

Exeter Energy from Waste Annual Report 2016

**Permit Number
HP3538CR**

Revision	Reason for Change	Prepared	Authorised
A	Original Document	Adrian Middlewick	Rod Jakeman

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1. Introduction

The Exeter Energy from Waste facility is operated by Cyclerval UK under contract to Viridor Waste Management. The facility is permitted by Environmental Permit number HP3538CR for the incineration of a maximum of 60,000 tonnes of non-hazardous waste per annum. The plant receives municipal waste collected from the District Councils of Exeter, East Devon, Teignbridge and Mid Devon. Where necessary additional waste may be imported from local commercial waste collectors. Where additional waste is imported, it is similar in composition to waste normally produced by house holders.

The plant commenced hot commissioning in April 2014 and entered full service in July 2014. 2016 is the second full year of operation.

The purpose of this report is to fulfil the requirements of section 4.2.2 of the environmental permit in respect of reporting on the activities of the plant over the previous year.

2. Plant Description

Plant Operator	Cyclerval UK Ltd
Name of Facility	Exeter Energy Recovery Facility
EPR Permit Number	HP3538CR
Facility Address	Grace Road South Exeter Devon EX2 8QE
Telephone Number	01392 255120

The Exeter Energy from Waste facility has been designed to process 60,000 tonnes of waste per annum at a calorific value of 9.3 MJ/Kg. This equates to a throughput of 7.7 tonnes per hour based on the plant being available 7,800 hours per year (89%) with the remaining time used to undertake essential maintenance. Waste is sourced primarily from the non-recyclable Municipal Waste Collections from Exeter and the surrounding areas plus residual waste arising from Civic Amenity sites in Exeter.

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The plant uses a technology based on an oscillating kiln combustor with heat recovery via a boiler raising steam to drive a turbine. The plant is designed to generate approximately 4 MW electricity of which 0.75 MW is consumed by the plant. The plant has been designed with an off take of medium pressure steam to feed a heat distribution network, a suitable distribution network for the heat has however not been yet developed.

Flue gas treatment is achieved through a multi-stage process including selective non catalytic reduction (SNCR) which uses urea injection to control oxides of nitrogen. Reaction with powdered lime and activated carbon which neutralise acidity and absorbs dioxin and heavy metals and filtration through a bag house which prevents release of particulate and encourages complete reaction with the powdered reagents.

Exeter EfW is regulated by the Environment Agency and is accredited under ISO 14001 2004, ISO 9001 2008 and OHSAS 18001.

3. Summary of Plant Operation

The plant is designed to treat waste for 89% of the time and generate electricity for 85% of the time. During 2016 the plant has fallen short of this target with an availability of 85.6% for the combustor and 83.5% for power generation. The additional shut down time has been necessary to carry out a modification to the boiler and aside from this lost time the plant has operated well and exceeded its design specification for both electricity generation and waste treatment.

The trend for waste to have a higher than expected calorific value (CV) has continued through 2016 with an average of 10.7 MJ/kg against a design criteria of 9.3 MJ/kg. Waste of this type remains comfortably within the plants operating range however the increase in CV results in a reduction in the plant capacity to the extent that while the plant is able to treat 60,000 tonnes at a CV of 9.3 it would be able to treat only 52,200 tonnes at a CV of 10.7. The plant has operated consistently above its design capacity enabling a greater quantity of waste than this to be processed.

Details of Waste treated, waste produced, energy and water consumed are contained in appendix A below.

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4. Summary of Plant Monitoring

4.1 Emissions to air

The plant is equipped with a continuous emissions monitoring package to continuously monitor the following emissions from the stack as required by the environmental permit.

Particulate
Total Organic Carbon
Hydrogen Chloride
Carbon Monoxide
Sulphur Dioxide
Oxides of Nitrogen
Ammonia

In order to ensure compliant operation in the event of a failure of the monitoring equipment the plant operates two sets of monitors providing full redundancy. Emissions monitoring has been in place for 100% of the combustor's operational time.

Results obtained during continuous monitoring are summarised below.

