2
13:15	132	46.2	15.06	3.41	0.00	57.2
13:16	130	46.1	15.13	3.28	0.00	67.4
13:17	131	46.1	14.67	4.14	0.00	83.2
13:18	134	46.2	14.41	3.13	0.00	101.8
13:19	132	46.1	15.07	3.60	0.00	99.1
13:20	136	46.1	15.21	3.74	0.00	97.1
13:21	136	46.1	14.89	3.55	0.00	94.2
13:22	136	46.0	14.70	3.55	0.00	89.7
13:23	135	46.0	14.89	3.43	0.00	89.5
13:24	135	46.0	14.90	3.09	0.00	89.9
13:25	135	46.0	14.75	2.74	0.00	92.4
13:26	134	46.1	14.99	2.22	0.00	90.9
13:27	135	46.0	15.01	1.88	0.00	86.1
13:28	128	46.0	15.19	1.52	0.00	84.2
13:29	131	46.1	15.63	1.31	0.00	73.5
13:30	120	46.1	15.38	0.52	0.00	59.4
13:31	125	46.1	15.20	0.50	0.00	51.3
13:32	115	46.0	15.33	0.51	0.00	48.4
13:33	119	46.1	15.58	0.54	0.00	49.4
13:34	116	46.1	15.71	0.55	0.00	46.4
13:35	110	46.1	15.75	0.54	0.00	46.7
13:36	113	46.1	15.90	0.57	0.00	45.7
13:37	116	46.1	16.03	0.57	0.00	45.7
13:38	116	46.1	15.95	0.58	0.00	47.0
13:39	118	46.2	15.82	0.56	0.00	47.2
13:40	116	46.2	15.90	0.57	0.00	46.9
13:41	101	46.2	16.18	0.00	0.00	45.0
13:42	86	46.2	16.32	0.00	0.00	44.9
13:43	82	46.2	16.62	0.64	0.00	42.5
13:44	103	46.2	17.22	0.61	0.00	58.3
13:45	132	46.2	18.40	1.37	0.00	74.6
13:46	132	46.3	18.84	5.28	0.00	71.2
13:47	127	46.2	17.82	186.92	0.00	82.9
13:48	132	46.2	18.00	33.22	0.00	108.2
13:49	131	46.2	16.69	1.96	0.00	93.1
13:50	131	46.2	15.70	0.81	0.00	70.0
13:51	131	46.2	17.00	0.73	0.00	54.9
13:52	127	46.2	16.03	1.50	0.00	59.3
13:53	127	46.2	15.45	0.90	0.00	62.1
13:54	124	46.2	17.11	9.28	0.00	55.1
Average	**125**	**46.3**	**15.44**	**6.65**	**0.00**	**75.4**

Carbon Monoxide First 30 mins	**4.78**
Carbon Monoxide Second 30 mins	**8.45**

Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

Coventry Cremators 1 & 2 & Abatement System

Total Particulate Matter and Hydrogen Chloride

Contract	Coventry Crematorium DEM1372
Date	11th November 2019
Location	Cremators 1&2 Abatement System Outlet (Flue To Stack)
Engineer(s)	JB
Absorbent	H_2O

Test Log	**Test H1**	**Test H2**	**Test H3**
Barometric Pressure(kPa)	99.9	99.9	99.9
Gas Meter Temperature(Deg C)	29.1	44.1	46.3
Oxygen Concentration(%v/v dry)	15.65	16.09	15.44
Flue Gas Volumetric Flow(Nm^3/h dry)	3049	3402	2959

	Start	End	Start	End	Start	End
Time	09:44	10:44	11:27	12:27	12:54	13:54
Gas Meter Reading(Am^3 dry)	68.785	69.255	69.728	70.259	70.478	71.002
Absorber Weight(g)	3428.4	3451.2	3440.7	3462.9	3431.5	3450.9
Filter Reference	CO121119F1		CO121119F2		CO121119F3	
Filter Weight(g)	0.53435	0.53455	0.53798	0.53814	0.53464	0.53483
Probe Rinse Reference	CO121119R1		CO121119R1		CO121119R1	
Probe Rinse Weight(g)	77.34662	77.34886	77.34886	77.35066	77.35066	77.35279
Sample Reference HCl	CO1211199 H11		CO121119 H12		CO121119 H13A+B	
Absorbent Volume(ml)	500		500		250	250
Absorbent(mg/l as HCl)	2.07		2.6		4.62	0.09
Blank(mg/l as HCl)	0		0		0	0

