The Environmental Permitting (England and Wales) Regulations 2010

Permit: EPR/LP3030XA
Cardiff Energy Recovery Facility

Environmental Monitoring Report
Q4 2024

1 October – 31 December 2024

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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 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 33.5 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 21 December 2022, 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 Q4 of 2024 (1 October – 31 December 2024).

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 3.6.1 and Table S3.1 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.

Availability of waste combustion Line 1 was 2,076 hours

As this quarter had 92 days (92 days x 24 hours = 2208 hours)
Line 1 was in operation 94.0%

Availability of waste combustion Line 2 was 1955 hours (88.5%).

This installation generated 76,291 MWh of electricity during the period.

2.3 Schedule Notices Issued

No Schedule 5 notification was submitted to NRW during this period.

Table 1: Emissions to Air from A1 and A2 (CEMS) taken from ENVEA (new name for A1- Cbiss) reports.

See attached PDF Data Sheets as agreed with NRW.

Table 2: Emissions to Air from A1 and A2 Periodic

Results of 6-monthly emissions testing reported to Viridor on 21st October 2024:

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Hydrogen fluoride	1 mg/m^3	Average of three consecutive measurements of at least 30 minutes each	0.070 (mg/m3)	CEN TS 17340	26 September 2024 08:31 - 10:31 10:36 - 12:36 12:40 - 14:40	0.05
A1	Cadmium & thallium and their compounds (total)	0.02 mg/m^3	Average of three consecutive measurements of at least 30 minutes each	0.0009 (mg/m3)	BS EN 14385	13 September 2024 07:48 - 08:51 09:05 - 10:09 10:18 - 11:21	0.0017
A1	Mercury and its compounds	0.02 mg/m^3	Average of three consecutive measurements of at least 30 minutes each	0.0147 (mg/m3)	BS EN 13211	11 September 2024 11:26 - 12:30 12:45 - 13:48 13:56 - 14:59	0.0018
A1	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.3 mg/m^3	Average of three consecutive measurements of at least 30 minutes each	0.019 (mg/m3)	BS EN 14385	13 September 2024 07:48 - 08:51 09:05 - 10:09 10:18 - 11:21	0.006
A1	Dioxins / Furans (I-TEQ)	0.06 ng/m^3	periodic over minimum 6 hours, maximum 8-hour period	0.0151 (ng/m3)	BS EN 1948 Parts 1, 2 and 3	17 September 2024 08:29 - 14:36	0.0023

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period value over sampling period of 2 to 4 weeks for long term sampling	0.0013 (ng/m3)	EN 1948 Parts 1, 2 and 4 CEN TS 1948-5	17 September 2024 08:29 - 14:36	0.0001
A1	Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period value over sampling period of 2 to 4 weeks for long term sampling	0.0001 (ng/m3)	EN 1948 Parts 1, 2 and 4 CEN TS 1948-5	17 September 2024 08:29 - 14:36	0.00001
A1	Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period value over sampling period of 2 to 4 weeks for long term sampling	0.0038 (ng/m3)	EN 1948 Parts 1, 2 and 4 CEN TS 1948-5	17 September 2024 08:29 - 14:36	0.0002
A1	Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0137 (ng/m3)	BS EN 1948 Parts 1, 2 and 3	17 September 2024 08:29 - 14:36	0.0021

