

# Battlefield Energy From Waste Facility

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**Annual Report**

**2016**

**EPR/XP3239GF**

Written by: Christine Skaramaga

Approved by: Scott Francis

Approved Date: 28/02/17

Version 2

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### Version control

Version Number	Date issued	Author	Update information
V1	27/01/17	Christine Skaramaga	Initial issue
V2	28/02/17	Christine Skaramaga	NH3 Mass release table on page 17 updated due to a typing error

## 1. INTRODUCTION

This is the Annual Performance Report for the Battlefield Energy Recovery Facility (Battlefield ERF) for 2016.

## 2. FACILITY INFORMATION

<b>Plant Operator</b>	<b>Veolia ES Shropshire Ltd</b>
<b>Name of Facility</b>	<b>Battlefield Energy From Waste Facility</b>
<b>EPR Permit Number</b>	<b>XP3239GF</b>
<b>Facility Address</b>	Veolia ES Shropshire Limited Vanguard Way Shrewsbury Shropshire SY1 3TG
<b>Telephone Number</b>	02035674600

The plant is operated by Veolia Shropshire Ltd, a wholly owned subsidiary of Veolia. The plant is designed to burn predominantly residual municipal solid waste and has the capacity to process up to 12 tonnes per hour or a Permitted 102,000 tonnes annually. The facility has been built to serve Shropshire Council.

The facility can generate approximately 8MW of electricity from waste. The facility uses approximately 1MW and the balance is exported to the national grid. In tangible terms the total electricity generated is equivalent to that used by, in the region of, 10,000 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 – 102,000 tonnes per annum
- One waste stream with a capacity of 12 tonnes per hour.
- Storage capacity 1200 (useable) Tonnes – Approximately 100 hours full plant capacity
- Number of tipping bays – 4
- Steam output – 38 tonnes of steam per hour at 400°C & 60 BAR
- Flue gas treatment – CNIM urea 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 one 65 metre high stack.
- Maximum energy generating capacity approximately 8MW

The facility is permitted to accept the following waste types:

**Table S3.1 Raw materials and fuels**

Raw materials and fuel description	Specification
Gas oil	Less than 0.1% sulphur

**Table S3.2 Permitted waste types and quantities for Incineration**

	Maximum quantity 102,000 tonnes per annum in total
Waste code	Description
19 12 07	Wood other than that mentioned in 19 12 06
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11*
20 03 01	Mixed municipal waste
20 03 02	Waste from markets
20 03 03	Street cleaning residues
20 03 07	Bulky waste
20 01 38	Wood other than that mentioned in 20 01 37 <sup>Notes 1</sup>



### 3. OPERATIONAL INFORMATION

Operational Details		
Operational hours	8345	Hours
Total Waste Incinerated	94421	Tonnes
Total Municipal Waste Incinerated	71651	Tonnes
Total Commercial Waste Incinerated	22770	Tonnes
Metals Recovered	2754	Tonnes
Incinerator Bottom Ash Produced	19109	Tonnes
APC Residues	2545	Tonnes

Reporting of Water and Other Raw Material Usage for the year 2016

Raw Material	Usage	Unit	Specific Usage	Unit
Mains water	19051	m <sup>3</sup>	201.7	kg/t
Total water usage	19051	m <sup>3</sup>	201.7	kg/t
Urea	188	Tonnes	1.99	Kg/t
Activated carbon	41.7	Tonnes	0.4	kg/t
Lime/hydrated lime	858	Tonnes	9.1	kg/t

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

Reporting of Energy Usage/Export for the year 2016

Energy Source	Energy (MWh)	Specific energy	Units
Electricity produced	64465	623	KWh/tonne of waste incinerated (dry basis)
Electricity imported	307.1	3.2	
Electricity Exported	58078	615	
Electricity used by ERF	6387	67.7	
Gas Oil	104464	1.1	L/tonne of waste incinerated (dry basis)
Thermal Energy produced (Steam Production)	270558	2.9	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 2016

Waste Description	Disposal Route	Annual Tonnes	Recovery Tonnes	Kg / Tonne Waste
1) Hazardous Wastes		0	0	0
APC Residues	Empire /Minosus	2545	0	27
IBA which is classified as hazardous waste		0	0	0
Total hazardous waste	Empire /Minosus	2545	0	27
2) Non-Hazardous Wastes				
IBA	Recycling	19109	19109	202
Other non-hazardous wastes	Metals Recycled	2754	2754	29
Total non-hazardous waste		21863	21863	231
TOTAL WASTE	-	24408	24408	258

## Reporting of other performance indicators for the period 2016

Parameter	Result
Number of periods of WID abnormal operation	0
Cumulative hours of WID abnormal operation for 2016	0

Parameter	Result
Number of Breaches of Permit in 2016	1
Dates	29 <sup>th</sup> Jan

There was 1 non-compliance with the permit emission limit values (ELVs) as follows:

29<sup>th</sup> Jan- half hourly average for Carbon Monoxide 113mg/m<sup>3</sup> (ELV 100mg/m<sup>3</sup>)

This is a breach under section 3.1.2 of the permit. This breach can't foreseeably have an impact on the environment and so has been classed as category 4.