Calculation: General

Barometric Pressure(kPa)	99.9	99.9	99.9
Gas Meter temperature(Deg C)	29.1	44.1	46.3
Gas Volume Sampled(Am^3 dry)	0.470	0.531	0.524
Gas Volume Sampled(Nm^3 dry)	0.4189	0.4508	0.4419
Mass of Dry Gas(g @ 1292.8 g/Nm^3)	541.50	582.86	571.27
Change in Absorber Weight(g)	22.8	22.2	19.4
Water Vapour Volume(Nm^3 @ 803.9 g/Nm^3)	0.0284	0.0276	0.0241
Gas Volume(Nm^3 wet)	0.4472	0.4785	0.4660
Mass of Wet Gas(g)	564.30	605.06	590.67
Moisture Concentration(%v/v)	**6.3**	**5.8**	**5.2**
Moisture Concentration(%w/w)	**4.0**	**3.7**	**3.3**

Calculation: Particulate

Increase In Filter Weights(g)	0.00244	0.00196	0.00232
Particulate Emission(mg/Nm^3 dry)	5.84	4.34	5.26
Oxygen Concentration(%v/v dry)	15.65	16.09	15.44
Particulate Emission (mg/Nm^3 @ 11 %v/v Oxygen dry)	**10.96**	**8.88**	**9.49**
Flue Gas Volumetric Flow(Nm^3/h dry)	3049	3402	2959
Particulate Emission(g/h)	**17.80**	**14.76**	**15.55**
Required Sample Velocity(Nm/s)	8.80	9.82	8.54
Nozzle Used(mm)	4.0	4.0	4.0
Area of Nozzle(m^2)	0.00001257	0.00001257	0.00001257
Test Duration(mins)	60	60	60
Actual Sample Velocity(Nm/s)	9.26	9.97	9.77
Isokinetic Closure(%)	105	101	114
Start Leak Check(%)	1.2 @10 l/min	1.2 @10 l/min	1.2 @10 l/min
End Leak Check(%)	1.2 @10 l/min	1.2 @10 l/min	1.2 @10 l/min

Calculation: HCl

Absorbent(mg/l as HCl)	2.07	2.6	4.62	0.09
Blank(mg/l as HCl)	0	0	0	0
Chloride Absorbed(mg/l as HCl)	2.07	2.6	4.62	0.09
Chloride Absorbed(mg as HCl)	1.04	1.30	1.16	0.02
HCl(mg)	1.04	1.30	1.18	
HCl Emission(mg/Nm^3 dry)	2.47	2.88	2.66	
Oxygen Concentration(%v/v dry)	15.65	16.09	15.44	
HCl Emission (mg/Nm^3 @ 11 %v/v Oxygen dry)	**4.64**	**5.90**	**4.81**	
Flue Gas Volumetric Flow(Nm^3/h dry)	3049	3402	2959	
HCl Emission(g/h)	**7.54**	**9.81**	**7.88**	

Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

Coventry Cremators 1 & 2 & Abatement System

Flue Gas Volumetric Flow

Contract	Coventry Crematorium DEM1372
Date	11th November 2019
Location	Cremators 1&2 Abatement System Outlet (Flue To Stack)
Engineer(s)	JB

Test Log	**Test H1**	**Test H2**	**Test H3**
Flue Gas Temperature(Deg C)	130	128	125
Flue Gas Pitot Head Sample Points(Pa)	83.1	101.7	75.4
Flue Gas Moisture(%v/v)	6.3	5.8	5.2
Flue Gas Moisture(%w/w)	4.0	3.7	3.3
Flue Gas Duct Dimensions(mm)	350 mm Diameter Circular Stack		
Flue Gas Duct Area(m^2)	0.0962		

