

# Viridor

Transforming waste™

The Environmental Permitting (England  
and Wales) Regulations 2010

## Permit **EPR/RP3638CG** Runcorn Energy from Waste Facility

**Annual Performance Report 2018**

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## Quality Assurance

This report has been prepared with all reasonable skill, care and diligence. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

### **Report Details**

Report Title: Runcorn EfW Facility – Annual Performance Report

Report Date: 20<sup>th</sup> Feb 2019

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## 1. Introduction

Runcorn Energy from Waste (EfW) facility is located to the North of the Runcorn site known as Weston Point. The EfW facility has a total capacity of approximately 350MW (thermal input) and is capable of generating up to approximately 86MW of electrical power and 110 tonnes per hour steam. The plant comprises of two parts: Phase 1 and Phase 2. Phase 1 consists of two lines 1 and 2 and has a capacity of 425,000 tonnes per year. Phase 2 consists of two further lines; 3 and 4 and doubles the capacity of the facility.

In accordance with the requirements of Condition 4.2.2 and Schedule 4 of Permit EPR/RP3638CG issued by the Environment Agency to Viridor Waste Management Limited (Viridor) on 29<sup>th</sup> March 2012, Viridor is required to produce an annual performance report which is to be submitted to the Environment Agency by the 31<sup>st</sup> March of each year as agreed in writing with the Environment Agency.

This report summarises the environmental and performance data collected at the site during 2018 and fulfils the requirement of the Industrial Emissions Directive.

The report will cover the following areas of environmental and performance monitoring:

- Section 2 – Point Source Emissions to Air
- Section 3 – Point Source Emissions to Water
- Section 4 – Residue Quality Monitoring Requirements
- Section 5 – Performance Parameters
- Section 6 – Periods of abnormal operation

## 2. Point Source Emissions to Air

### 2.1. Introduction

Permit Condition 3.5.1(a) and Tables S3.1 and S3.1(a) require Viridor to undertake performance monitoring of the point source emissions to air arising at sample points A1 (Line 1), A2 (Line 2), A3 (Line 3), and A4 (Line 4).

The date of first waste burn for each line is as follows:

- Line 1 – 7<sup>th</sup> March 2014
- Line 2 – 18<sup>th</sup> March 2014
- Line 3 – 19<sup>th</sup> December 2014
- Line 4 – 8<sup>th</sup> January 2015

A summary of the point source emissions to air monitoring data at sample point A1 and A2 for the period is included as Table 1. Point source emissions to air monitoring data at sample point A3 and A4 is included as Table 2.

## 2.2 Commentary on Data

The recorded concentrations generally remained compliant with the limits set out in Permit Tables S3.1 and S3.1(a) during the review period.

Note: 1 Q1 2018 - 1 X SO<sub>2</sub> event was recorded at emission point A1. The aggregating flue gas assessment across all 4 lines confirmed the average concentration at the windshield during this emission event caused no Environmental Impact

Note 2: Q2 2018 - 2 x SO<sub>2</sub> events were recorded at emission point A4. The aggregating flue gas assessment across all 4 lines confirmed the average concentration at the windshield caused no Environmental Impact, the levels did not affect the daily average of 50mg/m<sup>3</sup>

Note 3: Q3 2018 - 1 x HCl event was recorded at emission point A2. The aggregating flue gas assessment across all 4 lines confirmed the average concentration of HCl at the windshield caused no Environmental Impact

Note 4: Q 3 2018 2 x 10-minute CO events were recorded at emission point A3. The aggregating flue gas assessment across all 4 lines for both 10-minute periods and the daily average confirmed the average concentration of CO at the windshield caused no environmental impact.

Note: The max CO 10-minute readings of 2847.59mg/m<sup>3</sup> 531.11mg/m<sup>3</sup> and 960.51mg/m<sup>3</sup>, for line 1,2, & 4 below were compliant with the criteria set out in the Industrial Emissions Directive.