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Annual Summary 2016 Aerial Emissions of Dust			Date	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Half-hourly average			Half-Hour average ELV	30	30	30	30	30	30	30	30	30	30	30	30
	Monthly maximum	5.1	half hourly maximum	2.3	1.5	1.5	2.1	1.7	3.8	1.9	1.4	5.1	1.6	3.5	2.3
	Monthly mean	1.1	Mean half hourly average	1.1	1.0	1.1	1.0	1.1	1.2	1.1	1.1	1.2	1.2	1.2	1.3
	Sum of exceedances	0.0	Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Daily average			Daily average ELV	10	10	10	10	10	10	10	10	10	10	10	10
	Monthly maximum	2.6	Monthly Daily Maximum	1.2	1.1	1.2	1.2	1.3	1.3	1.2	1.2	2.6	1.3	1.8	1.7
	Monthly Mean	1.1	Monthly Daily Mean	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.3
	Sum of exceedances	0.0	Number of Exceedances	0	0	0	0	0	0	0	0	0	0	0	0

Annual Summary 2015 Aerial Emissions of VOC			Date	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Half-hourly average			Half-Hour average ELV	20	20	20	20	20	20	20	20	20	20	20	20
	Monthly maximum	13.2	half hourly maximum	11.2	13.2	2.3	0.2	7.1	11.8	2.7	2.0	1.4	1.1	7.0	0.9
	Monthly mean	0.3	Mean half hourly average	0	0.2	0.2	0	0	0	0.1	0.7	0.8	0.6	0.5	0.6
	Sum of exceedances	0.0	Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Daily average			Daily average ELV	10	10	10	10	10	10	10	10	10	10	10	10
	Monthly maximum	1.3	Monthly Daily Maximum	0.2	0.7	0.6	0	0.2	0.4	0.5	1.3	1.1	0.7	0.6	0.7
	Monthly Mean	0.3	Monthly Daily Mean	0	0.2	0.2	0	0	0	0.1	0.8	0.8	0.6	0.5	0.6
	Sum of exceedances	0.0	Number of Exceedances	0	0	0	0	0	0	0	0	0	0	0	0

Annual Summary 2015 Aerial Emissions of NH3			Date	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Half-hourly average			Half-Hour average ELV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Monthly maximum	4.8	half hourly maximum	3.4	3.3	3.8	1.6	3.2	4.2	4.8	3.1	1.0	0.9	0.8	1.1
	Monthly mean	0.4	Mean half hourly average	0.5	0.6	0.5	0.4	0.5	0.6	0.5	0.3	0.3	0.3	0.3	0.3
	Sum of exceedances	0.0	Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Daily average			Daily average ELV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Monthly maximum	1.9	Monthly Daily Maximum	0.7	0.8	1.6	0.5	1.9	0.9	1.0	1.0	0.5	0.5	0.5	0.4
	Monthly Mean	0.4	Monthly Daily Mean	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3
	Sum of exceedances	0.0	Number of Exceedances	0	0	0	0	0	0	0	0	0	0	0	0

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Annual Summary 2015 Aerial Emissions of HCl			Date	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Half-hourly average			Half-Hour average ELV	60	60	60	60	60	60	60	60	60	60	60	60
	Monthly maximum	26.6	half hourly maximum	21.8	12.3	20.8	25.3	23.4	26.6	12.4	25.9	12.4	11.7	12.0	19.4
	Monthly mean	6.2	Mean half hourly average	4.5	5.5	6.0	8.0	8.4	7.9	6.6	7.4	5.8	5.6	4.5	4.7
	Sum of exceedances	0.0	Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Daily average			Daily average ELV	10	10	10	10	10	10	10	10	10	10	10	10
	Monthly maximum	9.8	Monthly Daily Maximum	7.4	7.5	7.7	9.8	9.7	9.0	8.0	9.0	8.3	7.5	7.0	6
	Monthly Mean	6.5	Monthly Daily Mean	4.5	5.7	6.0	8.6	8.4	7.9	8.6	7.4	5.8	5.6	4.6	4.7
	Sum of exceedances	0.0	Number of Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Annual Summary 2015 Aerial Emissions of SO2			Date	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Half-hourly average			Half-Hour average ELV	200	200	200	200	200	200	200	200	200	200	200	200
	Monthly maximum	114.0	half hourly maximum	21	21	28	97	114	18	40	11	12	11	10	7
	Monthly mean	5.9	Mean half hourly average	4	8	6	14	10	5	5	5	4	3	3	3
	Sum of exceedances	0.0	Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Daily average			Daily average ELV	50	50	50	50	50	50	50	50	50	50	50	50
	Monthly maximum	20.0	Monthly Daily Maximum	7	7	9	19	20	7	7	6	5	5	4	3
	Monthly Mean	5.9	Monthly Daily Mean	4.5	5.3	6	15.5	10.5	5.3	5.1	4.8	4.5	3.2	3	2.7
	Sum of exceedances	0.0	Number of Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Annual Summary 2015 Aerial Emissions of CO			Date	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Half-hourly average			Half-Hour average ELV	100	100	100	100	100	100	100	100	100	100	100	100
	Monthly maximum	134.0	half hourly maximum	3	58	12	96	40	130	27	60	13	48	134	26
	Monthly mean	5.3	Mean half hourly average	0	3	3	9	5	6	6	5	4	6	8	8
	Sum of exceedances	3.0	Exceedances	0	0	0	0	0	2	0	0	0	0	1	0
Daily average			Daily average ELV	50	50	50	50	50	50	50	50	50	50	50	50
	Monthly maximum	12.0	Monthly Daily Maximum	5	4	9	11	8	12	9	6	7	8	10	10
	Monthly Mean	5.5	Monthly Daily Mean	2.5	2.7	3.1	9.2	4.9	5.5	6.1	4.5	4.3	6.4	8	8.4
	Sum of exceedances	0.0	Number of Exceedances	0	0	0	0	0	0	0	0	0	0	0	0