Calculation

Flue Gas Density(kg/m^3)	0.8621	0.8681	0.8768
Flue Gas Velocity(Am/s)	13.88	15.31	13.12
Flue Gas Volumetric Flowrate(Am^3/h)	4808	5302	4543
Flue Gas Volumetric Flowrate(Am^3/h dry)	4503	4996	4308
Flue Gas Volumetric Flowrate(Nm^3/h dry)	**3049**	**3402**	**2959**

Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

Coventry Sream 1 - Cremators 1 & 2 & Abatement System Outlet

Data Log **11/11/19**

Hg Test

Time	Flue Gas °C	Meter °C	Flue O_2 %v/v dry	Pitot Head Pa
12:44	130	16.2	16.19	74.6
12:45	130	16.2	15.50	82.5
12:46	131	16.3	15.69	114.0
12:47	130	16.5	16.06	91.2
12:48	130	16.7	15.21	90.3
12:49	131	17.0	14.40	97.0
12:50	132	17.2	14.51	107.2
12:51	135	17.5	15.07	160.3
12:52	136	17.9	14.55	148.6
12:53	136	18.2	15.57	169.3
12:54	136	19.5	16.39	141.2
12:55	134	19.4	15.63	108.4
12:56	133	19.4	16.17	89.1
12:57	133	19.7	15.46	86.8
12:58	133	20.1	14.39	73.8
12:59	133	20.5	14.95	69.2
13:00	134	20.9	13.95	94.8
13:01	134	21.4	14.05	113.5
13:02	135	21.8	15.55	136.0
13:03	135	22.2	14.83	135.7
13:04	136	22.6	15.61	139.6
13:05	136	23.0	15.57	124.4
13:06	136	23.4	14.62	106.1
13:07	136	23.9	15.48	111.2
13:08	136	24.3	15.32	102.0
13:09	136	24.7	14.31	92.7
13:10	135	25.1	15.76	88.9
13:11	135	25.5	17.41	115.4
13:12	135	25.9	16.93	117.0
13:13	135	26.3	17.17	99.2
13:14	134	26.7	16.38	83.0
13:15	135	27.1	15.94	88.4
13:16	135	27.5	17.60	101.6
13:17	134	27.9	15.89	79.8
13:18	133	28.3	15.66	69.9
13:19	132	28.6	16.59	70.1
13:20	131	29.0	15.23	55.3
13:21	131	29.4	15.31	48.8
13:22	130	29.7	16.44	51.0
13:23	130	30.1	14.54	42.3
13:24	130	30.4	14.41	37.5
13:25	129	30.8	15.82	46.4
13:26	130	31.1	16.38	55.3
13:27	129	31.4	13.91	56.6
13:28	129	31.7	15.83	64.9
13:29	129	32.0	16.77	73.5
13:30	129	32.3	14.39	57.9
13:31	129	32.6	15.92	56.6
13:32	130	32.9	17.44	107.4
13:33	133	33.2	16.14	130.2
13:34	133	33.5	15.15	107.8
13:35	133	33.8	15.62	87.7
13:36	131	34.1	15.85	62.7
13:37	131	34.3	15.92	62.5
13:38	131	34.6	15.85	95.4
13:39	132	34.8	14.73	105.6
13:40	133	35.1	15.75	112.4
13:41	134	35.4	16.19	113.2
13:42	135	35.6	14.94	102.1
13:43	134	35.9	14.77	81.8
13:44	133	36.1	14.61	70.1
13:45	132	36.4	14.75	71.6
13:46	132	36.6	14.81	65.1
13:47	131	36.8	14.99	61.4
13:48	132	37.0	15.09	66.0

