



Staffordshire ERF

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Annual Report 2018

EPR/HP3431HK

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1. INTRODUCTION

This is the Annual Performance Report for the Staffordshire Energy Recovery Facility (Staffordshire ERF) for 2018. This annual report is the facility's fifth complete annual report.

2. FACILITY INFORMATION

Plant Operator	Veolia ES Staffordshire Ltd
Name of Facility	Staffordshire Energy Recovery Facility
EPR Permit Number	HP3431HK
Facility Address	Staffordshire Energy Recovery Facility The Dell Enterprise Drive Four Ashes Wolverhampton Staffordshire WV10 7DF
Telephone Number	0203 567 6300

The ERF is operated by Veolia ES Staffordshire Ltd, a wholly owned subsidiary of Veolia. The plant is designed to burn predominantly residual municipal solid waste and now has a capacity to process up to 340,000 Tonnes annually. The facility has been built to serve Staffordshire County Council, its eight constituent Councils, and its other partner authorities.

The facility can generate approximately 29MW of electricity from waste. The facility uses 3.2MW and the balance is exported to the national grid. In tangible terms the electricity generated is equivalent to 66,000 homes.

The facility is designed so that it can supply heat, if a client becomes available in the future.

Technical details of the plant:

- Constructions Industrielles de la Mediterranee (CNIM) - Design
- Maximum Permitted Refuse throughput – 340,000 tonnes per annum
- Two waste streams each with a capacity of 20 tonnes per hour.
- Storage capacity 4,500 Tonnes – Approximately four and a half days full plant capacity
- Number of tipping bays – 5
- Steam output – 64.5 tonnes of steam per hour at 400°C at 60 BAR
- Flue gas treatment – CNIM ammonia injection for the reduction of NOx, dry lime injection for the removal of acid gases, activated carbon injection for removal of metals and dioxins followed by high performance bag filters for removal of particulates, dispersal via two 80 metre high stacks.
- Maximum energy generating capacity 29MW

The ERF is regulated by the Environment Agency and is certified in compliance with:

- ISO 9001 : 2008
- ISO 14001 : 2004, and
- OHSAS 18001 : 2007

The facility is permitted to accept the following waste types:

Waste code	Description
02	WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING
02 02	wastes from the preparation and processing of meat, fish and other foods of animal origin
02 02 02	animal-tissue waste
02 02 03	materials unsuitable for consumption or processing
16	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
16 03	off-specification batches and unused products
16 03 06	organic wastes other than those mentioned in 16 03 05
18	WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/OR RELATED RESEARCH (except kitchen and restaurant wastes not arising from immediate health care)
18 01	wastes from natal care, diagnosis, treatment or prevention of disease in humans
18 01 04	wastes whose collection and disposal is not subject to special requirements in order to prevent infection(for example dressings, plaster casts, linen, disposable clothing, diapers)
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 01	paper and cardboard
19 12 07	Wood other than that mentioned in 19 12 06
19 12 08	textiles
19 12 10	Combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

Waste code	Description
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS
20 01	separately collected fractions (except 15 01)
20 01 01	paper and cardboard
20 01 08	biodegradable kitchen and canteen waste
20 01 10	clothes
20 01 11	textiles
20 01 38	Wood other than that mentioned in 20 01 37
20 01 39	plastics
20 01 99	other fractions not otherwise specified (hygiene waste collected from domestic facilities that is not classified as clinical waste)
20 02	garden and park wastes (including cemetery waste)
20 02 01	biodegradable waste
20 03	other municipal wastes
20 03 01	Mixed municipal waste
20 03 02	Waste from markets
20 03 03	Street cleaning residues
20 03 07	Bulky waste

3. OPERATIONAL INFORMATION

Operational Details		
Operational hours	Line 1: 8376 Line 2: 8396	Hours
Total Waste Incinerated	336449	Tonnes
Total Municipal Waste Incinerated	313866	Tonnes
Total Commercial Waste Incinerated	22583	Tonnes
Metals Recovered	5141	Tonnes
Incinerator Bottom Ash Produced	65857	Tonnes
APC Residues	8227	Tonnes

Reporting of Water and Other Raw Material Usage for the year 2018

Raw Material	Usage	Unit	Specific Usage	Unit
Mains water	47516	m ³	141.2	kg/t
Total water usage	47516	m ³	141.2	kg/t
Ammonia	1120	Tonnes	3.3	Kg/t
Activated carbon	83	Tonnes	0.25	kg/t
Lime/hydrated lime	4035	Tonnes	12	kg/t

(Specific Usage is measured in kg/tonne waste incinerated)