## 2.3 Schedule Notices Issued

No schedule notifications given during 2018

**Table 1: Emissions to Air from A1 and A2**

Releases to Air from Incinerators							
Parameter	Reference period	Monitoring frequency	Limit	A1		A2	
				Max	Avg	Max	Avg
Particulates	½ hr average	Continuous	30 mg/m <sup>3</sup>	2.95	0.51	3.98	0.32
	Daily average	Continuous	10 mg/m <sup>3</sup>	2.53	0.51	1.72	0.32
TOCs (as C)	½ hr average	Continuous	20 mg/m <sup>3</sup>	19.46	0.06	6.59	0.23
	Daily average	Continuous	10 mg/m <sup>3</sup>	1.09	0.06	0.42	0.23
Hydrogen chloride	½ hr average	Continuous	60 mg/m <sup>3</sup>	29.35	3.95	86.48	3.03
	Daily average	Continuous	10 mg/m <sup>3</sup>	6.83	3.97	7.25	3.03
Carbon monoxide	10 min average	Continuous	150 mg/m <sup>3</sup>	2847.59	3.46	531.11	2.05
	Daily average	Continuous	50 mg/m <sup>3</sup>	33.48	3.41	11.32	2.00
Sulphur dioxide	½ hr average	Continuous	200 mg/m <sup>3</sup>	215.34	25.80	164.53	25.93
	Daily average	Continuous	50 mg/m <sup>3</sup>	40.86	25.75	45.61	25.87
Oxides of nitrogen	½ hr average	Continuous	400 mg/m <sup>3</sup>	289.16	165.82	259.26	162.16
	Daily average	Continuous	200 mg/m <sup>3</sup>	187.51	169.75	197.53	162.24
Nitrous oxide (N <sub>2</sub> O)	Daily average (units: mg/m <sup>3</sup> )	Continuous	N/A	5.00	2.88	3.82	2.55
Ammonia	Daily average (units: mg/m <sup>3</sup> )	Continuous	N/A	2.18	0.71	2.15	0.27
Hydrogen fluoride	1-hour period	Spot	2 mg/m <sup>3</sup>	1.5	0.865	0.44	0.385
Cd + Tl	½ – 8 hours	Spot	0.05 mg/m <sup>3</sup>	0.002	0.0015	0.002	0.0014
Hg	½ – 8 hours	Spot	0.05 mg/m <sup>3</sup>	0.004	0.0035	0.006	0.0045
Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V	½ – 8 hours	Spot	0.5 mg/m <sup>3</sup>	0.01	0.0235	0.09	0.0465
Dioxins and Furans (I-TEQ)	½ – 8 hours	Spot	0.1 ng/m <sup>3</sup>	0.006	0.0054	0.007	0.0059
Dioxin like PCB's (WHO – TEQ Humans/ Mammals)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.01	0.0053	0.001	0.0008
Dioxin like PCB's (WHO – TEQ Fish)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.0006	0.00035	0.0002	0.00015
Dioxin like PCB's (WHO – TEQ Birds)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.02	0.0119	0.005	0.0036

Dioxin / Furans (WHO –TEQ Humans/ Mammals)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.005	0.0048	0.006	0.00515
Dioxin / Furans (WHO –TEQ Fish)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.006	0.00575	0.006	0.0054
Dioxins / Furans (WHO –TEQ Birds)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.01	0.00875	0.01	0.0087
Anthanthrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.15
Benzo(a)anthracene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Benzo(a)pyrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Benzo(b)fluoranthene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Benzo(b)naphtho (2,1-d)thiophene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Benzo(c)phenanthrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Benzo(ghi)perylene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Benzo(k)fluoranthene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Chloanthrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Chrysene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.1	0.1
Cyclopenta(cd)pyrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.15	0.1	0.15
Dibenzo(ai)pyrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.2	0.15
Dibenzo(ah)anthracene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.2	0.1	0.2	0.15
Fluoranthene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Indeno(123-cd)pyrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Naphthalene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Total PAHs	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	1.7	1.65	2.7	2.15

Note [1]: Where LOD was observed on all sampling events; the max LOD result was used for the average