## 4. EMISSIONS TO AIR

The furnace is fitted with an independent dry urea system in order to reduce NO<sub>x</sub> emissions to air via selective non-catalytic reduction (SNCR). A dry flue gas treatment system is used to neutralise acid flue gases with the injection of hydrated lime into the reaction chamber. Activated carbon is injected into the flue gases in order to help reduce the concentrations of heavy metals and dioxins in the combustion gases emitted to air. Bag filters are used to separate out the resulting particulate matter from the cooled and treated gases. Gases are finally released to atmosphere via the 65m chimney. In compliance with the IED and EPR Permit, MCERTS accredited equipment is installed in the stack, which continuously monitors a range of determinants.

In addition to the continuous monitoring, an extractive sampling campaign is undertaken on a biannual 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, for the second and subsequent years of operation, are summarised.

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

Continuous emissions monitoring of six main pollutants with ELVs is undertaken, 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	100mg/m3	half hour 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 2016 with the monthly averages being those of the average daily concentrations:

Monthly Averages – from daily averages

	limit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dust	10	2.4	2.0	1.1	1.0	0	0	0	0	0	1.0	1.0	1.0
Total Organic Carbon	10	0	0	0	0	0	0	0	0	0	1	1	0.3
Hydrogen Chloride	10	0.75	2.6	4.9	5	5	6	6	7	7	5.8	6.5	6
Carbon Monoxide	50	17.4	17	21.9	23	12	9	9	8	8	10	8.5	6
Sulphur Dioxide	50	32.8	29	19.8	14	12	10	7	7	8	14.8	18.4	15
Oxides of Nitrogen	200	174.5	173	174	171	167	167	163	149	154	169	169.3	167

The above data is communicated monthly to the public via our Veolia website in terms of a percentage of each ELV. A more detailed WID report is sent to the EA each month showing emissions per pollutant 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.

## 4.3 Annual Mass Emissions

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

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

Annual Mass Emissions		
Parameter	Units	Annual Total
Hydrogen Fluoride	Kg	41
Mercury	Kg	1,50
Arsenic	Kg	0,34
Cadmium	Kg	0,40
Chromium	Kg	1,42
Copper	Kg	1,92
Nickel	Kg	3,34
Manganese	Kg	1,63
Antimony	Kg	1,61
Lead	Kg	8,80
Thallium	Kg	0,44
Dioxins and Furans I-TEQ*	Kg	0,00000275
PAHs	Kg	0,6828
PCBs Actual mass ie not toxic equivalence adjusted	Kg	0,000120

\*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 12 samples. IBA is transported to KSD in Denton, where it is reprocessed into a number of different graded aggregates. Metals are further extracted from the process and recycled.

The metals tested in the IBA are Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc and their compounds. Dioxins/Furans and dioxin-like PCB's are also tested. We monitor Total Organic Carbon in the sample for compliance.

Frequency	Monitoring	Test	Limit
Monthly	IBA	TOC	<5%
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, 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 65m stack. The APC from the Battlefield ERF is sent to another Veolia facility for treatment, 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, that the APC quality does not vary a great deal and is fully compliant.

## 6 ENVIRONMENTAL CONTROLS

Battlefield ERF has an experienced Veolia management team from other existing plants. The plant has been designed using proven technology and experience and is operating well. The plant supports our company ethos, as we operate 10 facilities in the UK. Reliable environmental controls and a robust management system ensures 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: EPR/XP3239GF Operator: Veolia ES Shropshire Ltd  
 Facility: Battlefield EFW Form Number: Air7 / 01/01/2012  
 Reporting of periodically monitored emissions to air for the period from 01/01/16 to 31/03/16 Quarter 1