Reporting of Energy Usage/Export for the year 2018

Energy Source	Energy (MWh)	Specific energy	Units
Electricity produced	226978	674.6	KWh/tonne of waste incinerated (dry basis)
Electricity imported	191	0.57	
Electricity Exported	201884	600	
Electricity used by ERF	25285	75.2	
Gas Oil	153299 Litres	0.46	L/tonne of waste incinerated (dry basis)
Thermal Energy produced (Steam Production)	1029728 Tonnes	3.1	Tonnes/Tonne waste incinerated
Waste heat utilised by ERF	0	0	KWh/tonne of waste incinerated (dry basis)

Reporting of Waste Disposal and Recovery for the year 2018

Waste Description	Disposal Route	Annual Tonnes	Recovery Tonnes	Kg / Tonne Waste
1) Hazardous Wastes				
APC Residues	Empire /Minosus	8227	0	24.5
IBA which is classified as hazardous waste		0	0	0
Total hazardous waste	Empire /Minosus	8227	0	24.5
2) Non-Hazardous Wastes				
IBA	Recycling	65857	65857	195.7
Other non-hazardous wastes	Metals Recycled	5141	5141	15.28
Total non-hazardous waste		70997	70997	211
TOTAL WASTE	-	79224	70997	235.5

Reporting of other performance indicators for the period 2018

Parameter	Result
Number of periods of WID abnormal operation	0
Cumulative hours of WID abnormal operation for 2018	0

4. EMISSIONS TO AIR

All gaseous emissions generated during the combustion process pass through an extensive flue gas cleaning process which starts in the boiler directly above the furnace with injected ammonia to reduce the levels of oxides of nitrogen. After the boiler, super heater and economiser the gases are cooled to approximately 150 degrees centigrade. Activated carbon is added to remove metals and dioxins, and lime is added to remove acidic gases such as SO₂ and HCL. Most of this reaction occurs in the bag filters where particulates are removed and APCr is formed. There is a recirculation of APC where the used lime and carbon is recirculated further to remove chlorinated gases via a recirculation silo. This secondary reactant is recirculated back to the original process via a lab loop. The cleaned gasses are finally released into the atmosphere through the chimney after the bag house.

In compliance with the IED and EPR Permit, the flue gasses are continuously monitored using MCERTS accredited equipment. In addition to the continuous monitoring, an extractive sampling campaign is undertaken on a quarterly basis by an approved service supplier. The organisation used for analysis and monitoring are accredited by the United Kingdom Accreditation Service (UKAS) and the Environment Agency's Monitoring Certification Scheme (MCERTS).

The parameters measured and their frequency of monitoring are summarised below.

Parameters	Continuous	Jan – Jun	Jul – Dec
Particulate Matter	✓		
TOC	✓		
Hydrogen Chloride	✓		
Oxides of Nitrogen	✓		
Carbon Monoxide	✓		
Sulphur Dioxides	✓		
Ammonia	✓		
Nitrous Oxide		✓	✓
Hydrogen Fluoride		✓	✓
Mercury		✓	✓
Arsenic		✓	✓
Cadmium		✓	✓
Chromium		✓	✓
Copper		✓	✓
Cobalt		✓	✓
Nickel		✓	✓
Manganese		✓	✓
Antimony		✓	✓
Lead		✓	✓
Thallium		✓	✓
Vanadium		✓	✓
Dioxins and Furans		✓	✓
Dioxin-like PCBs		✓	✓
PAHs		✓	✓

4.1 Continuous Emissions

Through the process there is continuous emissions monitoring of six main pollutants with ELVs using MCERTS approved instruments. The pollutants measured in this way comprise: particulates, total organic carbon, carbon monoxide, sulphur dioxide and oxides of nitrogen.

Each pollutant has its own Emission Limit Value (ELV). A summary is shown below.

Pollutant	Chemical Symbol	ELV	Measurement	Monitoring Standard
Particulates	PMx	30mg/m3	half hour average	BS EN 14181 and BS EN 15267-3
		10mg/m3	daily average	BS EN 14181 and BS EN 15267-3
Total Organic Carbon	TOC	20mg/m3	half hour average	BS EN 14181 and BS EN 15267-3
		10mg/m3	daily average	BS EN 14181 and BS EN 15267-3
Hydrogen Chloride	HCL	60mg/m3	half hour average	BS EN 14181 and BS EN 15267-3
		10mg/m3	daily average	BS EN 14181 and BS EN 15267-3
Carbon Monoxide	CO	150mg/m3	10 minute average	BS EN 14181 and BS EN 15267-3
		50mg/m3	daily average	BS EN 14181 and BS EN 15267-3
Sulphur Dioxide	SO2	200mg/m3	half hour average	BS EN 14181 and BS EN 15267-3
		50mg/m3	daily average	BS EN 14181 and BS EN 15267-3
Oxides of Nitrogen	NO and NO2 as NOX	400mg/m3	half hour average	BS EN 14181 and BS EN 15267-3
		200mg/m3	daily average	BS EN 14181 and BS EN 15267-3