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Dioxins / furans (WHO-TEQ Fish)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0156 (ng/m3)	BS EN 1948 Parts 1, 2 and 3	17 September 2024 08:29 - 14:36	0.0024
A1	Dioxins / furans (WHO-TEQ Birds)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0268 (ng/m3)	BS EN 1948 Parts 1, 2 and 3	17 September 2024 08:29 - 14:36	0.0041
A1	Polybrominated dibenzo-dioxins and furans	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0017 (ng/m3)	Method based on procedural requirements of EN 1948	17 September 2024 08:29 - 14:36	0.0029
	Poly-cyclic aromatic hydrocarbons (PAHs)		**Also reported in H1** **(added for completeness)** periodic over minimum 6 hours, maximum 8-hour period	**Results (ug/m3)**			
A1	Total	No limit applies		0.29 (ug/m3)	BS ISO 11338-1 and BS ISO 1138-2	16 September 2024 08:55 - 15:03	0.015
A1	Anthanthrene	No limit applies		<0.0012		16 September 2024 08:55 - 15:03	206.0%
A1	Benzo{a}anthracene	No limit applies		<0.001		16 September 2024 08:55 - 15:03	93.1%
A1	Benzo[b]fluoranthene	No limit applies		<0.001		16 September 2024 08:55 - 15:03	75.4%
A1	Benzo[k]fluoranthene	No limit applies		<0.001		16 September 2024 08:55 - 15:03	153.0%

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Benzo[b]naph(2,1-d}thiophene	No limit applies		<0.0012		16 September 2024 08:55 - 15:03	206.0%
A1	Benzo[c]phenanthrene	No limit applies		<0.0012		16 September 2024 08:55 - 15:03	206.0%
A1	Benzo[ghi]perylene	No limit applies		<0.001		16 September 2024 08:55 - 15:03	104.5%
A1	Benzo[a]pyrene	No limit applies		<0.0012		16 September 2024 08:55 - 15:03	206.0%
A1	Cholanthrene	No limit applies		<0.0012		16 September 2024 08:55 - 15:03	206.0%
A1	Chrysene	No limit applies		0.01		16 September 2024 08:55 - 15:03	67.2%
A1	Cyclopenta(c,d)pyrene	No limit applies		<0.0012		16 September 2024 08:55 - 15:03	206.0%
A1	Dibenzo[ah]anthracene	No limit applies		<0.0012		16 September 2024 08:55 - 15:03	206.0%
A1	Dibenzo[a,i]pyrene	No limit applies		<0.0012		16 September 2024 08:55 - 15:03	206.0%
A1	Fluoranthene	No limit applies		0.03		16 September 2024 08:55 - 15:03	49.8%

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A1	Indo[1,2,3-cd]pyrene	No limit applies		<0.01		16 September 2024 08:55 - 15:03	140.5%
A1	Naphthalene	No limit applies		0.24		16 September 2024 08:55 - 15:03	49.2%

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A2	Hydrogen fluoride	1 mg/m^3	Average of three consecutive measurements of at least 30 minutes each	0.040 (mg/m3)	CEN TS 17340	30 September 2024 08:30 - 10:30 10:35 - 12:35 12:40 - 14:40	0.04
A2	Cadmium & thallium and their compounds (total)	0.02 mg/m^3	Average of three consecutive measurements of at least 30 minutes each	0.0008 (mg/m3)	BS EN 14385	19 September 2024 08:27 - 09:30 09:42 - 10:45 11:02 - 12:05	0.02
A2	Mercury and its compounds	0.02 mg/m^3	Average of three consecutive measurements of at least 30 minutes each	0.0028 (mg/m3)	BS EN 13211	12 September 2024 08:00 - 09:03 09:18 - 10:22 10:36 - 11:39	0.0007
A2	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.3 mg/m^3	Average of three consecutive measurements of at least 30 minutes each	0.019 (mg/m3)	BS EN 14385	19 September 2024 08:27 - 09:30 09:42 - 10:45 11:02 - 12:05	0.005

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A2	Dioxins / Furans (I-TEQ)	0.06 ng/m^3	periodic over minimum 6 hours, maximum 8-hour period	0.0183 (ng/m3)	BS EN 1948 Parts 1, 2 and 3	30 September 2024 08:37 - 14:41	0.0028
A2	Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0024 (ng/m3)	EN 1948 Parts 1, 2 and 4	30 September 2024 08:37 - 14:41	0.0001
A2	Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0001 (ng/m3)	EN 1948 Parts 1, 2 and 4	30 September 2024 08:37 - 14:41	0.00001
A2	Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0062 (ng/m3)	EN 1948 Parts 1, 2 and 4	30 September 2024 08:37 - 14:41	0.0003
A2	Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0171 (ng/m3)	BS EN 1948 Parts 1, 2 and 3	30 September 2024 08:37 - 14:41	0.0026
A2	Dioxins / furans (WHO-TEQ Fish)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0190 (ng/m3)	BS EN 1948 Parts 1, 2 and 3	30 September 2024 08:37 - 14:41	0.0029
A2	Dioxins / furans (WHO-TEQ Birds)	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0287 (ng/m3)	BS EN 1948 Parts 1, 2 and 3	30 September 2024 08:37 - 14:41	0.0044

