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

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

**Environmental Monitoring Report
2nd Quarter 2016: 1st April – 30th June 2016**

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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 350,000 tonnes per year of residual municipal and C&I waste and has the capability of exporting approximately 30MW of electrical power from the process.

In accordance with the requirements of Condition 4.2.3, 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 submit a summary of the environmental monitoring works undertaken at the site on a quarterly basis. Such reports will form the basis of the annual environmental review 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 in accordance with Condition 4.2.2 of the Permit.

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 data collected at the site during the second quarter calendar period of 2016, between 1st April and 30th June.

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 under normal operation during the review period remained compliant with the limits set out in the Permit, with the exception of a single event listed in 2.3.

Line 1 was in operation for 87.6% of the quarter and Line 2 for 82.8%.

2.3 Schedule Notices Issued

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

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	185	169	188	174	BS EN 15267-3	
	400 mg/m ³	½ hourly mean	288		343			
Particulate Matter	10 mg/m ³	Daily mean	1	1	0	0		
	30 mg/m ³	½ hourly mean	1		3			
Total Organic Carbon (TOC)	10 mg/m ³	Daily mean	1	0	4	1		
	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	23		28			
Sulphur dioxide	50 mg/m ³	Daily mean	24	8	16	5		
	200 mg/m ³	½ hourly mean	52		56			
Carbon monoxide	50 mg/m ³	Daily mean	25	14	24	10		
	100 mg/m ³	½ hourly mean*						
Ammonia	No limit set	Daily mean	10	1	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	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	15.6	3.9	01/04/2016 09:57-10:57	12.9	3.7	01/04/2016 11:12-12:12	EN 14792
Hydrogen fluoride	2 mg/m ³		<0.031	0.002	01/04/2016 08:55-09:55	<0.029	0.0022	01/04/2016 11:10-12:10	ISO 15713
Cd and Th and their compounds	0.05 mg/m ³		<0.00082	0.00013	30/03/2016 12:35-13:05; 13:10-13:40;	0.00075	0.0001	30/03/2016 12:38:13:08; 13:12-13:42	EN 14385
Hg and its compounds	0.05 mg/m ³		0.0049	0.0007		0.0025	0.0003		EN 13211
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	0.5 mg/m ³		0.019	0.003		0.018	0.0027		EN 14385
Dioxins & Furans (I-TEQ)	0.1 ng/m ³	Mean over period minimum 6 hours, maximum 8 hours	0.026	0.005	03/06/2016 07:00-10:00; 10:03-13:03	0.0099	0.0020	31/03/2016 08:15-11:15; 11:20-14:20	EN 1948 1-3
PCBs (WHO-TEQ Humans / Mammals)	None set ng/m ³		0.0019	0.0004		0.0011	0.00022		EN 1948 1-3
PCBs (WHO-TEQ Fish)	None set ng/m ³		0.000099	0.000021		0.000058	0.000012		EN 1948 1-3
PCBs (WHO-TEQ Birds)	None set ng/m ³		0.0053	0.0011		0.0033	0.00068		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Humans/Mammals)	None set ng/m ³		0.026	0.005		0.0099	0.0020		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Fish)	None set ng/m ³		0.027	0.006		0.011	0.0022		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Birds)	None set ng/m ³		0.038	0.008		0.017	0.0034		EN 1948 1-3

Anthanthrene	None set µg/m ³	Mean over period minimum 6 hours, maximum 8 hours	<0.011	0.002	01/04/2016 08:00-11:00; 11:03-14:03	<0.010	0.0021	01/04/2016 08:01-11:01; 11:05-14:05	ISO 11338
Benzo(a)anthracene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Benzo(a)pyrene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Benzo(b)fluoranthene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Benzo(b)naphtho(2,1-d)thiophene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Benzo(c)phenanthrene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Benzo(ghi)perylene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Benzo(k)fluoranthene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Cholanthrene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Chrysene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Cyclopenta(cd)pyrene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Dibenzo(ai)pyrene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Dibenzo(ah)anthracene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Fluoranthene	None set µg/m ³		0.022	0.005		0.010	0.0021		
Indeno(123-cd)pyrene	None set µg/m ³		<0.011	0.002		<0.010	0.0021		
Naphthalene	None set µg/m ³		0.14	0.03		0.13	0.027		

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	3%	0.9	0.9		
		Composite			
Quarter		Quarter 2		Quarter 2	Quarter 2
Antimony (mg/kg)	---	149		1007	993
Cadmium (mg/kg)	---	17.8		334	337
Thallium (mg/kg)	---	<0.1		0.9	0.9
Mercury (mg/kg)	---	<0.5		24.3	21.2
Lead (mg/kg)	---	556.9		2126	2147
Chromium (mg/kg)	---	134		48.5	50.1
Copper (mg/kg)	---	2169.9		650	632
Manganese (mg/kg)	---	806		401	404
Nickel (mg/kg)	---	62.4		13.3	13
Arsenic (mg/kg)	---	19.7		58.3	58.2
Cobalt (mg/kg)	---	28.3		5.4	5.4
Vanadium (mg/kg)	---	45.2		<10	<10

Zinc (mg/kg)	---	2740.1	14310	14440
Dioxins / Furans (WHO 2005 TEQ) (ng/kg)	---	6.005	33813	32032
PCB (WHO 2005 TEQ) (ng/kg)	---	0.485	3356.9	3327.1