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

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

**Environmental Monitoring Report
1st Quarter 2015: 1st January – 31st March 2014**

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

In accordance with the requirements of Condition 4.2.3, Schedule 4 and table S4.1 of Permit EPR/LP3030XA issued by National 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 the National Resources Wales by the 30th April as agreed in writing with the National 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.

This report summarises the environmental data collected at the site during the first quarter calendar period of 2015, between 1st January and 31st March.

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.

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

Line 1 was in operation for 82.67% of the quarter and Line 2 for 80.96%.

2.3 Schedule Notices Issued

09/02/2015 – Schedule 5 Notification Part C was raised due to failure of the Flue Gas Treatment (FGT) dosing system due to reduced air flow on Line 2 (Part C was submitted 13/02/2015).

17/02/2015 - Schedule 5 Notification Part C was raised due to failure of the ID fan inverter on Line 2, this subsequently disabled the FGT dosing system, compromising the abatement process on Line 2 (Part C was submitted 19/02/2015).

22/02/2015 – Schedule 5 Notification Part A for CO 10 minute average spike at sample point A2 (Part B was submitted 23/02/2015).

23/02/2015 - Schedule 5 Notification Part C was raised due to failure to the lime dosing control loop programmed within the Distributed Control System. This subsequently rendered the acid abatement system on Line 2 ineffective (Part C was submitted 25/02/2015).

23/02/2015 - Schedule 5 Notification Part C was raised due to blockage within the urea silo resulting in a disturbance to the DeNOx abatement system on Line 2 (Part C was submitted 25/02/2015).

24/02/2015 – Schedule 5 Notification Part C was raised due to a failure of the FGT dosing system due to reduced air flow on Line 1 (Part C was submitted 25/02/2015).

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	198	170	198	173	BS EN 15267-3	
	400 mg/m ³	½ hourly mean	360	174	377	175		
Particulate Matter	10 mg/m ³	Daily mean	2	1	1	0		
	30 mg/m ³	½ hourly mean	5	1	2	0		
Total Organic Carbon (TOC)	10 mg/m ³	Daily mean	2	0	1	0		
	20 mg/m ³	½ hourly mean	18	0	17	0		
Hydrogen chloride	10 mg/m ³	Daily mean	8	6	8	6		
	60 mg/m ³	½ hourly mean	44	6	43	6		
Sulphur dioxide	50 mg/m ³	Daily mean	13	7	21	8		
	200 mg/m ³	½ hourly mean	79	8	26	8		
Carbon monoxide	50 mg/m ³	Daily mean	13	5	26	8		
	100 mg/m ³	½ hourly mean*						
Ammonia	No limit set	Daily mean	7	1	5	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	-	Periodic over 30 minutes. Maximum 8 hours	0.63	+/- 0.67	03/03/2015 15:00-16:00	6.4	+/- 0.74	06/03/2015 09:30-11:30	TGN M22
Hydrogen fluoride	2 mg/m ³		<0.027	+/- 0.0041	05/03/2015 09:30-10:30	<0.031	+/- 0.0046	06/03/2015 08:00-08:40; 08:42-09:02	ISO 15713
Cd and Th and their compounds	0.05 mg/m ³		<0.00082	+/- 0.00013	05/03/2015 08:40-09:10; 09:12-09:40	<0.00079	+/- 0.00023	06/03/2015 08:10-08:40; 08:42-09:12	EN 14385
Hg and its compounds	0.05 mg/m ³		0.0030	+/- 0.00041		0.00065	+/- 0.000		EN 13211
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	0.5 mg/m ³		0.015	+/- 0.0023		0.015	+/- 0.0045		EN 14385
Dioxins & Furans (I-TEQ)	0.1 ng/m ³	Mean over period minimum 6 hours, maximum 8 hours	0.096	+/- 0.020	04/03/2015 08:45-11:45; 11:50-14:50	0.0077	+/- 0.0016	04/03/2015 08:36-10:28; 10:58-12:08; 12:13-15:13	EN 1948 1-3
PCBs (WHO-TEQ Humans / Mammals)	None set ng/m ³		0.0078	+/- 0.0078		0.0020	+/- 0.00041		EN 1948 1-3
PCBs (WHO-TEQ Fish)	None set ng/m ³		0.00038	+/- 0.00038		0.000086	+/- 0.000018		EN 1948 1-3
PCBs (WHO-TEQ Birds)	None set ng/m ³		0.015	+/- 0.015		0.0039	+/- 0.00080		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Humans/Mammals)	None set ng/m ³		0.093	+/-0.020		0.0078	+/- 0.0016		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Fish)	None set ng/m ³		0.10	+/-0.019		0.0082	+/- 0.0017		EN 1948 1-3
Dioxins/Furans (WHO-TEQ Birds)	None set ng/m ³		0.16	+/-0.034		0.012	+/- 0.0024		EN 1948 1-3