13:49	132	37.2	15.07	57.7
13:50	132	37.4	14.36	55.6
13:51	132	37.6	14.34	62.2
13:52	131	37.8	14.80	54.0
13:53	130	38.0	14.60	55.6
13:54	130	38.1	14.63	53.4
13:55	130	38.3	14.88	52.9
13:56	129	38.5	15.45	40.4
13:57	129	38.7	16.94	57.0
13:58	130	38.9	16.49	58.4
13:59	130	39.1	16.64	74.4
14:00	131	39.2	15.94	98.8
14:01	131	39.3	14.79	92.4
14:02	130	39.5	14.89	66.1
14:03	129	39.7	14.57	51.9
14:04	129	39.9	14.15	46.1
14:05	129	40.0	14.66	48.9
14:06	129	40.2	14.89	52.3
14:07	129	40.3	14.41	58.5
14:08	130	40.5	13.89	88.0
14:09	131	40.7	14.23	106.5
14:10	132	40.9	14.45	119.1
14:11	133	41.0	13.71	134.7
14:12	134	41.2	15.92	157.1
14:13	134	41.3	15.00	128.8
14:14	134	41.5	16.76	106.3
14:15	135	41.6	16.05	133.6
14:16	137	41.7	15.15	156.7
14:17	136	41.9	17.61	123.4
14:18	135	42.0	15.35	102.8
14:19	134	42.1	15.85	98.6
14:20	135	42.2	14.97	117.0
14:21	136	42.3	13.55	114.9
14:22	136	42.5	16.06	111.1
14:23	137	42.6	13.04	116.0
14:24	137	42.7	15.78	113.5
14:25	136	42.7	16.03	115.4
14:26	136	42.8	14.05	114.0
14:27	136	42.9	16.27	130.8
14:28	136	43.1	15.14	116.1
14:29	136	43.2	15.10	86.4
14:30	135	43.2	16.43	68.7
14:31	135	43.3	13.44	88.1
14:32	135	43.4	16.61	81.2
14:33	135	43.5	15.36	121.3
14:34	135	43.6	15.69	104.5
14:35	134	43.7	16.00	84.4
14:36	134	43.8	15.76	85.6
14:37	134	43.9	15.60	79.1
14:38	134	44.0	15.23	72.8
14:39	134	44.1	15.46	79.5
14:40	134	44.2	15.92	82.3
14:41	133	44.2	15.87	74.8
14:42	132	44.3	15.52	67.7
14:43	132	44.4	15.28	66.3
14:44	132	44.4	15.31	63.8
14:45	132	44.5	15.27	67.3
14:46	133	19.3	15.67	98.5
14:47	134	19.2	16.22	94.5
14:48	133	44.7	17.15	73.5
14:49	132	44.8	17.16	84.8
14:50	132	44.9	16.64	96.5
14:51	132	45.0	16.88	74.2
14:52	132	45.0	15.54	77.5
14:53	133	45.1	14.82	85.8
14:54	133	45.1	15.66	69.4
14:55	133	45.2	15.63	76.0
14:56	133	45.3	15.25	85.6
14:57	132	45.3	15.70	67.6
14:58	131	45.4	15.93	59.6
14:59	131	45.4	16.93	69.5
15:00	132	45.5	17.33	99.5
15:01	133	45.6	17.64	95.8
15:02	133	45.6	17.22	77.2

15:03	133	45.7	15.75	70.3
15:04	131	45.7	18.25	41.7
15:05	130	45.7	17.89	38.6
15:06	130	45.8	17.90	40.3
15:07	129	45.8	17.95	42.2
15:08	129	45.9	17.98	39.2
15:09	129	45.9	17.99	38.9
15:10	128	46.0	18.04	39.1
15:11	128	46.0	18.10	39.6
15:12	128	46.1	18.13	38.6
15:13	128	46.1	18.15	39.7
15:14	128	46.3	18.16	37.0
15:15	127	46.3	18.09	36.1
15:16	127	46.4	18.05	36.3
15:17	126	46.5	18.06	36.3
15:18	126	46.5	18.05	37.6
15:19	126	46.6	18.04	36.0
15:20	126	46.7	18.04	35.3
15:21	125	46.8	18.05	35.3
15:22	125	46.8	18.05	37.8
15:23	125	46.9	18.05	34.9
15:24	125	46.9	18.04	36.3
15:25	125	47.0	18.04	36.1
Average	**132**	**36.4**	**15.85**	**81.6**

Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

Coventry Sream 1 - Cremators 1 & 2 & Abatement System Outlet

Mercury

Contract	Coventry Crematorium, DEM1372
Date	11th November 2019
Location	Cremators 1 & 2 Flue Gas Abatement System Outlet
Engineer(s)	JB
Absorbent	4% $K_2CR_2O_7$ / 20% HNO_3 in H_2O

Test Log	**Hg Test**
Barometric Pressure(kPa)	101.3
Gas Meter Temperature(Deg C)	36.4
Oxygen Concentration(%v/v dry)	15.85
Flue Gas Volumetric Flow(Nm^3/h dry)	2958

	Start	End
Time	12:44	15:25
Gas Meter Reading(Am^3 dry)	66.713	67.993
Absorber Weight(g)	3426.5	3509.8
Filter Reference	CO11119 HgF1	
Filter Fraction Analysed	1	
Filter(µg as Hg)	0	
Filter Blank(µg as Hg)	0	
Probe Rinse Reference	Washed into HgA	
Probe Rinse Volume(ml)	0	
Probe Rinse(µg/l as Hg)	0	
Probe Rinse Blank(µg/l as Hg)	0	
Absorbent Reference	CO11119 Hg1 A+B	
Absorbent Volume(ml)	250	250
Absorbent(µg/l as Hg)	21	1
Absorbent Blank(µg/l as Hg)	0.0	0.0

Calculation: General

Barometric Pressure(kPa)	101.3
Gas Meter Temperature(Deg C)	36.4
Gas Volume Sampled(Am^3 dry)	1.280
Gas Volume Sampled(Nm^3 dry)	1.1294
Mass of Dry Gas(g @ 1292.8 g/Nm^3)	1460.12
Change in Absorber Weight(g)	83.3
Water Vapour Volume(Nm^3 @ 803.9 g/Nm^3)	0.1036
Gas Volume(Nm^3 wet)	1.2330
Mass of Wet Gas(g)	1543.42
Moisture Concentration(%v/v)	**8.4**
Moisture Concentration(%w/w)	**5.4**

Calculation: Mercury

Filter(µg as Hg)	0.00
Probe Rinse(µg as Hg)	0.00
Absorbent(µg as Hg)	5.50
Total Mercury Sampled(µg)	5.50
Mercury Emission(µg/Nm^3 dry)	4.87
Oxygen Concentration(%v/v dry)	15.85
Mercury Emission	**9.50**
(µg/Nm^3 @ 11 %v/v Oxygen dry)	
Flue Gas Volumetric Flowrate(Nm^3/h dry)	2958
Mercury Emission(g/h)	**0.014**

Required Sample Velocity(Nm/s)	8.54
Nozzle Used(mm)	4.0
Area of Nozzle(m^2)	0.00001257
Test Duration(mins)	161
Actual Sample Velocity(Nm/s)	9.30
Isokinetic Closure(%)	109

Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

Coventry Sream 1 - Cremators 1 & 2 & Abatement System Outlet

Flue Gas Volumetric Flow

Contract	Coventry Crematorium, DEM1372
Date	11th November 2019
Location	Cremators 1 & 2 Flue Gas Abatement System Outlet
Engineer(s)	JB

Test Log	**Hg Test**
Flue Gas Temperature(Deg C)	132
Flue Gas Pitot Head Sample Points(Pa)	81.6
Flue Gas Moisture(%v/v)	8.4
Flue Gas Moisture(%w/w)	5.4
Flue Gas Duct Dimensions(mm)	350 mm Diameter Circular Flue
Flue Gas Duct Area(m^2)	0.0962

Calculation

Flue Gas Density(kg/m^3)	0.8536
Flue Gas Velocity(Am/s)	13.83
Flue Gas Volumetric Flowrate(Am^3/h)	4791
Flue Gas Volumetric Flowrate(Am^3/h dry)	4388
Flue Gas Volumetric Flowrate(Nm^3/h dry)	**2958**