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result (1)	Test Method	Result Date and Time (2)	Uncertainty (3)
A1	Hydrogen fluoride	2 mg/m <sup>3</sup>	Periodic over minimum 1-hour period	0.10 mg/m <sup>3</sup>	BS ISO 15713	10/03/2016; 11:10 – 12:10	15%
A1	Cadmium & Thallium and their compounds (total)	0.05 mg/m <sup>3</sup>	over minimum 30 minute, maximum 8 hour period	0.0010 mg/m <sup>3</sup>	BS EN 14385	10/03/2016; 08:45 – 10:47	5%
A1	Mercury and its compounds	0.05 mg/m <sup>3</sup>	over minimum 30 minute, maximum 8 hour period	0.0014 mg/m <sup>3</sup>	BS EN 14385	10/03/2016; 08:45 – 10:47	14%
A1	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m <sup>3</sup>	over minimum 30 minute, maximum 8 hour period	0.015 mg/m <sup>3</sup>	BS EN 14385	10/03/2016; 08:45 – 10:47	5%
A1	Nitrous Oxide (N <sub>2</sub> O)	No limit applies	Periodic Over minimum 1-hour period	21.57 mg/m <sup>3</sup>	EA TGN M22	10/03/2016; 10:00 – 11:00	10%
A1	Dioxins / Furans (I-TEQ)	0.1 ng/m <sup>3</sup>	over minimum 6 hour period, maximum 8 hour period	0.0016 - 0.0022 ng/m <sup>3</sup>	BS EN 1948 Parts 1, 2 and 3	14/03/2016; 07:55 – 13:58	18%
A1	Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.0016 - 0.0024 ng/m <sup>3</sup>	BS EN 1948 Parts 1, 2 and 3	14/03/2016; 07:55 – 13:58	18%
A1	Dioxins / furans (WHO-TEQ Fish)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.0015 - 0.0024 ng/m <sup>3</sup>	BS EN 1948 Parts 1, 2 and 3	14/03/2016; 07:55 – 13:58	20%
A1	Dioxins / furans (WHO-TEQ Birds)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.0032 - 0.0040 ng/m <sup>3</sup>	BS EN 1948 Parts 1, 2 and 3	14/03/2016; 07:55 – 13:58	24%
A1	Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.000023 - 0.00037 ng/m <sup>3</sup>	BS EN/TS 1948-4	14/03/2016; 07:55 – 13:58	18%
A1	Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.0000043 - 0.000021 ng/m <sup>3</sup>	BS EN/TS 1948-4	14/03/2016; 07:55 – 13:58	16%
A1	Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.0017 - 0.0024 ng/m <sup>3</sup>	BS EN/TS 1948-4	14/03/2016; 07:55 – 13:58	17%

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ERP/XP3239GF

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result <sup>(1)</sup>	Test Method	Result Date and Time <sup>(2)</sup>	Uncertainty <sup>(3)</sup>
A1	Poly-cyclic aromatic hydrocarbons (PAHs) Total	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.89 ug/m <sup>3</sup>	BS ISO 11338-1 and BS ISO 11138-2	15/03/2016; 07:15 – 13:17	6%
A1	Anthracene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[a]anthracene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[b]fluoranthene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[k]fluoranthene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[a]naph (2,1-d) thiophene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[c]phenanthrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[ghi]perylene	No limit applies		0.015 ug/m <sup>3</sup>			18%
A1	Benzo[a]pyrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Cholanthrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Chrysene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Cyclopentate dipylene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Dibenzo[ah]anthracene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Dibenzo[ai]pyrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Fluoranthene	No limit applies		0.10 ug/m <sup>3</sup>			18%
A1	Indol[1,2,3-cd]pyrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Naphthalene	No limit applies		0.59 ug/m <sup>3</sup>			>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 28/9/2016  
(authorised to sign as representative of Operator)



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ERP/XP3239GF

Permit Number: EPR/XP3239GF Operator: Veolia ES Shropshire Ltd  
 Facility: Battlefield EFW Form Number: Air7 / 01/01/2012  
 Reporting of periodically monitored emissions to air for the period from 01/07/16 to 31/12/16