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Annual Summary 2015 Aerial Emissions of NOX			Date	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Half-hourly average			Half-Hour average ELV	400	400	400	400	400	400	400	400	400	400	400	400
	Monthly maximum	316.0	half hourly maximum	314	218	214	221	273	315	316	241	307	262	266	293
	Monthly mean	191.8	Mean half hourly average	188	189	189	189	190	195	194	196	198	191	192	190
	Sum of exceedances	0.0	Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Daily average			Daily average ELV	200	200	200	200	200	200	200	200	200	200	200	200
	Monthly maximum	199.0	Monthly Daily Maximum	193	193	192	191	199	199	198	199	199	197	195	195
	Monthly Mean	191.5	Monthly Daily Mean	188	189	189	189	190	195	194	196	196	190	192	190
	Sum of exceedances	0.0	Number of Exceedances	0	0	0	0	0	0	0	0	0	0	0	0

Daily and half hourly emission values are published on line at.
<http://176.32.230.52/tiru-uk.co.uk/exeter/environmental-reports/>

Review of Continuous Emissions Monitoring Results

- **Dust:**
Dust emissions have been consistently low with no exceedances of either 30 minute or daily emission limits.
- **VOC:**
VOC emissions have remained at a low level during this period with no exceedances of either daily or half hourly emission limit values. The monthly averages appear to show an increase over the previous year however this is attributable to a modification to the data capture method to ensure emissions at the limit of detection are more accurately recorded.
- **NH3**
NH3 while not controlled by an emission limit value NH3 can be used in conjunction with the NOX values to indicate whether the DeNOX system is working efficiently. Emissions of NH3 are lower compared to the previous year as a result of improvements to management of the denox system
- **HCl:**
HCL continues to be maintained at a low level well below the emission limit value. Lessons have been learned from previous years enabling the avoidance of exceedances during periods when the waste is producing high levels of HCl.
- **SO2:**
SO2 emissions are controlled by reaction with lime in a similar manner to HCL. Throughout the year SO2 emissions have remained in compliance with both daily and half hourly emission limit values.
- **CO**
Emissions have generally stayed well within emission limits with the exception of three occasions.
On two of these the plant stopped unexpectedly resulting in a short period of oxygen starvation and resultant accumulation of CO in the combustor. As the plant re-started the CO was flushed from the combustor and detected as a short spikes in emissions which breached the half hourly emission limit value.
A Further incident has been attributed to a pressurised gas bottle exploding in the combustor. The sudden combustion of a large volume of gas stripped oxygen from the combustion process and again resulted in a momentary spike in CO and an exceedance of the half hourly emission limit.
None of these incidents were sufficient to significantly increase the daily average emission.
- **NOX**
NOX is produced by the combustion process and controlled through the injection of urea solution at two levels within the post combustion chamber. On entering the chamber the urea solution reacts with oxides of nitrogen to form nitrogen and water. Where excess urea is added to the process this remains un-reacted and will be released as ammonia in the flue gas. During the year there have been no exceedances of either the daily or half hourly emission limit.