**Table 2: Emissions to Air from A3 and A4**

Releases to Air from Incinerators							
Parameter	Reference period	Monitoring frequency	Limit	A3		A4	
				Max	Avg	Max	Avg
Particulates	½ hr average	Continuous	30 mg/m <sup>3</sup>	1.34	0.06	0.13	0.01
	Daily average	Continuous	10 mg/m <sup>3</sup>	0.61	0.06	0.07	0.01
TOCs (as C)	½ hr average	Continuous	20 mg/m <sup>3</sup>	17.96	0.08	8.70	0.19
	Daily average	Continuous	10 mg/m <sup>3</sup>	0.34	0.08	0.62	0.19
Hydrogen chloride	½ hr average	Continuous	60 mg/m <sup>3</sup>	25.20	2.36	31.04	2.03
	Daily average	Continuous	10 mg/m <sup>3</sup>	7.47	2.36	6.18	2.03
Carbon monoxide	10 min average	Continuous	150 mg/m <sup>3</sup>	1077.77	1.94	960.51	1.67
	Daily average	Continuous	50 mg/m <sup>3</sup>	7.97	1.80	9.26	1.60
Sulphur dioxide	½ hr average	Continuous	200 mg/m <sup>3</sup>	175.79	23.86	277.03	21.25
	Daily average	Continuous	50 mg/m <sup>3</sup>	45.76	23.86	47.37	21.30
Oxides of nitrogen	½ hr average	Continuous	400 mg/m <sup>3</sup>	319.62	159.25	215.98	140.60
	Daily average	Continuous	200 mg/m <sup>3</sup>	192.31	159.34	154.58	140.66
Nitrous oxide (N <sub>2</sub> O)	Daily average (units: mg/m <sup>3</sup> )	Continuous	N/A	5.54	4.15	3.84	2.52
Ammonia	Daily average (units: mg/m <sup>3</sup> )	Continuous	N/A	1.05	0.32	1.02	0.23
Hydrogen fluoride	1-hour period	Spot	2 mg/m <sup>3</sup>	0.41	0.31	1	0.6
Cd + Tl	½ – 8 hours	Spot	0.05 mg/m <sup>3</sup>	0.001	0.001	0.001	0.001
Hg	½ – 8 hours	Spot	0.05 mg/m <sup>3</sup>	0.012	0.0085	0.015	0.0095
Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V	½ – 8 hours	Spot	0.5 mg/m <sup>3</sup>	0.02	0.0175	0.03	0.024
Dioxins and Furans (I-TEQ)	½ – 8 hours	Spot	0.1 ng/m <sup>3</sup>	0.009	0.0074	0.006	0.00555
Dioxin like PCB's (WHO –TEQ Humans/Mammals)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.0016	0.00105	0.0009	0.00065
Dioxin like PCB's (WHO –TEQ Fish)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.0002	0.00015	0.00015	0.0001

Dioxin like PCB's (WHO –TEQ –TEQ Birds)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.0065	0.00475	0.004	0.003
Dioxin/Furans (WHO –TEQ Humans/ Mammals)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.008	0.0066	0.005	0.00295
Dioxin/Furans (WHO –TEQ Fish)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.01	0.00805	0.0056	0.00285
Dioxins/ Furans (WHO –TEQ Birds)	½ – 8 hours	Spot	N/A ng/m <sup>3</sup>	0.0107	0.01035	0.01	0.0096
Anthanthrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.2	0.1
Benzo(a) anthracene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Benzo(a) pyrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Benzo(b) fluoranthene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Benzo(b) naphtho (2,1d) thiophene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Benzo(c) phenanthrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Benzo(ghi) perylene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Benzo(k) fluoranthene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Chloanthrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Chrysene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Cyclopenta (cd)pyrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.20	0.15
Dibenzo(ai) pyrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.20	0.15
Dibenzo(ah) anthracene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.20	0.15
Fluoranthene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Indeno (123-cd) pyrene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Naphthalene	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	0.10	0.1	0.10	0.1
Total PAHs	½ – 8 hours	Spot	N/A µg/m <sup>3</sup>	1.6	1.6	2	1.8

Note [1]: Where LOD was observed on all sampling events; the max LOD observed was used for the average

### **3. Point Source Emissions to Water**

#### **3.1. Introduction**

Permit Condition 3.5.1(a) and Table S3.2 requires Viridor to undertake minimum weekly spot performance monitoring of the point source emissions to water arising at sample point W1.

