Viridor Transforming waste™

The Environmental Permitting (England and Wales) Regulations 2010

Permit: EPR/LP3030XA
Cardiff Energy Recovery Facility

Annual Performance Report 2016

Prepared by:
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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	
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1. Introduction

Cardiff Energy Recovery Facility is located immediately north of Cardiff Docks. The facility will process approximately 22.96 tonnes of residual municipal and C&I waste per line, per hour and has the capability of exporting approximately 30MW of electrical power.

In accordance with the requirements of Condition 4.2.2, Schedule 4 and Table S4.1 of Permit EPR/LP3030XA issued by Natural Resources Wales to Viridor Waste Management Limited (Viridor) on 4th November 2010, Viridor is required to produce an annual performance report which is to be submitted to Natural Resources Wales by the 30th April as agreed in writing with Natural Resources Wales of each year.

Viridor took over the operation of the Plant on 31st January 2015; therefore 2016 is the second year of operations at the Facility.

This report summarises the environmental and performance data collected at the site 1st January 2016 – 31st December 2016 and fulfils the reporting requirement of Chapter IV, Article 55 (2) of the Industrial Emissions Directive.

The report will cover the following areas of environmental 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

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 and A2.

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.

2.2 Commentary on Data

The recorded concentrations remained compliant with the limits set out in Permit Tables S3.1 and S3.1 (a) during the review period with the exception of those listed in 2.3.

Line 1 was in operation for 88.8% of the year and Line 2 for 88.6%.

Note 1: Detail of periodic sampling timings, uncertainty and method used have previously been supplied to Natural Resources Wales within the 2016 quarterly reports.

Note 2: Results recorded by both, periodic and continuous monitoring have broadly been within the range expected for the energy recovery operation, with exception to the exceedances included in 2.3 below.

2.3 Schedule Notices Issued

Schedule 5 Part C Notification was raised for abnormal operation due to disturbances in the abatement system on the following date for Line 1: 22/09/2016

Schedule 5 Part C Notification was raised for abnormal operation due to disturbances in the abatement system on the following date for Line 2: 22/09/2016

23/05/2016 – Schedule 5 Notification Part A was submitted due to two elevated 10 minute CO readings.

09/09/2016 – Schedule 5 Notification Part A was submitted due to a marginally elevated half hour TOC reading. (Part B was submitted 12/09/2016).

11/09/2016 – Schedule 5 Notification Part A was submitted due to two marginally elevated 10 minute CO readings. (Part B was submitted 12/09/2016).

11/09/2016 – Schedule 5 Notification Part A was submitted due to two marginally elevated half hour TOC readings. (Part B was submitted 12/09/2016).

Table 1: Emissions to Air from A1 and A2 (CEMS)

Releases to Air from Incinerators – Continuous Monitoring – Air 2								
Parameter	**Limit**	**Reference Period**	**A1**		**A2**		**Test Method**	**Uncertainty**
			Max	**Avg**	**Max**	**Avg**		
Oxides of nitrogen	200 mg/m^3	Daily mean	186	173	189	178	BS EN 15267-3	
	400 mg/m^3	½ hourly mean	304		326			
Particulate Matter	10 mg/m^3	Daily mean	1	1	0	0		
	30 mg/m^3	½ hourly mean	4		2			
Total Organic Carbon (TOC)	10 mg/m^3	Daily mean	1	0	2	0		
	20 mg/m^3	½ hourly mean	8		7			
Hydrogen chloride	10 mg/m^3	Daily mean	9	8	9	8		
	60 mg/m^3	½ hourly mean	22		28			
Sulphur dioxide	50 mg/m^3	Daily mean	22	9	13	5		
	200 mg/m^3	½ hourly mean	65		47			
Carbon monoxide	50 mg/m^3	Daily mean	21	9	19	8		
	100 mg/m^3	½ hourly mean*						
Ammonia	No limit set	Daily mean	4	0	3	1		

*Note. ½ hourly monitoring for CO is no longer required in the latest version of the permit
*Note: CEMS data figures are adjusted for the method uncertainty