Anthanthrene	None set µg/m ³	Mean over period minimum 6 hours, maximum 8 hours	<0.010	+/- 0.0021	03/03/2015 10:10–17:16	<0.011	+/- 0.0023	03/03/2015 09:58-12:58; 13:00-16:00	ISO 11338
Benzo(a)anthracene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Benzo(a)pyrene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Benzo(b)fluoranthene	None set µg/m ³		0.070	+/- 0.014		0.077	+/- 0.0158		
Benzo(b)naphtho(2,1-d)thiophene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Benzo(c)phenanthrene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Benzo(ghi)perylene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Benzo(k)fluoranthene	None set µg/m ³		0.040	+/- 0.0021		0.044	+/- 0.0090		
Cholanthrene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Chrysene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Cyclopenta(cd)pyrene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Dibenzo(ai)pyrene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Dibenzo(ah)anthracene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Fluoranthene	None set µg/m ³		0.020	+/- 0.0041		<0.011	+/- 0.0023		
Indeno(123-cd)pyrene	None set µg/m ³		<0.010	+/- 0.0021		<0.011	+/- 0.0023		
Naphthalene	None set µg/m ³		1.3	+/- 0.27		1.4	+/- 0.29		

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

Following finalisation of construction works in the area, samples taken from W1 during the period have returned results free of oil grease and visible solids.

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 in Table 3 detail the monthly analysis undertaken in line with the criteria laid out in the ESA protocol. Viridor note that due to laboratory turn-around times March analysis has yet to be received, and therefore could not be included in this report, but will be included in the next quarterly report.

Air Pollution Control Residues

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

Results for January 2015 correspond to a representative sub-sample of air pollution control residues. Viridor note that due to laboratory turn-around times March analysis has yet to be received, and therefore could not be included in this report, but will be included in the next quarterly report.

Table 3 Residue Quality

Residue quality													
Parameter	Limit	Normal Operation											
		Bottom ash						APC Residues					
		Line 1			Line 2			Line 1			Line 2		
		Jan	Feb	Mar	Jan	Feb	Mar						
Total Organic Carbon	3%	1.89	1.27		0.75	1.76							
		Composite											
Month		Jan		Feb		Mar		Jan	Feb	Mar	Jan	Feb	Mar
Antimony (mg/kg)	---	122		130				792	753			520	
Cadmium (mg/kg)	---	10.4		9.89				212	255			221	
Thallium (mg/kg)	---	0.83		0.82				<1	<1			<1	
Mercury (mg/kg)	---	<0.83		<0.82				5.63	5.38			5.93	
Lead (mg/kg)	---	879		1084				2210	3060			2740	
Chromium (mg/kg)	---	100		116				27	27.2			23.7	
Copper (mg/kg)	---	2228		2281				638	713			411	
Manganese (mg/kg)	---	674		742				387	338			296	
Nickel (mg/kg)	---	87.7		125				13.6	14.0			12.7	
Arsenic (mg/kg)	---	8.86		9.34				36.9	40.5			34.2	
Cobalt (mg/kg)	---	25.4		45				5.9	5.68			5.47	
Vanadium (mg/kg)	---	36.3		41.6				8.64	9.58			8.44	

Zinc (mg/kg)	---	3243	2453		13400	14200			12600	
Dioxins / Furans I-TEQ (ng/kg)	---	41.1	11.7		1310	7004			5548	
PCB (WHO-TEQ) Humans (ng/kg)	---	48.4	13.5		1482	8190			6767	
PCB (WHO-TEQ) Birds (ng/kg)	---	55.6	17.0		2324	11666			9352	
PCB (WHO-TEQ) Fish (ng/kg)	---	36.4	11.1		1365	7629			5953	