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Coventry Cremators 1 & 2 & Abatement System

Emissions Monitoring November 2019

Test Instrumentation Calibration Data

	Siemens Ultramat 23
	O_2
Date of Check	11/11/2019
Time of Check	12:00
Test Reference	Hg
Zero reading at analyser	20.95%
Span reading at analyser	0.01%
Zero check down line	20.95%
Span check down line	0.03%
Zero reading post test at analyser	20.95%
Date of Check	11/11/2019
Time of Check	15:40
Test Reference	Hg
Zero reading at analyser	21.10%
Span reading at analyser	0.01%
Zero check down line	21.10%
Span check down line	0.01%
Zero in air post test at analyser	21.10%

Calibration Gases

Gas	Supplier	Cylinder No.	Certified Conc.	Analytical Tolerance ± %
Carbon monoxide in Nitrogen	DRM	AGG2010-1-2	397 ppm 496 mg/m³	2
Propane in synthetic air	DRM	AGG2010-2-2	50.3 ppm	2
Oxygen		-	-	-

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Coventry Cremators 1 & 2 & Abatement System

Emissions Monitoring November 2019

Test Instrumentation Calibration Data

	Siemens Ultramat 23		Signal 3030PM
	CO	O_2	VOC
Date of Check	12/11/2019	12/11/2019	12/11/2019
Time of Check	08:15	08:15	08:30
Test Reference	H11-H13	H11-H13	H11-H13
Zero reading at analyser	0 mg/m³	20.95%	0.0 ppm
Span reading at analyser	498 mg/m³	0.01%	50.5 ppm
Zero check down line	0 mg/m³	20.95%	0.0 ppm
Span check down line	496 mg/m³	0.03%	50.5 ppm
Zero reading post test at analyser	0 mg/m³	20.95%	0.1 ppm
Date of Check	01/08/2019	01/08/2019	01/08/2019
Time of Check	13:15	13:15	13:25
Test Reference	H11-H13	H11-H13	H11-H13
Zero reading at analyser	0 mg/m³	20.95%	-0.1 ppm
Span reading at analyser	497 mg/m³	0.01%	50.3 ppm
Zero check down line	0 mg/m³	20.95%	-0.1 ppm
Span check down line	495 mg/m³	0.01%	50.3 ppm
Zero in air post test at analyser	0 mg/m³	20.95%	-0.1 ppm

Calibration Gases

Gas	Supplier	Cylinder No.	Certified Conc.	Analytical Tolerance ± %
Carbon monoxide in Nitrogen	DRM	AGG2010-1-2	397 ppm 496 mg/m³	2
Propane in synthetic air	DRM	AGG2010-2-2	50.3 ppm	2

