

Viridor

Transforming waste™

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

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

**Environmental Monitoring Report
Q4 2022**

1 October – 31 December 2022

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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|---------------|---|
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|-----------|---------------------------|
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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 Trident Park Limited (VTPL) on 21 December 2022, VTPL 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 2022 (1 October – 31 December 2022).

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(a) and Tables S3.1 and S3.1(a) require VTPL 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 2062.55 hours
As this quarter had 90 days (92 days x 24 hours = 2208 hours)
Line 1 was in operation 93.4%

Line 2 was in operation for 2,119.33 hours (95.9%).

This installation generated 79,580 MWh of electricity during the period.

2.3 Schedule Notices Issued

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

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

See attached PDF Data Sheets as agreed with NRW

| 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 | | | | | BS EN 15267-3 | |
| | 400 mg/m ³ | ½ hourly mean | | | | | | |
| Particulate Matter | 10 mg/m ³ | Daily mean | | | | | | |
| | 30 mg/m ³ | ½ hourly mean | | | | | | |
| Total Organic Carbon (TOC) | 10 mg/m ³ | Daily mean | | | | | | |
| | 20 mg/m ³ | ½ hourly mean | | | | | | |
| Hydrogen chloride | 10 mg/m ³ | Daily mean | | | | | | |
| | 60 mg/m ³ | ½ hourly mean | | | | | | |
| Sulphur dioxide | 50 mg/m ³ | Daily mean | | | | | | |
| | 200 mg/m ³ | ½ hourly mean | | | | | | |
| Carbon monoxide | 50 mg/m ³ | Daily mean | | | | | | |
| | 100 mg/m ³ | ½ hourly mean* | | | | | | |
| | | | | | | | | |

* 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

*** Corrective factor determined by NPL during latest QAL 2 (inputted into CDAS on 22 February 2021).

*

Table 2: Emissions to Air from A1 and A2 Periodic (Reported by SOCOTEC on 2 November 2022)

| 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 | 7.5 | 1.4 | 14 September 2022 12:00 – 13:00 | 8.6 | 1.7 | 7 September 2022 12:00 – 13:00 | EN 14792 |
| Hydrogen fluoride | 2 mg/m ³ | | 0.01 | 0.01 | 9 September 2022 09:00 – 12:00 | 0.00 | 0.02 | 6 September 2022 08:10 – 11:10 | SRM - BS ISO 15713 |
| Hg and its compounds | 0.05 mg/m ³ | | 0.0083 | 0.0011 | 13 September 2022 09:08 – 12:15 | 0.0044 | 0.0008 | 7 September 2022 09:00 – 12:30 | SRM - BS EN 13211 / MID 14385 |
| Cd and Tl and their compounds. | 0.05 mg/m ³ | | 0.0006 | 0.0007 | 13 September 2022 | 0.0005 | 0.0007 | 6 September 2022 | SRM – BS EN 14385 |
| Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds | 0.5 mg/m ³ | | 0.015 | 0.003 | | 15:35 – 17:40 | 0.013 | | |

| | | | | | | | | | |
|---|----------------------------|---|---------|--------|------------------------------------|---------|--------|-----------------------------------|------------------------|
| Dioxins & Furans (I-TEQ) | 0.1 ng/m ³ | Mean over period minimum 6 hours, maximum 8 hours | 0.0148 | 0.0045 | 12 September 2022 09:18 – 15:25 | 0.0023 | 0.0007 | 5 September 2022 12:00 – 18:07 | SRM - BS EN 1948-1 |
| PCBs (WHO-TEQ Humans / Mammals) | None set ng/m ³ | | 0.0010 | 0.0001 | | 0.0002 | 0.0000 | | SRM - BS EN 1948-1 |
| PCBs (WHO-TEQ Fish) | None set ng/m ³ | | 0.0001 | 0.0000 | | 0.0000 | 0.0000 | | SRM - BS EN 1948-1 |
| PCBs (WHO-TEQ Birds) | None set ng/m ³ | | 0.0027 | 0.0004 | | 0.0008 | 0.0001 | | SRM - BS EN 1948-1 |
| Dioxins/Furans (WHO-TEQ Humans/Mammals) | None set ng/m ³ | | 0.0136 | 0.0041 | | 0.0021 | 0.0006 | | SRM - BS EN 1948-1 |
| Dioxins/Furans (WHO-TEQ Fish) | None set ng/m ³ | | 0.0159 | 0.0048 | | 0.0023 | 0.0007 | | SRM - BS EN 1948-1 |
| Dioxins/Furans (WHO-TEQ Birds) | None set ng/m ³ | | 0.0318 | 0.0096 | | 0.0045 | 0.0014 | | EN 1948 1-3 |
| Anthanthrene | None set µg/m ³ | Mean over period minimum 6 hours, maximum 8 hours | < 0.001 | 214.7 | 12 September 2022 09:18 – 15:25 | < 0.001 | 212.9 | 6 September 2022 08:30 – 14:40 | SRM - BS ISO 11338 - 1 |
| Benzo(a)anthracene | None set µg/m ³ | | < 0.001 | 214.7 | | < 0.001 | 212.9 | | |
| Benzo(a)pyrene | None set µg/m ³ | | < 0.001 | 214.7 | | < 0.001 | 212.9 | | |
| Benzo(b)fluoranthene | None set µg/m ³ | | < 0.001 | 214.7 | | < 0.001 | 212.9 | | |
| Benzo(b)naphtho(2,1-d)thiophene | None set µg/m ³ | | 0.00 | 163.7 | | 0.00 | 161.4 | | |
| Benzo(c)phenanthrene | None set µg/m ³ | | < 0.001 | 214.7 | | < 0.001 | 212.9 | | |
| Benzo(ghi)perylene | None set µg/m ³ | | < 0.001 | 214.7 | | < 0.001 | 212.9 | | |
| Benzo(k)fluoranthene | None set µg/m ³ | | < 0.001 | 214.7 | | < 0.001 | 212.9 | | |

