
The Viridor logo, featuring the word "Viridor" in a large, white, serif font on a black background.

Transforming waste™

**The Environmental Permitting (England
and Wales) Regulations 2010**

**Permit: EPR/LP3030XA
Cardiff Energy Recovery Facility**

**Environmental Monitoring Report
Q1 2019**

1 January – 31 March 2019

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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:	Cardiff Energy Recovery Facility Environmental Report Q1 1 January – 31 March 2019
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1. Introduction

Cardiff Energy Recovery Facility is located immediately north of Cardiff Docks. The facility has an annual throughput of up to 425,000 tonnes per year of residual municipal and C&I waste and has the capability of exporting approximately 30 MW of electrical power from the process.

In accordance with the requirements of Permit EPR/LP3030XA issued by Natural Resources Wales to Viridor Waste Management Limited (Viridor) on 4 May 2018, Viridor is required to submit an Environmental Monitoring Report on a quarterly basis.

This report summarises the environmental data collected at the site during the Q1 of 2019 (1 Jan – 31 Mar 2019).

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

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 on a continuous and periodic basis.

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

The measurement frequency for periodic point source emissions to air monitoring data at sample point A1 and A2 is on a bi-annual basis, after 12 months of operation.

2.2 Commentary on Data

The concentrations recorded were obtained by running a quarterly continuous emissions report on CDAS software report.

Line 1 was in operation for 87.9% of the quarter and Line 2 for 91.9%.

2.3 Schedule Notices Issued

Part A notification reported on 10 January 2019
Date of event 09 January 2019
Details Elevated CO (daily mean) reading on Line 2.

Part A notification submitted on 15 February 2019
Date of event 13 February 2019
Event Elevated HCl (1/2 hour mean) reading on Line 1.

Part C Notification reported on 8 March 2019 (after discussions with NRW)
Date of event 5 March 2019
Details Abnormal operation on Line 2. At 20:30H on Tuesday 5 March 2019, there was a failure of communication between the Distributed Control System (DCS) and the Continuous Emissions Monitoring System (CEMS).

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/m³	Daily mean	220.6	175.3	195.6	181.3	BS EN 15267-3	
	400 mg/m³	½ hourly mean	297.7		316.9			
Particulate Matter	10 mg/m³	Daily mean	0.6	0.4	0.4	0.4		
	30 mg/m³	½ hourly mean	2.5		0.6			
Total Organic Carbon (TOC)	10 mg/m³	Daily mean	0.5	0.3	0.7	<0.1		
	20 mg/m³	½ hourly mean	4.1		10.6			
Hydrogen chloride	10 mg/m³	Daily mean	13.4	8.6	10.1	8.4		
	60 mg/m³	½ hourly mean	87.4		59.4			
Sulphur dioxide	50 mg/m³	Daily mean	45.4	15.6	22.6	8.7		
	200 mg/m³	½ hourly mean	125.2		52.3			
Carbon monoxide	50 mg/m³	Daily mean	28.8	5.5	94.0	6.9		
	100 mg/m³	½ hourly mean*						
Ammonia	No limit set	Daily mean	<0.01	<0.01	3.4	0.8		

*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	Reference Period	A1 Result	Uncertainty	Sample Date / Time	A2 Result	Uncertainty	Sample Date / Time	Test Method
Nitrous oxide	None set mg/m ³	Periodic over 30 minutes. Maximum 8 hours	3.08	+/- 0.31		3.08	+/- 0.31		EN 14792
Hydrogen fluoride	2 mg/m ³		0.02	+/- 0.013	14/11/2018 1505 – 1618H	0.01	+/- 0.012	15/11/2018 1452 – 1603H	ISO 15713
Cd and Th and their compounds	0.05 mg/m ³		0.0009	+/- 0.0006	14/11/2018 1435 – 1648H	0.0010	+/- 0.0007	15/11/2018 1422 – 1633H	EN 14385
Hg and its compounds	0.05 mg/m ³		0.0019	+/- 0.0005		0.0003	+/- 0.0004		EN 13211
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	0.5 mg/m ³		0.0262	+/- 0.0044		0.0481	+/- 0.0075		EN 14385
Dioxins & Furans (I-TEQ)	0.1 ng/m ³	Mean over period minimum 6 hours, maximum 8 hours	0.0436	+/- 0.0046	14/11/2018 0800 – 1415H	0.0331	+/- 0.0035	15/11/2018 0755 – 1409H	EN 1948 1-3
PCBs (WHO-TEQ Humans / Mammals)	None set ng/m ³		0.0030	+/- 0.0003		0.0034	+/- 0.0004		EN 1948 1-3
PCBs (WHO-TEQ Fish)	None set ng/m ³		0.0003	<0.00001		0.0003	<0.00001		EN 1948 1-3
PCBs (WHO-TEQ Birds)	None set ng/m ³		0.0075	+/- 0.0008		0.0075	+/- 0.0009		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Humans/Mammals)	None set ng/m ³		0.0408	+/- 0.0043		0.0322	+/- 0.0034		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Fish)	None set ng/m ³		0.0415	+/- 0.0044		0.0328	+/- 0.0034		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Birds)	None set ng/m ³		0.0639	+/- 0.0067		0.048	+/- 0.005		EN 1948 1-3