A summary of the continuous emissions can be seen below for 2018 for average daily figures per month:

Stream 1 Monthly mean

	ELV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dust	10	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Total Organic Carbon	10	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0	0	0.1	0.1
Hydrogen Chloride	10	7	7.2	7.4	6.5	6.7	5.1	6.6	7.5	7.8	7.6	6.4	7.4
Carbon Monoxide	50	3.9	6.1	5.7	5.1	3.8	3.1	4	5.3	4.7	5	5.4	5.8
Sulphur Dioxide	50	26.5	31	29	29.9	23	28.4	22.9	25.7	28.3	31.5	36.4	33.2
Oxides of Nitrogen	200	155.4	156.1	160.8	161.8	164.4	167.7	167.6	169.8	170.7	177.5	169.8	161.7

Stream 2 Monthly mean

	ELV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dust	10	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1
Total Organic Carbon	10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0.1	0
Hydrogen Chloride	10	6.2	6.4	6.4	6.6	5.6	5.7	7.1	7.7	6.8	6.7	5.3	6.4
Carbon Monoxide	50	2.7	4.5	4.4	3.9	3.3	3.3	2.8	3.6	4.2	4.1	4.6	4.2
Sulphur Dioxide	50	25.8	32.3	26.5	31	27.6	31.3	27.9	29.9	31.2	35	37.6	35.7
Oxides of Nitrogen	200	152.3	154.9	161.7	166.5	167.8	173.3	173.7	176.7	177.3	182.9	178.5	179.3

An interpretation shows that the emission levels are consistently stable from month to month. This data is communicated monthly to the public via our Veolia website in terms of a percentage of each ELV. A more detailed IED report is sent to the EA each month showing emissions per pollutant per line, per month in terms of half hourly averages and daily averages.

4.2 Extractive Sampling

Typically these pollutants are far harder to measure and are only present in very low concentrations so are taken from the stack using appropriate methodologies.

Extractive testing data is shown in Appendix B.

An interpretation of the data shows that the extractive samples are an order of magnitude below the prescribed limits in the permit.

4.3 Annual Mass Emissions

CEMS gas mass emissions are calculated by the MCERT Software developed by Envirosoft. These are shown in Appendix B.

An interpretation of the CEMS Mass Emission is that there is generally a steady state of control. Extractive mass emissions are calculated by using CEMS data and extractive results.

Annual Mass Emissions		
Parameter	Units	Annual Total
Hydrogen Fluoride	Kg	247.9
Mercury	Kg	1.8
Arsenic	Kg	1.0
Cadmium	Kg	1.2
Chromium	Kg	3.1
Copper	Kg	4.8
Nickel	Kg	4.3
Manganese	Kg	7.9
Antimony	Kg	1.6
Lead	Kg	2.8
Thallium	Kg	1.0
Dioxins and Furans*	Kg	0.00003
PAHs	Kg	0.9
PCBs*	Kg	0.0007
Cobalt	Kg	1.0
Vanadium	Kg	1.0

*Measured concentrations were used to derive these mass emissions ie NOT converted to toxic equivalence first. Non-detects included

5 INCINERATOR BOTTOM ASH (IBA) AND AIR POLLUTION CONTROL (APC) RESIDUE

5.1 IBA

The plant has undergone rigorous testing to prove that the IBA is non-hazardous. The IBA is of a consistently high standard and there have been no failures in the last 24 samples. IBA is transported to Ballast Phoenix in Castle Bromwich, where it is reprocessed into a number of different graded aggregates. Metals are further extracted from the process and recycled.

In addition to Dioxins/Furans and dioxin-like PCB's, Total Organic Carbon, metals tested in IBA are Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc and their compounds.

Frequency	Monitoring	Test	Limit
Monthly	IBA	TOC	< 3%
Monthly	IBA	Metals, dioxins/furans and dioxin-like PCB's	No limit

The results can be seen in Appendix C.

An interpretation shows that the results are uniform and that the IBA quality does not vary a great deal and is fully compliant.

5.2 APC

APC residue is the fine particulate matter that is removed at the end of the gas cleansing process. It contains residues from the waste gas and the reactants used to treat the gas. APC is captured in the bag house filters in the plant before the gas is emitted and dispersed through the ERF's two 80m stacks. The APC from the Staffordshire ERF is sent to another Veolia facility for use in their treatment facility, Empire Works or for permanent underground storage at Minosus.

The results can be seen in Appendix C.

An interpretation shows that the results are uniform and that the APC quality does not vary and is uniform.

6 ENVIRONMENTAL CONTROLS

Staffordshire ERF has an experienced Veolia management team from other existing plants. The plant has been designed using proven technology and experience and is performing well. The plant supports our company ethos, as we operate 10 facilities in the UK. Reliable environmental controls and a robust management system ensure that compliance with the Industrial Emissions Directive and EPR Permit.