As control of the denox has improved the NOX in the flue gas has increased while remaining within the emission limits. This has enabled a reduction on NH3 released from the stack.

In addition to continuous monitoring of stack emissions, six monthly extractive testing of flue gas is undertaken to monitor levels of:

Hydrogen Fluoride

Cadmium and Thallium

Mercury

Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V

Nitrous Oxide

Dioxin and Furan TEQ for mammals, fish and birds

Dioxin like PCB TEQ for mammals, fish and birds

Poly-cyclic aromatic hydrocarbons

Parameter		Emission Limit Value	May 16	June 16	October 16
Hydrogen Fluoride	Mg/m3	2 mg/m3	<0.047		<0.029
Cadmium and Thallium and their compounds	Mg/m3	0.05 mg/m3	<0.0013		0.0012
Mercury and its compounds	Mg/m3	0.05 mg/m3	0.0028		<0.00044
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, and V and their compounds	Mg/m3	0.05mg/m3	0.0025		0.011
Nitrous Oxide	Mg/m3	No limit set	38.3		27.6
Dioxins / Furans I-TEQ	ng/m3	0.1 ng/m3		0.026	0.023
Dioxins / Furans (WHO – TEQ Humans/ Mammals)	ng/m3	No limit set		0.052	0.024
Dioxins / Furans (WHO-TEQ Fish)	ng/m3	No limit set		0.027	0.022
Dioxins / Furans (WHO-TEQ Birds)	ng/m3	No limit set		0.027	0.024
Dioxin like PCBs (WHO – TEQ Humans/Mammals)	ng/m3	No limit set		0.016	0.0019
Dioxin like PCBs (WHO – TEQ Fish)	ng/m3	No limit set		0.000078	0.000088
Dioxin like PCBs (WHO – TEQ Birds)	ng/m3	No limit set		0.0031	0.0038

Congener		Emission Limit Value	Results µg/m3		
			May 16	June 16	October 16
Poly-cyclic aromatic hydrocarbons (PAHs) Total	µg/m3	N/A	4.5		0.84
Anthanthrene	µg/m3	N/A	<0.021		<0.019
Benzo{a}anthracene	µg/m3	N/A	0.11		<0.019
Benzo[b]fluoranthene	µg/m3	N/A	0.59		<0.019
Benzo[k]fluoranthene	µg/m3	N/A	0.15		<0.019
Benzo[b]naph(2,1-d)thiophene	µg/m3	N/A	<0.021		<0.019
Benzo[c]phenanthrene	µg/m3	N/A	<0.021		<0.019
Benzo[ghi]perylene	µg/m3	N/A	<0.021		<0.019
Benzo[a]pyrene	µg/m3	N/A	<0.021		<0.019
Cholanthrene	µg/m3	N/A	<0.021		<0.019
Chrysene	µg/m3	N/A	0.38		<0.019
Cyclopenta(c,d)pyrene	µg/m3	N/A	<0.021		<0.019
Dibenzo[ah]anthracene	µg/m3	N/A	<0.021		<0.019
Dibenzo[a,i]pyrene	µg/m3	N/A	<0.021		<0.019
Fluoranthene	µg/m3	N/A	0.67		<0.019
Indo[1,2,3-cd]pyrene	µg/m3	N/A	<0.021		<0.019
Naphthalene	µg/m3	N/A	4.2		0.56

Review of Extractive Monitoring Results

Extractive monitoring was undertaken in May/June and October. This analysis continues to show all aerial emissions are within the emission limits specified by the permit. Where no emission limit is set the results remain consistent with those obtained during previous years.

4.2 Bottom Ash and Air Pollution Control Residues

Bottom ash and air pollution control residue (APCr) residue are subject to quarterly analysis as required by the environmental permit. The results of this testing are shown below. In addition to this bottom ash undergoes twice monthly testing and interpretation to characterise whether the ash should be treated as hazardous or non-hazardous waste. This follows the testing regime devised by the Environmental Services Association and approved by the Environment Agency.