| | | | | | |
|-----------------------|--------------------------------------|---------|-------|---------|-------|
| Cholanthrene | None set $\mu\text{g}/\text{m}^3$ | < 0.001 | 214.7 | < 0.001 | 212.9 |
| Chrysene | None set $\mu\text{g}/\text{m}^3$ | < 0.001 | 214.7 | < 0.001 | 212.9 |
| Cyclopenta(cd)pyrene | None set $\mu\text{g}/\text{m}^3$ | < 0.001 | 214.7 | < 0.001 | 212.9 |
| Dibenzo(ai)pyrene | None set $\mu\text{g}/\text{m}^3$ | < 0.001 | 214.7 | < 0.001 | 212.9 |
| Dibenzo(ah)anthracene | None set $\mu\text{g}/\text{m}^3$ | < 0.001 | 214.7 | < 0.001 | 212.9 |
| Fluoranthene | None set $\mu\text{g}/\text{m}^3$ | 0.00 | 107.4 | < 0.00 | 103.8 |
| Indeno(123-cd)pyrene | None set $\mu\text{g}/\text{m}^3$ | < 0.001 | 214.7 | < 0.001 | 212.9 |
| Naphthalene | None set $\mu\text{g}/\text{m}^3$ | 0.00 | 207.5 | < 0.00 | 205.7 |

3. Point Source Emissions to Water

3.1. Introduction

Permit Condition 3.6.1(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 3.6.1(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 3_11_2022 Reported to Viridor 7_11_2022 | Received at lab 3_11_2022 Reported to Viridor 7_11_2022 | | |
| Total Organic Carbon | 3% | 1.5% | 0.8% | | |
| | | Composite | | | |
| | | Received at lab 3_11_2022 Reported to Viridor 23_11_2022 | Received at lab 3_11_2022 Metals reported to Viridor 10_11_2022 D, F + PCBs reported to Viridor 15_11_2022 | Received at lab 3_11_2022 Metals reported to Viridor 10_11_2022 D, F + PCBs reported to Viridor 15_11_2022 | |
| Antimony (mg/kg) | --- | 344 | 699 | 701 | |
| Cadmium (mg/kg) | --- | 23.6 | 240 | 268 | |
| Thallium (mg/kg) | --- | <0.1 | 0.7 | 0.8 | |
| Mercury (mg/kg) | --- | <0.5 | 2.54 | 3.02 | |

| | | | | |
|---|-----|--------------------------------------|---------------------------------------|--------------------------------------|
| Lead (mg/kg) | --- | 438.5 | 1519 | 1557 |
| Chromium (mg/kg) | --- | 133 | 25.5 | 23.4 |
| Copper (mg/kg) | --- | 1848.8 | 486 | 537 |
| Manganese (mg/kg) | --- | 1506 | 320 | 323 |
| Nickel (mg/kg) | --- | 95.5 | 7.8 | 9.8 |
| Arsenic (mg/kg) | --- | 30.1 | 79.3 | 57.6 |
| Cobalt (mg/kg) | --- | 63.6 | 2.3 | 4 |
| Vanadium (mg/kg) | --- | 30.8 | <10 | <10 |
| Zinc (mg/kg) | --- | 5175.9 | 12110 | 13240 |
| Dioxins / Furans (WHO 2005 TEQ) (ng/kg) | --- | Dioxins = 2.4526 Furans = 4.76028 | Dioxins = 75.1439 Furans = 131.165 | Dioxins = 520.03 Furans = 663.632 |
| PCB (WHO 2005 TEQ) (ng/kg) | --- | 0.2783 | 2.07724 | 56.7333 |