Veolia staff are aware of the environmental impacts of their work and exercise a high standard of housekeeping. Training and competency of staff is controlled by the Veolia Business Management System. The Management System covers training, awareness and competence. The company identifies the training requirements of its employees and provides suitable resources to ensure they have the required knowledge, skills and expertise to carry out their duties.

APPENDIX A – EXTRACTIVE EMISSIONS
APPENDIX B – MASS EMISSIONS
APPENDIX C – IBA AND APC RESULTS

APPENDIX A

Permit Number: ERR/HP3431HK Operator: Veolia ES Staffordshire Ltd

Facility: Staffordshire ERF Form Number: Air7 / 01/01/2012

Reporting of periodically monitored emissions to air for the period from 01/01/18 to 30/06/18

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result ⁽¹⁾	Test Method	Result Date and Time ⁽²⁾	Uncertainty ⁽³⁾
A1 & A2	Hydrogen fluoride	2 mg/m ³	Periodic over minimum 1-hour period	A1: 0.02 mg/m ³	BS ISO 15713	A1: 9/03/2018 7:25 – 8:25	14%
				A2: 0.03 mg/m ³		A2: 7/03/2018 12:15 – 13:15	14%
A1 & A2	Cadmium & thallium and their compounds (total)	0.05 mg/m ³	over minimum 30 minute, maximum 8 hour period	A1: 0.0011 mg/m ³	BS EN 14385	A1: 9/03/2018 7:30 – 9:32	8%
				A2: 0.0011 mg/m ³		A2: 8/03/2018 9:15 – 11:21	8%
A1 & A2	Mercury and its compounds	0.05 mg/m ³	over minimum 30 minute, maximum 8 hour period	A1: 0.0012 mg/m ³	BS EN 14385	A1: 9/03/2018 7:30 – 9:32	14%
				A2: 0.00083 mg/m ³		A2: 8/03/2018 9:15 – 11:21	14%
A1 & A2	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m ³	over minimum 30 minute, maximum 8 hour period	A1: 0.02 mg/m ³	BS EN 14385	A1: 9/03/2018 7:30 – 9:32	8%
				A2: 0.014 mg/m ³		A2: 8/03/2018 9:15 – 11:21	4%
A1 & A2	N ₂ O	N/A	Periodic Over minimum 1-hour period	A1: 0.31 mg/m ³	EA TGN M22	A1: 6/03/2018 12:30-13:30	8%
				A2: 0.32 mg/m ³		A2: 7/03/2018 12:30-13:30	8%

A1 & A2	Dioxins / Furans (I-TEQ)	0.1 ng/m ³	over minimum 6 hour period, maximum 8 hour period	A1: 0.013-0.015 ng/m ³ A2: 0.011-0.014 ng/m ³	BS EN 1948	A1: 6/03/2018 7:45 – 14:26 A2: 7/03/2018 7:30 – 13:33	15% 14%
A1 & A2	Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.0032-0.0032 ng/m ³ A2: 0.0025-0.0025 ng/m ³	BS EN 1948	A1: 6/03/2018 7:45 – 14:26 A2: 7/03/2018 7:30 – 13:33	21% 21%
A1 & A2	Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.00018-0.00018 ng/m ³ A2: 0.00014-0.00014 ng/m ³	BS EN 1948	A1: 6/03/2018 7:45 – 14:26 A2: 7/03/2018 7:30 – 13:33	19% 19%
A1 & A2	Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.011-0.011 ng/m ³ A2: 0.0065-0.0065 ng/m ³	BS EN 1948	A1: 6/03/2018 7:45 – 14:26 A2: 7/03/2018 7:30 – 13:33	13% 13%
A1 & A2	Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.013-0.017 ng/m ³ A2: 0.011-0.016 ng/m ³	BS EN 1948	A1: 6/03/2018 7:45 – 14:26 A2: 7/03/2018 7:30 – 13:33	16% 15%
A1 & A2	Dioxins / furans (WHO-TEQ Fish)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.012-0.016 ng/m ³ A2: 0.0084-0.014 ng/m ³	BS EN 1948	A1: 6/03/2018 7:45 – 14:26 A2: 7/03/2018 7:30 – 13:33	17% 17%
A1 & A2	Dioxins / furans (WHO-TEQ Birds)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.023-0.026 ng/m ³ A2: 0.02-0.025 ng/m ³	BS EN 1948	A1: 6/03/2018 7:45 – 14:26 A2: 7/03/2018 7:30 – 13:33	18% 17%