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method	Result Date and Time [2]	Uncertainty [3]
A2	Polybrominated dibenzo-dioxins and furans	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.0020 (ng/m3)	Method based on procedural requirements of EN 1948	30 September 2024 08:37 - 14:41	0.0046

	Poly-cyclic aromatic hydrocarbons (PAHs)			*Result (ug/m3)*			*Uncertainty*
A2	Total	No limit applies	periodic over minimum 6 hours, maximum 8-hour period	0.54	BS ISO 11338-1 and BS ISO 1138-2	18 September 2024 08:20 - 14:28	0.15
A2	Anthanthrene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Benzo{a}anthracene	No limit applies		<0.01		18 September 2024 08:20 - 14:28	190.5%
A2	Benzo[b]fluoranthene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Benzo[k]fluoranthene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Benzo[b]naph(2,1-d}thiophene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Benzo[c]phenanthrene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Benzo[ghi]perylene	No limit applies		<0.01		18 September 2024 08:20 - 14:28	171.6%

A2	Benzo[a]pyrene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Cholanthrene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Chrysene	No limit applies		<0.01		18 September 2024 08:20 - 14:28	133.4%
A2	Cyclopenta(c,d)pyrene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Dibenzo[ah]anthracene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Dibenzo[a,i]pyrene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Fluoranthene	No limit applies		0.03		18 September 2024 08:20 - 14:28	27.8%
A2	Indo[1,2,3-cd]pyrene	No limit applies		<0.0011		18 September 2024 08:20 - 14:28	201.8%
A2	Naphthalene	No limit applies		0.50		18 September 2024 08:20 - 14:28	26.6%

3. Point Source Emissions to Water

3.1. Introduction

Permit Condition 3.1.1 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 3.6.1(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
		Received at lab 21/11/2024 Reported to Viridor 05/12/2024	Received at lab 21/011/2024 Reported to Viridor 05/12/2024		
Total Organic Carbon	3%	<1%	<1%		
		Composite			
		Received at lab 21/11/2024 Reported to Viridor 05/12/2024		Received at lab 21/10/2024 Metals reported to Viridor 04/11/2024 D, F + PCBs reported to Viridor 04/11/2024	Received at lab 21/10/2024 Metals reported to Viridor 04/11/2024 D, F + PCBs reported to Viridor 04/11/2024
Antimony (mg/kg)	---	613		739	954
Arsenic (mg/kg)	---	38		64	71
Cadmium (mg/kg)	---	19		194	302
Chromium (mg/kg)	---	141		22	23
Cobalt (mg/kg)	---	83		4.1	4.5
Copper (mg/kg)	---	1745		434	609
Manganese (mg/kg)	---	1078		317	296
Mercury (mg/kg)	---	0.8		2.6	4.9
Nickel (mg/kg)	---	123		8.6	6.6
Lead (mg/kg)	---	400		1253	1649
Thallium (mg/kg)	---	1.2		1.4	1.0
Vanadium (mg/kg)	---	38		2.8	4.1
Zinc (mg/kg)	---	5137		9771	15448
Dioxins / Furans (WHO 2005 TEQ) (ng/kg)	---	Dioxins = 6.04 Furans = 4.67		Dioxins = 81.5 Furans = 101	Dioxins = 622 Furans = 1070
PCB (WHO 2005 TEQ) (ng/kg)	---	0.416		4.33	141