Table 2: Emissions to Air from A1 and A2 Periodic

Substance / Parameter	Emission Limit Value	A1	A2
Nitrous oxide	None set mg/m^3	16.95	15.1
Hydrogen fluoride	2 mg/m^3	0.0355	0.0235
Cd and Th and their compounds	0.05 mg/m^3	0.00088	0.000715
Hg and its compounds	0.05 mg/m^3	0.00395	0.00151
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	0.5 mg/m^3	0.041	0.219
Dioxins & Furans (I-TEQ)	0.1 ng/m^3	0.0145	0.01695
PCBs (WHO-TEQ Humans / Mammals)	None set ng/m^3	0.00112	0.00089
PCBs (WHO-TEQ Fish)	None set ng/m^3	0.0000575	0.000048
PCBs (WHO-TEQ Birds)	None set ng/m^3	0.00325	0.00325
Dioxins & Furans (WHO-TEQ Humans / Mammals)	None set ng/m^3	0.01405	0.01645
Dioxins & Furans (WHO-TEQ Fish)	None set ng/m^3	0.0146	0.017
Dioxins & Furans (WHO-TEQ Birds)	None set ng/m^3	0.02075	0.0245
Anthanthrene	None set µg/m^3	<0.012	<0.011
Benzo(a)anthracene	None set µg/m^3	<0.012	<0.011
Benzo(a)pyrene	None set µg/m^3	<0.012	<0.011
Benzo(b)fluoranthene	None set µg/m^3	<0.012	<0.011
Benzo(b)naptho(2,1-d)thiophene	None set µg/m^3	<0.012	<0.011
Benzo(c)phenanthrene	None set µg/m^3	<0.012	<0.011
Benzo(ghi)perylene	None set µg/m^3	<0.012	<0.011
Benzo(k)fluoranthene	None set µg/m^3	<0.012	<0.011
Cholanthrene	None set µg/m^3	<0.012	<0.011
Chrysene	None set µg/m^3	<0.012	<0.011
Cyclopenta(cd)pyrene	None set µg/m^3	<0.012	<0.011
Dibenzo(ai)pyrene	None set µg/m^3	<0.012	<0.011
Dibenzo(ah)anthracene	None set µg/m^3	<0.012	<0.011
Fluoranthene	None set µg/m^3	0.0305	0.011
Indeno(123-cd)pyrene	None set µg/m^3	<0.012	<0.011
Naphthalene	None set µg/m^3	1.67	1.115

Note [1]: Where LOD was observed on all sampling events; the max LOD result 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 ensure sample point W1 is free of oil, grease and visible solids

3.2 Commentary on Data

Routine sampling was undertaken at W1 during 2016.

3.3 Schedule Notices Issued

No Permit limit exceedances were recorded during the review period for emissions to water.

4. Residue Quality Monitoring Requirements

4.1. Introduction

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

4.2 Commentary on Data

Incinerator Bottom Ash

Figures shown are an average of the analysis undertaken during 2016 which have followed the criteria laid out in the ESA protocol.

Air Pollution Control Residues

Figures shown in Table 3 are an average of the analysis undertaken during 2016.

Table 3: Residue Quality

Residue quality									
Parameter	Limit	Normal Operation				Before use of a new disposal or recycling route			
		Bottom ash		APC Residues		Bottom ash (Soluble fractions)		APC Residues (Soluble fractions)	
		Line 1	Line 2	Line 1	Line 2	Line 1	Line 2	Line 1	Line 2
Total Organic Carbon	3%	1.1	1.3						
Antimony (mg/kg)	---	172		879.8	845				
Cadmium (mg/kg)	---	16.2		255.8	256				
Thallium (mg/kg)	---	0.12		0.9	0.9				
Mercury (mg/kg)	---	<0.5		11.7	9.5				
Lead (mg/kg)	---	759.5		1963	1933				
Chromium (mg/kg)	---	129.6		65.8	35.7				
Copper (mg/kg)	---	2521.9		552.8	525				
Manganese (mg/kg)	---	826		386.5	380.5				
Nickel (mg/kg)	---	69.5		11.7	10.9				
Arsenic (mg/kg)	---	16.9		54.1	51.7				
Cobalt (mg/kg)	---	24.5		5.1	4.6				
Vanadium (mg/kg)	---	39.6		<10	<10				
Zinc (mg/kg)	---	2856.3		12618	12422.5				

Dioxins/Furans ITEQ (ng/kg)	---	5.38	8701.3	8247.9				
PCB (WHO-TEQ) Humans (ng/kg)	---	1.49	848	839.1				
Total soluble fraction (%)	---							
Metals only soluble fraction (%)	---							

5. Performance Parameters

5.1 Introduction

Condition 4.2.2 (b), (c), Table S4.2 and S4.3 of the Permit set out the reporting criteria for performance parameters.

5.2 Commentary on Data

The recorded performance data is set out in Tables 4; 5; 6 and 7.

Table 4: Energy 1

Parameter	Total (MWh)	Specific usage (MW / tonne incinerated)
Electricity generated	226,326	0.64
Electricity exported to the National Grid	198,957	0.56
Energy exported as heat (if any)	0	0
Energy usage	27,369	0.08

Table 5: Performance 1

Parameter	Units	
Total municipal (domestic household) waste received on site	Tonnes	265,348
Total commercial and industrial waste received on site	Tonnes	83,163
Municipal waste incinerated	Tonnes	268,155
Commercial and industrial waste incinerated	Tonnes	84,043
Total waste incinerated	Tonnes	352,198
Unsuitable waste sent off-site for treatment	Tonnes	0
Rejected material sent for off-site disposal	Tonnes	18
Gas oil consumption	Tonnes	462
Dry Urea Reagent usage	kg/tonne waste incinerated	0.47
Hydrated Calcium Hydroxide Reagent usage	kg/tonne waste incinerated	11.79
Activated carbon used	kg/tonne waste incinerated	0.33

Table 6: Water Usage 1

Parameter	Units	
Mains water usage	m^3	17933
Mains water usage	Litres/tonne waste incinerated	0.05

Table 7: Residues

Parameter	Units	
Total Air Pollution Control residues disposed of	kg/tonne waste incinerated	24.03
Total bottom ash generated	kg/tonne waste incinerated	207.76
Total bottom ash recycled	kg/tonne waste incinerated	183.57
Total bottom ash disposed of	kg/tonne waste incinerated	26.38