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result ^[1]	Test Method	Result Date and Time ^[2]	Uncertainty ^[3]
A1 & A2	Poly-cyclic aromatic hydrocarbons (PAHs) Total	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.42 µg/m ³ A2: 0.63 µg/m ³	BS ISO 11338-1 and BS ISO 11338-2	12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	14% 15%
A1 & A2	Anthanthrene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Benzo[a]anthracene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Benzo[b]fluoranthene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Benzo[k]fluoranthene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Benzo[b]naph(2,1-d)thiophene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Benzo[c]phenanthrene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Benzo[ghi]perylene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Benzo[a]pyrene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Cholanthrene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Chrysene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Cyclopenta(c,d)pyrene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Dibenzo[ah]anthracene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Dibenzo[a,i]pyrene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Fluoranthene	No limit applies		A1: 0.047 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	18% >100%
A1 & A2	Indo[1,2,3-cd]pyrene	No limit applies		A1: 0.012 µg/m ³ A2: 0.013 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	>100% >100%
A1 & A2	Naphthalene	No limit applies		A1: 0.21 µg/m ³ A2: 0.43 µg/m ³		12/03/18 7:10 – 13:11 8/03/18 7:20 – 13:21	18% 18%

[1] For dioxins and dioxin-like PCBs, the result are to be reported as a range based on: All congeners less than the detection limit assumed to be zero as a minimum, and all congeners less than the detection limit assumed to be at the detection limit as a maximum

[2] The date and time of the sample that produced the result is given.

[3] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated.

Signed

Date.....17/7/18.....

(authorised to sign as representative of Operator)

Permit Number: ERR/HP3431HK Operator: Veolia ES Staffordshire Ltd
 Facility: Staffordshire ERF Form Number: Air7 / 01/01/2012
 Reporting of periodically monitored emissions to air for the period from 01/07/18 to 31/12/18

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result ^[1]	Test Method	Result Date and Time ^[2]	Uncertainty ^[3]
A1 & A2	Hydrogen fluoride	2 mg/m ³	Periodic over minimum 1-hour period	A1: 0.08 mg/m ³ A2: 0.38 mg/m ³	BS ISO 15713	A1: 13/09/2018 8:00 – 9:00 A2: 12/09/2018 9:00 – 10:00	14% 14%
A1 & A2	Cadmium & thallium and their compounds (total)	0.05 mg/m ³	over minimum 30 minute, maximum 8 hour period	A1: 0.0018 mg/m ³ A2: 0.0012 mg/m ³	BS EN 14385	A1: 14/09/2018 7:15 – 9:16 A2: 14/09/2018 9:50 – 11:51	10% 8%
A1 & A2	Mercury and its compounds	0.05 mg/m ³	over minimum 30 minute, maximum 8 hour period	A1: 0.0012 mg/m ³ A2: 0.00078 mg/m ³	BS EN 14385	A1: 14/09/2018 7:15 – 9:16 A2: 14/09/2018 9:50 – 11:51	15% 14%
A1 & A2	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m ³	over minimum 30 minute, maximum 8 hour period	A1: 0.017 mg/m ³ A2: 0.01 mg/m ³	BS EN 14385	A1: 14/09/2018 7:15 – 9:16 A2: 14/09/2018 9:50 – 11:51	5% 4%
A1 & A2	N ₂ O	N/A	Periodic Over minimum 1-hour period	A1: 0.74 mg/m ³ A2: 0.22 mg/m ³	EA TGN M22	A1: 13/09/2018 11:00-12:00 A2: 12/09/2018 11:00-12:00	10% 10%
A1 & A2	Dioxins / Furans (I-TEQ)	0.1 ng/m ³	over minimum 8 hour period, maximum 8 hour period	A1: 0.013-0.017 ng/m ³ A2: 0.012-0.013 ng/m ³	BS EN 1948	A1: 13/09/2018 7:15 – 13:18 A2: 12/09/2018 7:20 – 13:23	13% 13%

A1 & A2	Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.0045-0.0045 ng/m ³ A2: 0.0034-0.0041 ng/m ³	BS EN 1948	A1: 13/09/2018 7:15 – 13:18 A2: 12/09/2018 7:20 – 13:23	21% 21%
A1 & A2	Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.00022-0.00023 ng/m ³ A2: 0.00018-0.00022 ng/m ³	BS EN 1948	A1: 13/09/2018 7:15 – 13:18 A2: 12/09/2018 7:20 – 13:23	20% 19%
A1 & A2	Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.0069-0.0088 ng/m ³ A2: 0.007-0.0092 ng/m ³	BS EN 1948	A1: 13/09/2018 7:15 – 13:18 A2: 12/09/2018 7:20 – 13:23	14% 13%
A1 & A2	Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.015-0.019 ng/m ³ A2: 0.014-0.015 ng/m ³	BS EN 1948	A1: 13/09/2018 7:15 – 13:18 A2: 12/09/2018 7:20 – 13:23	13% 13%
A1 & A2	Dioxins / furans (WHO-TEQ Fish)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.015-0.018 ng/m ³ A2: 0.013-0.014 ng/m ³	BS EN 1948	A1: 13/09/2018 7:15 – 13:18 A2: 12/09/2018 7:20 – 13:23	14% 14%
A1 & A2	Dioxins / furans (WHO-TEQ Birds)	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.02-0.024 ng/m ³ A2: 0.019-0.02 ng/m ³	BS EN 1948	A1: 13/09/2018 7:15 – 13:18 A2: 12/09/2018 7:20 – 13:23	18% 17%