A summary of the point source emissions to water monitoring data for the period is included in Table 2.

#### **3.2 Commentary on Data**

During Q2 2018, the following events were identified and investigated:

- On the 22<sup>nd</sup> June, it was reported, that the temperature of the discharged water at W1 was 42.1°C. Checks of the upstream and downstream results were below the permitted level, this causing no environmental impact.
- On the 18<sup>th</sup> May, it was reported, that the temperature of the discharged water at W1 was 40.2°C. Checks of the upstream and downstream results were below the permitted level, this causing no environmental impact.

During Q3 2018, the following events were identified and investigated:

- On the 14<sup>th</sup> August it was reported that the temperature of the discharging water at RUW1 was 41.7°C. Checks of the upstream and downstream showed results below the permit level, confirming no Environmental Impact had been caused.
- On the 17<sup>th</sup> September Surface water was being diverted away from the outfall a sample was taken in an alternative site which has a temperature reading of 45.3°C. This level was raised with the Environment Agency, who agreed that it should be discarded as it was agreed the water was not leaving site, thus causing no Environmental Impact.

The above investigations and their conclusions were discussed and agreed with the Environment Agency's Site Inspector.

#### **3.3 Schedule Notices Issued**

No Schedule Notices were issued during the review period

**Table 3: Emissions to Water from W1**

<b>Releases to Water via Outfall W1</b>				
<b>Parameter</b>	<b>Monitoring frequency</b>	<b>Limit (L) Target (T)</b>	<b>Maximum</b>	<b>Average</b>
Suspended solids	Weekly, Spot (when flow present)	150 mg/l (L) 100 mg/l (T)	30	6.16
pH	Weekly, Spot (when flow present)	4 – 11 (L) 5 – 9 (T)	9.2	7.72
Temperature	Weekly, Spot (when flow present)	40 °C (L)	45.3	33.64
Available chlorine	Weekly, Spot (when flow present)	20 mg/l (L) 5 mg/l (T)	0.07	0.025
Oil and grease	Weekly, Spot (when flow present)	None visible	None visible	None visible

## **4. Residue Quality Monitoring Requirements**

### **4.1. Introduction**

Permit Condition 3.5.1(d) and Table S3.5 require Viridor to undertake residue quality monitoring at minimum monthly intervals for both bottom ash and APC residues.

### **4.2 Commentary on Data**

#### **Incinerator Bottom Ash**

Figures shown are an average of the compliance analysis undertaken during the review period for Phase 1 and Phase 2, which have followed the criteria laid out in the ESA protocol.

#### **Air Pollution Control Residues**

Figures shown are an average of the sampling undertaken for compliance analysis during 2018

**Table 4: Residue Quality Monitoring**

Residue quality									
Parameter	(Note 1) Limit	Normal Operation				Before use of a new disposal or recycling route (Note [2])			
		Bottom ash		APC Residues		Bottom ash		APC Residues	
		Incinerator		Incinerator		Incinerator		Incinerator	
		Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
Loss on ignition (%)	<5	2.174	2.22						
Antimony	---	129.33	151.91	258.19	278.96				
Cadmium	---	77.14	121.86	163.46	192.22				
Thallium	---	0	0	100.49	974.49				
Mercury	---	0.5	0.5	178.45	285.69				
Lead	---	830.21	914.90	2080.89	2336.88				
Chromium	---	382.04	476.49	80.24	97.24				
Copper	---	2184.02	2193.78	4410.62	4709.19				
Manganese	---	737.03	773.16	606.32	614.65				
Nickel	---	231.38	271.58	80.72	115.23				
Arsenic	---	87.38	113.29	230.69	164.97				
Cobalt	---	138.12	139.46	117.47	157.23				
Vanadium	---	78.95	93.82	130.22	154.48				
Zinc	---	2287.17	2323.85	4928.24	5283.27				
Dioxins/ Furans ITEQ (ng/kg)	---								
PCB (WHO- TEQ) Humans (ng/kg)	---	0.36	0.74	67.93	95.77				
Total soluble fraction (%)	---								
Metals only soluble fraction (%)	---								

Note [1]: Units mg/kg unless otherwise indicated

Note [2]: Normalised metal concentrations are reported

## **5. Performance Parameters**

### **5.1. Introduction**

Condition 4.2.2 and Table S4.3 of the Permit require Viridor set out the reporting criteria for performance parameters.

