STACK EMISSIONS MONITORING

SOCOTEC

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Operator & Address:
Viridor Waste Management Ltd Cardiff Energy from Waste Facility Glass Avenue Ocean Way Cardiff

Permit Reference:
EPR Permit: EPR/LP3030XA

Release Point:
A2 - Stream 2

Sampling Date(s):
15th November 2018

SOCOTEC UK Job Number:	LSO 181117 / Biannual 2
Report Date:	01st Febuary 2019
Version:	1
Report By: MCERTS Number: MCERTS Level: Technical Endorsements:	Jonathan Ward MM 02 080 MCERTS Level 2 - Team Leader 1, 2, 3 & 4
Report Approved By: MCERTS Number: Business Title: Technical Endorsements: Signature:	David May MM 07 862 MCERTS Level 2 - Operations Manager (LSO) 1, 2, 3 & 4

UKAS TESTING
1015

MCERTS

EXECUTIVE SUMMARY

EMISSIONS SUMMARY

Parameter	Units	Result	Calculated Uncertainty +/-	Limit	MCERTS accredited result
Dioxins & Furans - UPPER Limits					
Dioxins & Furans (NATO I-TEQ)	ng/m³	0.0331	0.0035	0.1	✓
Dioxins & Furans (NATO I-TEQ) Emission Rate	µg/hr	5.1502	0.5408	-	
Dioxins & Furans (WHO TEQ Humans / Mammals)	ng/m³	0.0322	0.0034	-	✓
Dioxins & Furans (WHO TEQ H / M) Emission Rate	µg/hr	5.0147	0.5265	-	
Dioxins & Furans (WHO TEQ Fish)	ng/m³	0.0328	0.0034	-	✓
Dioxins & Furans (WHO TEQ Fish) Emission Rate	µg/hr	5.1001	0.5355	-	
Dioxins & Furans (WHO TEQ Birds)	ng/m³	0.0480	0.0050	-	✓
Dioxins & Furans (WHO TEQ Birds) Emission Rate	µg/hr	7.4703	0.7844	-	
Dioxins & Furans - LOWER Limits					
Dioxins & Furans (NATO I-TEQ)	ng/m³	0.0331	0.0035	-	✓
Dioxins & Furans (NATO I-TEQ) Emission Rate	µg/hr	5.1502	0.5408	-	
Dioxins & Furans (WHO TEQ Humans / Mammals)	ng/m³	0.0322	0.0034	-	✓
Dioxins & Furans (WHO TEQ H / M) Emission Rate	µg/hr	5.0147	0.5265	-	
Dioxins & Furans (WHO TEQ Fish)	ng/m³	0.0328	0.0034	-	✓
Dioxins & Furans (WHO TEQ Fish) Emission Rate	µg/hr	5.1001	0.5355	-	
Dioxins & Furans (WHO TEQ Birds)	ng/m³	0.0480	0.0050	-	✓
Dioxins & Furans (WHO TEQ Birds) Emission Rate	µg/hr	7.4703	0.7844	-	
Dioxin-like PCBs - UPPER Limits					
Dioxin-like PCBs (WHO TEQ Humans / Mammals)	ng/m³	0.0034	0.0004	-	✓
Dioxin-like PCBs (WHO TEQ H / M) Emission Rate	µg/hr	0.5283	0.0629	-	
Dioxin-like PCBs (WHO TEQ Fish)	ng/m³	0.0003	0.0000	-	✓
Dioxin-like PCBs (WHO TEQ Fish) Emission Rate	µg/hr	0.0463	0.0055	-	
Dioxin-like PCBs (WHO TEQ Birds)	ng/m³	0.0075	0.0009	-	✓
Dioxin-like PCBs (WHO TEQ Birds) Emission Rate	µg/hr	1.1636	0.1385	-	
Dioxin-like PCBs - LOWER Limits					
Dioxin-like PCBs (WHO TEQ Humans / Mammals)	ng/m³	0.0034	0.0004	-	✓
Dioxin-like PCBs (WHO TEQ H / M) Emission Rate	µg/hr	0.5283	0.0629	-	
Dioxin-like PCBs (WHO TEQ Fish)	ng/m³	0.0003	0.0000	-	✓
Dioxin-like PCBs (WHO TEQ Fish) Emission Rate	µg/hr	0.0463	0.0055	-	
Dioxin-like PCBs (WHO TEQ Birds)	ng/m³	0.0075	0.0009	-	✓
Dioxin-like PCBs (WHO TEQ Birds) Emission Rate	µg/hr	1.1636	0.1385	-	
PAHs	ug/m³	1.07	0.71	-	✓
PAHs Emission Rate	g/hr	0.17	0.11	-	
Cadmium & Thallium	mg/m³	0.0010	0.0007	0.05	✓
Cadmium & Thallium Emission Rate	g/hr	0.1644	0.1098	-	
Heavy Metals	mg/m³	0.0481	0.0075	0.5	✓
Heavy Metals Emission Rate	g/hr	7.7424	1.2001	-	
Mercury	mg/m³	0.0003	0.0004	0.05	✓
Mercury Emission Rate	g/hr	0.0522	0.0691	-	
Hydrogen Fluoride	mg/m³	0.01	0.012	1	✓
Hydrogen Fluoride Emission Rate	g/hr	1.87	1.880	-	
Nitrous Oxide	mg/m³	3.08	0.31	-	✓
Nitrous Oxide Emission Rate	g/hr	0.48	0.07	-	
Moisture	%	14.8	0.43	-	✓
Stack Gas Temperature	°C	158	-	-	✓
Stack Gas Velocity	m/s	25.6	0.62	-	
Gas Volumetric Flow Rate (Actual)	m³/hr	229558	11803	-	
Gas Volumetric Flow Rate (STP, Wet)	m³/hr	140202	7208	-	
Gas Volumetric Flow Rate (STP, Dry)	m³/hr	119467	6142	-	
Gas Volumetric Flow Rate at Reference Conditions	m³/hr	161680	8313	-	