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result ^[1]	Test Method	Result Date and Time ^[2]	Uncertainty ^[3]
A1 & A2	Poly-cyclic aromatic hydrocarbons (PAHs) Total	No limit applies	over minimum 6 hour period, maximum 8 hour period	A1: 0.35 µg/m ³ A2: 0.36 µg/m ³	BS ISO 11338-1 and BS ISO 11338-2	17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	13% 14%
A1 & A2	Anthanthrene	No limit applies		A1: 0.014 µg/m ³ A2: 0.043 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% 18%
A1 & A2	Benzo(a)anthracene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% >100%
A1 & A2	Benzo(b)fluoranthene	No limit applies		A1: 0.027 µg/m ³ A2: 0.029 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	18% 18%
A1 & A2	Benzo(k)fluoranthene	No limit applies		A1: 0.027 µg/m ³ A2: 0.029 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	18% 18%
A1 & A2	Benzo(b)naph(2,1-d)thiophene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% >100%
A1 & A2	Benzo(c)phenanthrene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% >100%
A1 & A2	Benzo(ghi)perylene	No limit applies		A1: 0.068 µg/m ³ A2: 0.043 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	18% 18%
A1 & A2	Benzo(a)pyrene	No limit applies		A1: 0.027 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	18% >100%
A1 & A2	Cholanthrene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% >100%
A1 & A2	Chrysene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	18% >100%
A1 & A2	Cyclopenta(c,d)pyrene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% >100%
A1 & A2	Dibenzo(ah)anthracene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% >100%
A1 & A2	Dibenzo(a,i)pyrene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% >100%
A1 & A2	Fluoranthene	No limit applies		A1: 0.054 µg/m ³ A2: 0.058 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	18% 18%
A1 & A2	Indo[1,2,3-cd]pyrene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	18% >100%
A1 & A2	Naphthalene	No limit applies		A1: 0.014 µg/m ³ A2: 0.014 µg/m ³		17/09/18 7:35 – 13:36 18/09/18 7:15 – 13:16	>100% >100%

[1] For dioxins and dioxin-like PCBs, the result are to be reported as a range based on: All congeners less than the detection limit assumed to be zero as a minimum, and all congeners less than the detection limit assumed to be at the detection limit as a maximum

[2] The date and time of the sample that produced the result is given.

[3] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated.

Signed 

Date 24/11/19

(authorised to sign as representative of Operator)

APPENDIX B

OPERATIONAL SUMMARY for each month of the YEAR 2018

Operator: Veolia

Installation: Stafford EfW

Confidence adjusted values

Release Point: Unit 1

Average concentrations from valid 30 min (10 min for CO) averages.

Month	NO x	CO	SO2	HCl	VOC	NH3	Dust	Flow
	(mg/m3)	(mg/m3)	(mg/m3)	(mg/m3)	(mg/m3)	(mg/m3)	(mg/m3)	(Nm3/hr)
January	155.4	3.9	26.5	7.04	0.05	4.84	0.23	123727
February	156.1	4	31	7.21	0.1	5.5	0.24	123739
March	160.8	3.8	29	7.41	0.07	4.55	0.23	127658
April	168.1	3.3	29.9	6.52	0.04	4.68	0.23	122896
May	164.4	2.6	23	6.67	0.09	5.44	0.23	120456
June	167.7	2.2	28.4	5.06	0.08	4.64	0.12	121474
July	167.6	1.7	22.9	6.65	0.07	3.55	0.14	115922
August	169.8	2.2	25.7	7.53	0.06	4.18	0.2	117558
September	170.7	3.2	28.3	7.79	0.04	5.23	0.24	120360
October	177.5	3.4	31.5	7.58	0.02	3.85	0.23	122250
November	169.8	3.8	36.4	6.39	0.1	4.26	0.23	121638
December	161.7	4.2	33.2	7.38	0.09	4.4	0.23	122187
Yearly Average	165.8	3.2	29	6.9	0.1	4.6	0.2	121655