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result <sup>(1)</sup>	Test Method	Result Date and Time <sup>(2)</sup>	Uncertainty <sup>(3)</sup>
A1	Hydrogen fluoride	2 mg/m <sup>3</sup>	Periodic over minimum 1-hour period	0.03 mg/m <sup>3</sup>	BS ISO 15713	12/10/2016; 08:00 – 09:00	15%
A1	Cadmium & Thallium and their compounds (total)	0.05 mg/m <sup>3</sup>	over minimum 30 minute, maximum 8 hour period	0.0012 mg/m <sup>3</sup>	BS EN 14385	14/10/2016; 07:25 – 09:27	9%
A1	Mercury and its compounds	0.05 mg/m <sup>3</sup>	over minimum 30 minute, maximum 8 hour period	0.0031 mg/m <sup>3</sup>	BS EN 14385	14/10/2016; 07:25 – 09:27	14%
A1	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m <sup>3</sup>	over minimum 30 minute, maximum 8 hour period	0.042 mg/m <sup>3</sup>	BS EN 14385	14/10/2016; 07:25 – 09:27	9%
A1	Nitrous Oxide (N <sub>2</sub> O)	No limit applies	Periodic Over minimum 1-hour period	26.58 mg/m <sup>3</sup>	EA TGN M22	11/10/2016; 12:30 – 13:30	11%
A1	Dioxins / Furans (I-TEQ)	0.1 ng/m <sup>3</sup>	over minimum 6 hour period, maximum 8 hour period	0.0039 - 0.0058 ng/m <sup>3</sup>	BS EN 1948 Parts 1, 2 and 3	12/10/2016; 07:25 – 13:30	21%
A1	Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.0039 - 0.0057 ng/m <sup>3</sup>	BS EN 1948 Parts 1, 2 and 3	12/10/2016; 07:25 – 13:30	22%
A1	Dioxins / furans (WHO-TEQ Fish)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.0036 - 0.0057 ng/m <sup>3</sup>	BS EN 1948 Parts 1, 2 and 3	12/10/2016; 07:25 – 13:30	22%
A1	Dioxins / furans (WHO-TEQ Birds)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.010 - 0.013 ng/m <sup>3</sup>	BS EN 1948 Parts 1, 2 and 3	12/10/2016; 07:25 – 13:30	21%
A1	Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.00033 - 0.00036 ng/m <sup>3</sup>	BS EN/TS 1948-4	12/10/2016; 07:25 – 13:30	20%
A1	Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.000019 - 0.000021 ng/m <sup>3</sup>	BS EN/TS 1948-4	12/10/2016; 07:25 – 13:30	17%
A1	Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	over minimum 6 hour period, maximum 8 hour period	0.0016 - 0.0019 ng/m <sup>3</sup>	BS EN/TS 1948-4	12/10/2016; 07:25 – 13:30	16%



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Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Poly-cyclic aromatic hydrocarbons (PAHs) Total	No limit applies	over minimum 6 hour period, maximum 8 hour period	1.27 ug/m <sup>3</sup>	BS ISO 11338-1 and BS ISO 11138-2	13/10/2016: 07:25 – 13:27	13%
A1	Anthracene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[a]anthracene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[b]fluoranthene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[k]fluoranthene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[b]naph (2,1-d) thiophene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[c]phenanthrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[ghi]perylene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Benzo[a]pyrene	No limit applies		0.11 ug/m <sup>3</sup>			18%
A1	Cholanthrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Chrysene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Cyclopenta(c,d)pyrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Dibenzo[a,h]anthracene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Dibenzo[a,i]pyrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Fluoranthene	No limit applies		0.075 ug/m <sup>3</sup>			18%
A1	Indo[1,2,3-cd]pyrene	No limit applies		0.015 ug/m <sup>3</sup>			>100%
A1	Naphthalene	No limit applies		0.89 ug/m <sup>3</sup>			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 27/01/17  
(authorised to sign as representative of Operator)

## APPENDIX B

OPERATIONAL SUMMARY for each month of the YEAR to 31/12/2016

Average concentrations from valid 30 min averages.

Month	NO x (mg/m3)	CO (mg/m3)	SO2 (mg/m3)	HCl (mg/m3)	VOC (mg/m3)	NH3 (mg/m3)	Dust (mg/m3)	Flow (Nm3/hr)
January	174,5	17,4	32,8	0,75	0	35	2,4	60,2
February	173	17	29	2,6	0	30,3	2	59
March	174	21,9	19,8	4,9	0	14,3	1,1	73,5
April	171	23	14	5	0	14,5	1	75,3
May	167	12	12	5	0	15,1	0	75,6
June	167	9	10	6	0	20	0	76
July	163	9	7	6	0	18	0	75,2
August	149	8	7	7	0	10	0	75
September	154	8	8	7	0	15	0	73,5
October	169	10	14,8	5,8	0	22	0	73,7
November	169,3	8,5	18,4	6,5	1	14,5	1	74,3
December	167	6	15	6	1	8,4	1	75
<b>Yearly Average</b>	<b>166,5</b>	<b>12,5</b>	<b>15,7</b>	<b>5,2</b>	<b>0,2</b>	<b>19</b>	<b>0,6</b>	<b>72,2</b>