ND = None Detected,

Results at or below the limit of detection are highlighted by bold italic text.

The above volumetric flow rate is calculated using data from the preliminary survey. Mass emissions for non isokinetic tests are calculated using these values. For all isokinetic testing the mass emission is calculated using test specific flow data and not the above values.

Reference conditions are 273K, 101.3kPa, dry gas 11% Oxygen.

APPENDIX 2 - Summaries, Calculations, Raw Data and Charts

PAHs SUMMARY					
Test	Sampling Times	Concentration ug/m³	LOD ug/m³	Limit ug/m³	Emission Rate g/hr
Run 1	07:55 - 14:09 15 November 2018	1.1	0.15	-	0.166
Field Blank	-	1.01	-	-	-

Reference conditions are 273K, 101.3kPa, dry gas 11% Oxygen.

PAHs ANALYSIS SUMMARY RUN 1

Compound Name	LOD ug	Blank Result ug	Blank Result ug/m³	Run 1 Result ug	Run 1 Result ug/m³	Run 1 Uncertainites %
Anthranthrene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Benzo(a)anthracene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Benzo(b,j,k)fluoranthene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Benzo[b]napth(2,1-d)thiophene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Benzo(c)phenanthrene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Benzo(ghi)perylene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Benzo(a)pyrene	0.10	0.60	0.06	0.70	0.07	66.7
Chrysene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Cyclopenta(c,d)pyrene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Dibenzo(ah)anthracene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Dibenzo(a,i)pyrene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Fluoranthene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Indeno(1,2,3-cd)pyrene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Naphthalene	0.10	7.50	0.70	9.40	0.87	60.3
Acenaphthylene	0.10	0.10	< 0.0093	0.10	< 0.0093	208.9
Acenaphthene	0.10	1.50	0.14	0.10	< 0.0093	208.9
TOTAL PAHs	1.60	10.90	1.01	11.50	1.07	66.40
REPORTED PAHs (>= or equal to	-	-	-	-	1	