Mass release

Month	NO x	CO	SO2	HCl	VOC	NH3	Dust	Burn time
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(hrs)
January	18015	391.3	3044.5	1076.38	5.79	445.51	28.41	743
February	16361.4	362.8	3213.4	996.86	11.25	457.42	27.22	672
March	18849	390.5	3379.5	1145.66	8.17	419.71	28.51	732
April	18733.8	319.2	3290.4	958.39	4.06	415.11	27.47	720
May	15525.2	216	2156.9	833.09	8.33	409.13	24.08	623
June	13627.8	155.1	2272.8	542.38	6.31	300.79	10.76	530
July	18093.8	162.5	2845.3	956.79	7.25	305.77	17.28	740
August	18736.6	216.2	3230	1104.81	6.57	367.89	23.82	744
September	18616.7	307.6	3055.6	1120.95	4.61	453.34	27.68	719
October	20287.3	344.4	3568.1	1144.8	1.51	350.49	28.27	743
November	17319.3	340	3668.2	860.59	10.35	344.54	25.49	666
December	18516.2	422.6	3760.1	1115.74	11.09	400.42	28.47	744
Total	212682.1	3628.2	37484.8	11856.4	85.29	4670.12	297.46	8376

OPERATIONAL SUMMARY for each month of the YEAR 2018

Operator: Veolia

Installation: Stafford EfW

Confidence adjusted values

Release Point: Unit 2

Average concentrations from valid 30 min (10 min for CO) averages.

Month	NO x	CO	SO2	HCl	VOC	NH3	Dust	Flow
	(mg/m3)	(mg/m3)	(mg/m3)	(mg/m3)	(mg/m3)	(mg/m3)	(mg/m3)	(Nm3/hr)
January	152.3	2.7	25.8	6.2	0.08	5.56	0.00	127612
February	154.9	2.9	32.3	6.42	0.11	6.23	0.00	128189
March	161.7	3.1	26.5	6.35	0.11	4.23	0.00	126462
April	166.5	2.4	31	6.62	0.09	4.21	0.00	126370
May	167.8	1.8	27.6	5.57	0.13	3.88	0.01	122829
June	173.3	2.1	31.3	5.66	0.08	2.81	0.00	124387
July	173.7	1.1	27.9	7.05	0.08	2.73	0.01	117275
August	176.7	1.6	29.9	7.72	0.08	3.06	0.02	119517
September	177.3	3	31.2	6.8	0.03	2.73	0.11	124864
October	182.9	2.8	35	6.71	0.02	2.08	0.11	126076
November	178.5	3.1	37.6	5.27	0.06	2.03	0.11	125065
December	179.3	2.8	35.7	6.44	0.03	1.89	0.11	125371
Yearly Average	170	2.5	31	6.4	0.1	3.5	0.04	124501

Mass release

Month	NO x	CO	SO2	HCl	VOC	NH3	Dust	Burn time
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(hrs)
January	18083.9	281.4	3048.7	976.61	9.48	526.11	0.00	740
February	16749.6	277.7	3476.1	920.79	13.44	537.6	0.01	672
March	17873.7	302	2924.1	930.87	11.99	374.14	0.00	696
April	19002.1	241.7	3508.1	1000.43	10.11	384.67	0.00	719
May	12495.4	122.2	2044.6	551.98	10.36	231.66	0.93	483
June	19386.3	213.1	3456.1	837.62	8.86	251.84	0.00	716
July	18868.3	111.8	3489.2	1021.23	9.38	238.05	0.74	738
August	19759.3	166.2	3794.9	1146.88	9.21	274.84	2.31	744
September	19981.6	304.2	3474.4	1015.04	3.31	246.99	14.24	720
October	21476.1	287.1	4071.9	1045.59	2.04	196.14	14.86	743
November	19128.7	292.6	3998.5	750.69	6.51	174.67	13.02	681
December	20966	294	4140.7	997.55	3.2	176.85	14.88	744
Total	223771	2894	41427.3	11195.28	97.89	3613.56	60.99	8396

APPENDIX C

Permit Number : ERR/HP3431HK

Operator : Veolia ES Staffordshire Ltd

Permit Reference Number: EPR/3431HK

Operator : Veolia

Analysis month: Jan-18

Installation : Staffordshire ERF

Form Number : Residue 1/01/01/2012

Reporting of Ash Composition for the period from

Ash Composition (LOI/TOC):		
	LOI (%)	% Carbon (TOC) % _w
Bottom ash		1,7

* At least one of LOI or TOC to be reported

Ash Composition (Metals, Dioxins, etc.)																	
	Sb mg/kg	Cd mg/kg	Tl mg/kg	Hg mg/kg	Pb mg/kg	Cr mg/kg	Cu mg/kg	Mn mg/kg	Ni mg/kg	As mg/kg	Co mg/kg	V mg/kg	Zn mg/kg	DIOXIN & FURANS I-TEQ ng/kg	DIOXINS, FURANS & DIOXIN-LIKE PCBs		
															WHO-TEQ ng/kg		
															Humans/ mammals	Birds	Fish
Bottom ash	61,4	12,5	0,0792	0,396	466	87,8	3771	2702	148	7,71	31,2	79,7	2867	9,34	8,82	14,4	9,63
APC residue	630	137	0,7	5,9	853	60,6	599	653	32,6	45,8	8,7	65,6	8244	556	520	1245	591