### **5.2 Commentary on Data**

The recorded performance data is set out in Table 5.

### **5.3 Annual mass emissions of monitored pollutants**

Condition 4.2.2(c) of the permit requires mass emissions of monitored pollutants to be reported on an annual basis. The recorded data is set out in Appendix 1 and is taken from the sites 2018 Pollution Inventory report.

## **6. Periods of IED abnormal operation**

Table S4.3 of the Permit requires detail of periods of IED abnormal operation to be reported on a quarterly basis.

Abnormal operations reported in Q3 2018

- 4 hours' abnormal operation for phase 2 line 4 on the 25/07/2018
- 3 hours and 5 minutes' abnormal operation for phase 1 line 2 on the 29/09/2018

<b>Table 5: Performance Parameters</b>	<b>Units</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>2018</b>
Refuse derived fuel incinerated (a)	tonnes	223,770.77	205,354.99	245,656.28	216,150.79	884,331.21
Digestate incinerated (b)	tonnes	0	0	0	0	0
Biomass incinerated (c)	tonnes	0	0	0	0	0
Commercial waste incinerated (d)	tonnes	0	0	0	0	0
Total waste incinerated (a+b+c+d)	tonnes	228,156.56	204,188.92	245,666.15	216,150.79	884,331.21
Total electrical energy generated	KWh	152,454,136	145,554,827	181,051,120	146,325,479	636,436,664
Total electricity exported	KWh	134,462,934	128,430,493	160,397,827	130,141,128	562,106,544
Electrical energy used on installation	KWh / tonne of waste incinerated	81.52	89.67	84.21	84.07	86.08
	KWh total used	18,242,261	18,413,917	20,687,098	18,172,336	76,122,499
Total steam exported	tonnes	139,399	123,356	148,274	112,224	526,945
Fuel gas consumption	Kg / tonne of waste incinerated	0.18	0.45	0.15	0.20	0.25
	Kg total used	41059.03	92094.59	37838.09	42435.99	224,011.38
Mass of Bottom Ash produced	Kg / tonne of waste incinerated	218.45	225.99	236.76	208.70	223.47
	Kg total	48,881,662	46,408,819	58,161,780	45,110,933	197,623,412
Mass of APC residues produced	Kg / tonne of waste incinerated	38.23	39.97	38.27	34.28	34.77
	Kg total	8,555,570	8,207,886	9,401,830	7,410,470	30,746,417
Mass of other solid residues produced	Kg / tonne of waste incinerated	0	0	0	0	0
Ammonia consumption	Kg / tonne of waste incinerated	2.85	3.09	2.85	2.62	2.83
	Kg total used	638,110	633,740	700,800	566,420	2,505,840
Activated Carbon consumption	Kg / tonne of waste incinerated	0.21	0.23	0.23	0.18	0.23
	Kg total used	46,110	46,430	56,140	39,200	199,210

Lime consumption	Kg / tonne of waste incinerated	22.16	24.79	22.68	18.54	19.37
	Kg total used	4,958,600	5,091,380	5,570,890	4,007,740	17,127,681
Dee Water consumption	Kg / tonne of waste incinerated	102.04	198.56	257.98	276.03	267.52
Dee Water consumption	Kg total used	22,834,350	40,775,290	63,374,740	59,664,860	236,579,260
High Grade Water consumption	Kg / tonne of waste incinerated	823.82	793.07	747.89	717.26	798.13
	Kg total used	184,347,930	162,861,710	183,724,500	155,035,620	705,811,480

## Appendices

## **Appendix 1 - Annual Mass Emissions**