## Mass Releases

Month	NO x	CO	SO2	HCl	VOC	NH3	Dust	Operating Hours
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(hrs)
January	6142,1	536,6	1132,0	41,2	0	972,3	90,4	470
February	8798,9	782,0	1453,2	13,5	0	1220	126,2	688
March	11797,9	1313,2	1342,1	444,5	0	763,2	59,6	742
April	11493,7	1358,7	942,9	445,0	0	778,2	50,6	720
May	11657,4	764,6	800,2	439,7	11	843,1	36,4	742
June	11284,2	544,1	672,9	557,3	17,4	1083,3	23,4	715
July	11193,4	540,4	483,9	536,3	18,5	987,4	31,5	733
August	10298,7	497,6	469,5	604,4	15,4	544,0	18,8	744
September	10335,5	475,6	538,3	565,5	26,3	753,3	19,2	715
October	10729,8	566,6	917,3	481,8	51,1	1097,3	48,1	689
November	10084,3	452,6	1051,0	509,4	42,4	692	60,5	643
December	11684,6	386,5	1040,5	588,5	38,9	470,8	56,9	744
<b>Total</b>	<b>125500,7</b>	<b>8218,6</b>	<b>10843,9</b>	<b>5227,0</b>	<b>221</b>	<b>10204,8</b>	<b>621,6</b>	<b>8345</b>

(Mass release is not confidence adjusted)





Operator : Veolia ES Shropshire Ltd  
Form Number : ASH 1

\* At least one of LOI or TOC to be reported.

Analysis month: Apr-16

Form Number : AGENCY FORM / ASH1

### Ash Composition (LOI/TOC):

\* At least one of LOI or TOC to be reported

	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 I-TEQ ng/kg	DIOXIN		
															WHO-TEQ ng/kg		
															Humans/ mammals	Birds	Fish
Bottom ash	59.3	3.88	0.08	0.39	1161	102	1770	664	91.1	16.4	44.0	119	1967	0.28	0.28	0.65	0.28
APC residue	590	151	0.80	9.00	1839	154	818	903	93.8	93.7	25.6	186	10260	383	383	845	445

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# Battlefield ERF – Annual Report

ERP/XP3239GF

Permit Number : EPR/XP3239GF  
Facility : Battlefield ERF

Operator : Veolia ES Shropshire Ltd  
Form Number : ASH 1

## Reporting of residue quality for July - September 2016

\* At least one of LOI or TOC to be reported.

Permit Reference Number : XP3239GF

Operator : Veolia

Analysis month: Jul-16

Installation : Battlefield ERF

Form Number : AGENCY FORM / ASH1

Reporting of Ash Composition for the period from

Ash Composition (LOI/TOC):		
	LOI (%)	% Carbon (TOC) %
Bottom ash	1.94	0.78

\* 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 1-TEQ ng/kg	DIOXIN		
															Humans/ mammals	Birds	Fish
Bottom ash	96.2	12.0	0.08	0.39	1005	111	1592	664	99.8	9.39	31.7	32.5	2183	3.14	6.40	9.29	7.02
APC residue	996	281	0.80	11.9	2659	111	696	479	36.0	64.5	13.0	26.1	17120	354	711	1548	783

Signed

 Date: 29.07.16

(authorised to sign as representative of Operator)



Permit Number : EPR/XP3239GF  
Facility : Battlefield ERF

Operator : Veolia ES Shropshire Ltd  
Form Number : ASH 1

## Reporting of residue quality for October – December 2016

\* At least one of LOI or TOC to be reported.

Permit Reference Number : XP3239GF

Operator : Veolia

Analysis month: Oct-16

Installation : Battlefield ERF


Form Number : AGENCY FORM / ASH1

Reporting of Ash Composition for the period from

Ash Composition (LOI/TOC):		
	LOI (%)	% Carbon (TOC) %
Bottom ash	2.89	1.00

\* 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 I-TEQ ng/kg	DIOXINS, FURANS & DIOXIN-LIKE PCBs		
															WHO-TEQ ng/kg	Humans/ mammals	Birds
Bottom ash	67.0	6.91	0.10	0.36	823	97.8	1766	759	82.0	8.99	42.1	34.0	2819	6.99	7.18	13.5	7.79
APC residue	711	154	0.60	9.60	1276	79.3	507	636	37.5	58.7	13.0	32.0	10190	457	463	1019	531

Signed:  Date: 3.11.16  
(authorised to sign as representative of Operator)