Signed:  Date: 23/4/18
 (authorised to sign as representative of Operator)

Permit Number : ERR/HP3431HK

Operator : Veolia ES Staffordshire Ltd

Permit Reference Number: EPR/3431HK

Operator : Veolia

Analysis month: Apr-18

Installation : Staffordshire ERF

Form Number : Residue 1/01/01/2012

Reporting of Ash Composition for the period from

Ash Composition (LOI/TOC):

	LOI (%)	% Carbon (TOC) %/yr
Bottom ash		1.00

* At least one of LOI or TOC to be reported

Ash Composition (Metals, Dioxins, etc.)

	Sb mg/kg	Cd mg/kg	Ti mg/kg	Hg mg/kg	Pb mg/kg	Cr mg/kg	Cu mg/kg	Mn mg/kg	Ni mg/kg	As mg/kg	Co mg/kg	V mg/kg	Zn mg/kg	DIOXIN & FURANS I-TEQ ng/kg	DIOXINS, FURANS & DIOXIN-LIKE PCBs		
															WHO-TEQ ng/kg		
															Humans/ mammals	Birds	Fish
Bottom ash	59.6	5.40	0.09	0.43	334	115.0	1419	1174	150	8.60	34.4	61.9	1992	2.65	2.66	4.72	2.89
APC residue	745	183	0.90	7.50	1018	79.6	501	490	30.6	59.2	10.70	42.7	8063	585	540	1299	621

Signed:  Date: 17/7/18

(authorised to sign as representative of Operator)

Permit Number : ERR/HP3431HK

Operator : Veolia ES Staffordshire Ltd

Permit Reference Number: EPR/HP3431HK

Operator : Veolia

Analysis month: Jul-18

Installation : Staffordshire ERF

Form Number : Residue 1/01/01/2012

Reporting of Ash Composition for the period from

Ash Composition (LOI/TOC):

	LOI (%)	% Carbon (TOC) %/w
Bottom ash		0.80

* At least one of LOI or TOC to be reported

Ash Composition (Metals, Dioxins, etc.)

	Sb mg/kg	Cd mg/kg	Tl mg/kg	Hg mg/kg	Pb mg/kg	Cr mg/kg	Cu mg/kg	Mn mg/kg	Ni mg/kg	As mg/kg	Co mg/kg	V mg/kg	Zn mg/kg	DIOXIN & FURANS I-TEQ ng/kg	DIOXINS, FURANS & DIOXIN-LIKE PCBs		
															WHO-TEQ ng/kg		
															Humans/ mammals	Birds	Fish
Bottom ash	97.5	10.00	0.08	0.38	293	88.7	2360	693	58.5	7.01	22.5	18.7	1692	1.65	1.95	2.95	2.06
APC residue	804	196	1.00	1.50	1038	67.7	426	387	20.1	55.9	7.00	10.4	8332	183	171	391	192

Signed:



Date: 19.10.18

(authorised to sign as representative of Operator)

Permit Number : ERR/HP3431HK

Operator : Veolia ES Staffordshire Ltd

Permit Reference Number: EPR/3431HK

Operator : Veolia

Analysis month: Oct-18

Installation : Staffordshire ERF

Form Number : Residue 1/01/01/2012

Reporting of Ash Composition for the period from

October to December 2018

Ash Composition (LOI/TOC):

	LOI (%)	% Carbon (TOC) ^{w/w}
Bottom ash		1.30

* At least one of LOI or TOC to be reported

Ash Composition (Metals, Dioxins, etc.)

	Sb mg/kg	Cd mg/kg	Tl mg/kg	Hg mg/kg	Pb mg/kg	Cr mg/kg	Cu mg/kg	Mn mg/kg	Ni mg/kg	As mg/kg	Co mg/kg	V mg/kg	Zn mg/kg	DIOXIN & FURANS I-TEQ ng/kg	DIOXINS, FURANS & DIOXIN-LIKE PCBs		
															WHO-TEQ ng/kg		
															Humans/ mammals	Birds	Fish
Bottom ash	88.4	8.52	0.08	0.39	549	84.3	1932	1028	61.6	7.75	66.8	26.5	1840	1.66	1.54	3.04	1.64
APC residue	720	170	0.70	5.30	982	69.5	476	410	20.3	57.5	6.60	16.0	7964	214	193	509	221

Signed: 

Date:

24/12/18

(authorised to sign as representative of Operator)