Anthanthrene	None set $\mu\text{g}/\text{m}^3$	Mean over period minimum 6 hours, maximum 8 hours	<0.0091	210.7%	14/11/2018 0800 - 1415H	<0.0093	208.9%	15/11/2018 0755 – 1409H	ISO 11338
Benzo(a)anthracene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Benzo(a)pyrene	None set $\mu\text{g}/\text{m}^3$		0.06	72.1%		0.07	66.7%		
Benzo(b)fluoranthene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Benzo(b)naphtho(2,1- d)thiophene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Benzo(c)phenanthrene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Benzo(ghi)perylene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Benzo(k)fluoranthene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Chrysene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Cyclopenta(cd)pyrene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Dibenzo(ai)pyrene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Dibenzo(ah)anthracene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Fluoranthene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Indeno(123-cd)pyrene	None set $\mu\text{g}/\text{m}^3$		<0.0091	210.7%		<0.0093	208.9%		
Naphthalene	None set $\mu\text{g}/\text{m}^3$		0.81	66.2%		0.87	60.3%		

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

During the quarter monitoring point W1 has remained free of oil and grease.

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 quarterly intervals following the first year of operation. This applies for both bottom ash and air pollution control residues.

4.2 Commentary on Data

Incinerator Bottom Ash

Figures shown in Table 3 detail the quarterly analysis undertaken in line with the criteria laid out in the ESA protocol.

Air Pollution Control Residues

Figures shown in Table 3 detail the analysis undertaken during the quarter.

Table 3: Residue Quality

Residue quality					
Parameter	Limit	Normal Operation			
		Bottom ash		APC Residues	
		Line 1	Line 2	Line 1	Line 2
		Quarter 1	Quarter 1		
Total Organic Carbon (report 25/3/2019)	3%	1.5	2.2		
		Composite			
Quarter		1 st 2019 sample reported 29 Apr 2019 ¹		Reported 6 and 7 Feb 2019	Reported 6 and 7 Feb 2019
Antimony (mg/kg)	---	336		827	826
Cadmium (mg/kg)	---	33.4		240	340
Thallium (mg/kg)	---	<0.1		0.9	0.8
Mercury (mg/kg)	---	<0.5		7.41	7.25
Lead (mg/kg)	---	511.6		1458	1557
Chromium (mg/kg)	---	126		34.8	31.0
Copper (mg/kg)	---	1553.6		663	605

¹ The initial sample collected on the 31 Jan 2019 was sent to NRM Laboratories and was damaged in transit by their courier. After discussion with NRM Laboratories it was decided to cancel that damaged /spilt sample and collect a fresh sample. Another composite sample of IBA was collected and sent to NRM Laboratories for analysis. Please refer to e-mail from "Enviro Prep" dated 05 February 2019 @ 12:37H. An IBA sample for reporting within the Q2 Environmental Monitoring Report will be taken in May 2019 and results submitted to Natural Resources Wales during July 2019.

Manganese (mg/kg)	---	1040	412	361
Nickel (mg/kg)	---	63.1	13.0	12.0
Arsenic (mg/kg)	---	25.6	48.2	60.2
Cobalt (mg/kg)	---	31.7	4.1	3.9
Vanadium (mg/kg)	---	38.9	<10	<10
Zinc (mg/kg)	---	3835.7	16360	15220
Dioxins / Furans (WHO 2005 TEQ) (ng/kg)	---	Dioxins = 11.8067 Furans = 12.6497	339.047	349.571
PCB (WHO 2005 TEQ) (ng/kg)	---	6.23511	6.9108	11.458