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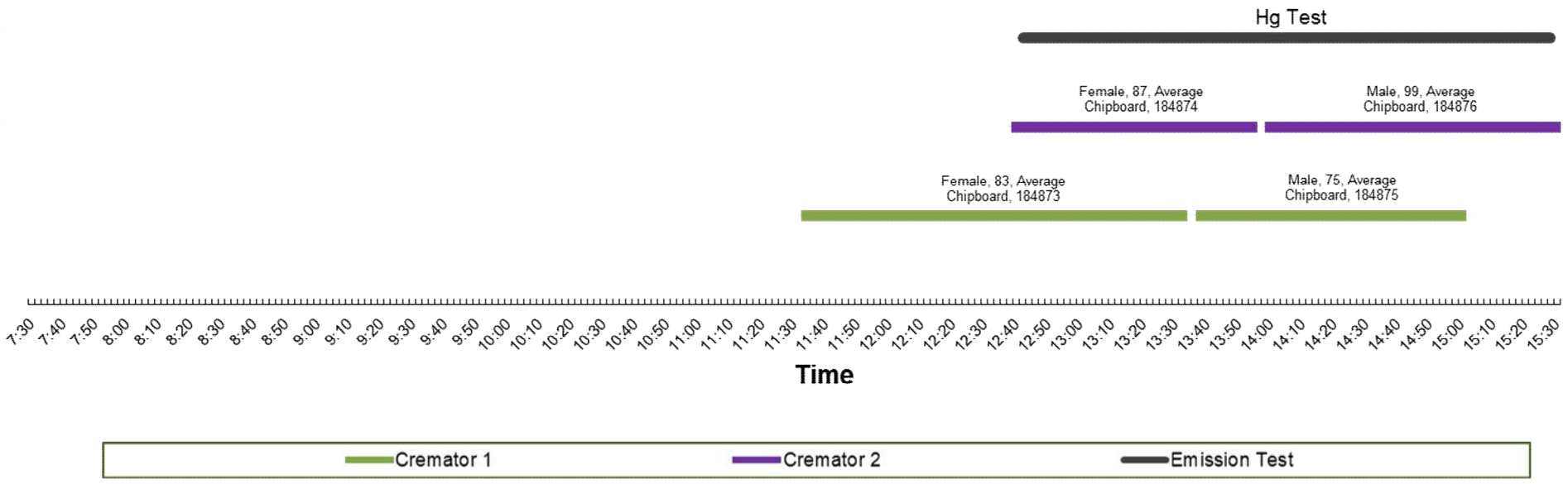
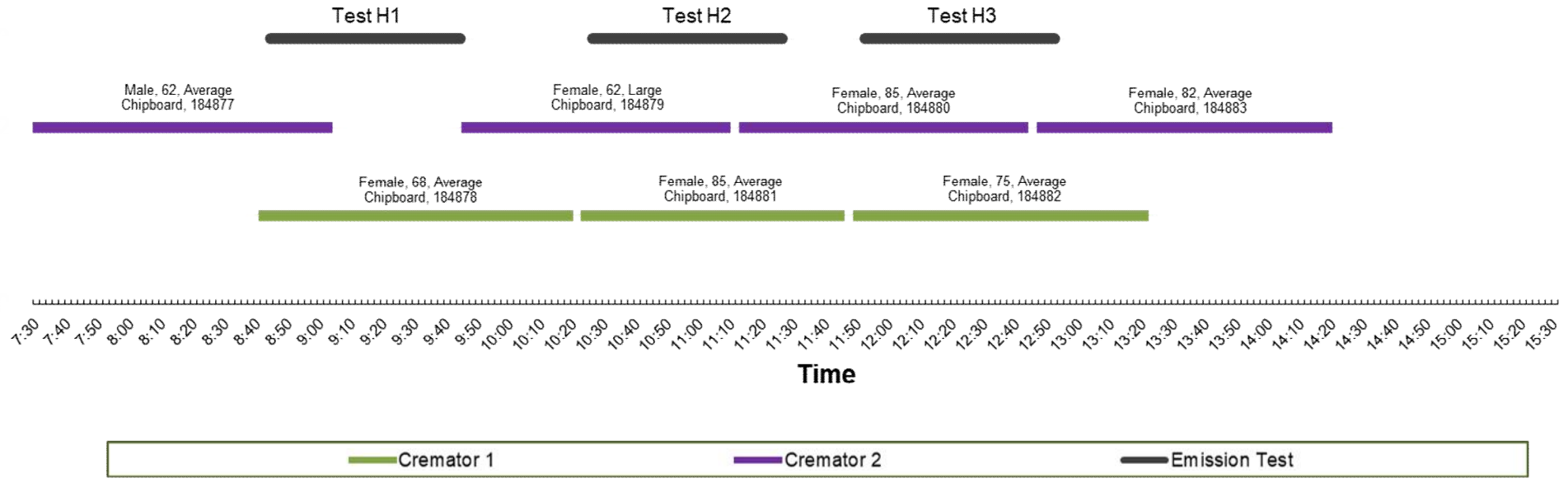
Coventry Stream 1 - Cremators 1 & 2 & Abatement System
Emission Tests 11/11/2019
Plant Operation & Test Periods



Coventry Stream 1 - Cremators 1 & 2 & Abatement System
Emission Tests 12/11/2019
Plant Operation & Test Periods



APPENDIX 2

Analysis Reports

Particulate Weight Determination

Reference			Clean Dry Weight g	Dirty Dry Weight g
Filters	CO121119FOB	18	0.56564	0.56565
	CO121119F1	D14	0.53435	0.53455
	CO121119F2	D15	0.53798	0.53814
	CO121119F3	D16	0.53464	0.53483
Rinses	CO121119ROB		77.62987	77.62992
	CO121119R1		77.34662	77.35279

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Emissions Monitoring Specialists

UKAS TESTING 0605

MAKING COMPLEX EASY

Test Certificate

Date 18/12/2019

Client	Davies & Co Enviromental Ltd Moor Road Leeds West Yorkshire LS10 2DD	**Order No.**	50001947
		Certificate No.	**WK19-13243**
		Issue No.	1
Contact	Steve Atherton	**Date Received**	02/12/2019
Description	5 solutions for HCL	**Technique**	IC Stack

Sample No.	**1095833**	**CO121119H11**	**Method**
Hydrogen chloride	2.07 µg/ml		C27 (MCERTS)(U)
Sample No.	**1095834**	**CO121119H12**	**Method**
Hydrogen chloride	2.60 µg/ml		C27 (MCERTS)(U)
Sample No.	**1095835**	**CO121119H13A**	**Method**
Hydrogen chloride	4.62 µg/ml		C27 (MCERTS)(U)
Sample No.	**1095836**	**CO121119H13B**	**Method**
Hydrogen chloride	0.09 µg/ml		C27 (MCERTS)(U)
Sample No.	**1095837**	**CO121119HBLANK**	**Method**
Hydrogen chloride	<0.05 µg/ml		C27 (MCERTS)(U)

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Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

UKAS TESTING 0605

Date 18/12/2019

Test Certificate

Client	Davies & Co Enviromental Ltd	**Certificate No.**	**WK19-13243**
		Issue No.	1

Tested By	Lora McKerracher	Date	16/12/2019
Approved By	[redacted]	Date	17/12/2019

Joanne Dewhurst
Operational

For and on authority of RPS Laboratories Ltd.

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

Concentration values (mg/m3 and ppm) are not covered by the scope of UKAS accreditation.
Results stated as ml are refering to the sample volume.

RPS Laboratories terms and conditions apply - a copy is available on request.
Analysis carried out on samples 'as received'

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Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

UKAS TESTING 0605

MAKING COMPLEX EASY

Test Certificate

Date 19/12/2019

Client	Davies & Co Enviromental Ltd Moor Road Leeds West Yorkshire LS10 2DD	**Order No.**	50001947
		Certificate No.	**WK19-13230**
		Issue No.	1

Contact	Steve Atherton	**Date Received**	02/12/2019
Description	5 samples for Hg	**Technique**	ICP Stack

Sample No.	**1095828**	**CO11119HgF**	**Method**
Mercury	<0.03 µg		M112-BSEN13211(U)
Sample No.	**1095829**	**CO111119HgFBLANK**	**Method**
Mercury	<0.03 µg		M112-BSEN13211(U)
Sample No.	**1095830**	**CO111119Hg1A**	**Method**
Mercury	21 µg/l		M112-BSEN13211(U)
Sample No.	**1095831**	**CO111119Hg1B**	**Method**
Mercury	1 µg/l		M112-BSEN13211(U)
Sample No.	**1095832**	**CO111119HgBLANK**	**Method**
Mercury	<0.5 µg/l		M112-BSEN13211(U)

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Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

UKAS TESTING 0605

Date 19/12/2019

Test Certificate

Client	Davies & Co Enviromental Ltd	**Certificate No.**	**WK19-13230**
		Issue No.	1

Tested By	Mateusz Lisowski	Date	18/12/2019 12/12/2019
Approved By	[redacted]	Date	19/12/2019

Joanne Dewhurst
Operational

For and on authority of RPS Laboratories Ltd.

Method Symbols
(U) Analysis is UKAS Accredited
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