2016 Incinerator Bottom Ash		<u>Jan - Mar</u>	<u>April - June</u>	<u>July - Sept</u>	<u>Oct - Dec</u>
LOI	%	1.4	1.3	1.7	1.2
Antimony	mg/kg	103	17	61	60
Arsenic	mg/Kg	21	17	13.2	22
Cadmium	mg/Kg	28	51	33	42
Chromium	mg/Kg	154	128	180	173
Cobalt	mg/Kg	93	59	82	126
Copper	mg/Kg	1327	1157	1392	1114
Lead	mg/Kg	630	454	680	501
Manganese	mg/Kg	374	264	364	290
Mercury	mg/Kg	<0.5	<0.5	<0.5	<0.5
Nickel	mg/Kg	119	120	125	121
Thallium	mg/Kg	<1	<1	<1	<1
Vanadium	mg/Kg	150	57	104	115
Zinc	mg/Kg	1407	111	1483	1293

Incinerator Bottom Ash Dioxin / PCB		<u>Jan - Mar</u>	<u>April - June</u>	<u>July - Sept</u>	<u>Oct - Dec</u>
Dioxins I-TEQ	ng/Kg	3.01	4.84	3.07	2.52
Dioxins Human/ Mammals	ng/Kg	3.21	4.21	2.57	2.35
Dioxins Birds	ng/Kg	5.12	8.25	6.03	4.61
Dioxins Fish	ng/Kg	3.73	4.66	3.04	2.49
PCBs Humans/ Mammals	ng/Kg	0.161	0.0695	0.0259	0.038
PCBs Birds	ng/Kg	0.0502	0.171	0.0758	0.012
PCBs Fish	ng/Kg	0.0791	0.0033	0.00130	0.002

Air Pollution Control Residue		<u>Jan - Mar</u>	<u>April - June</u>	<u>July - Sept</u>	<u>Oct - Dec</u>
Antimony	mg/Kg	224	161	312	334
Arsenic	mg/Kg	139	100	100	119
Cadmium	mg/Kg	56	118	99	127
Chromium	mg/Kg	146	90	120	78
Cobalt	mg/Kg	90	117	121	139
Copper	mg/Kg	2265	2455	2756	2435
Lead	mg/Kg	2003	3217	3009	2876
Manganese	mg/Kg	254	339	250	303
Mercury	mg/Kg	140	171	138	171

Nickel	mg/Kg	31	59	33	56
Thallium	mg/Kg	1020	31	40	59
Vanadium	mg/Kg	200	140	329	213
Zinc	mg/Kg	3365	3654	3435	3756

Air Pollution Control Residue Dioxin / PCB		<u>Jan – Mar</u>	<u>April - June</u>	<u>July - Sept</u>	<u>Oct – Dec</u>
Dioxins I-TEQ	ng/Kg	1760	1410	546	726
Dioxins Human/ Mammals	ng/Kg	1610	1300	511	681
Dioxins Birds	ng/Kg	2860	2290	921	1130
Dioxins Fish	ng/Kg	1870	1120	592	761
PCBs Humans/ Mammals	ng/Kg	50.9	37.9	17.3	11.5
PCBs Birds	ng/Kg	74.1	1.73	23.5	16.1
PCBs Fish	ng/Kg	2.33	53	0.798	0.0517

Review of Ash analysis.

Twenty four sample of bottom ash have been analysed during this period and in each case the ash has been shown to meet the requirements of non-hazardous waste.

This analysis has also shown the ash to be of consistent composition with limited variation since the plant was commissioned.

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APPENDIX A

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Reporting of Waste Disposal and Recovery for the year2016.....

Waste Description	Disposal Route	Tonnes	Recovery Tonnes
Hazardous Wastes			
APC residue	Treatment and landfill	969	
APC residue	Recovery		1,415
Oil	Oil recovery		
Total hazardous waste		969	1,415
Non-Hazardous Wastes			
Bottom ash	Landfill	256.32	
Bottom Ash	Recovery		8,980.18
Scrap metal			366.8
Water / Ash		20.45	
TOTAL WASTE	-	1,245.77	10761.18

Trends in Waste Disposal and Recovery			
	Parameter		
	Named Waste	Total Waste	Waste per unit output
2016	APC Residue	2,384	0.0446
2015	APC Residue	2311.38	0.0427
2014	APC Residue	1687.29	0.0447
2016	Boiler Water	20.45	0.00038
2015	Boiler Water	19	0.00035
2014	Boiler Water	97.35	0.00258
2016	Waste Oil	0	
2015	Waste Oil	0.81	
2014	Waste Oil	0.55	
2016	Incinerator Bottom Ash	9,236.5	0.1727
2015	Incinerator Bottom Ash	9326.2	0.1723
2014	Incinerator Bottom Ash	6164.04	0.1633
2016	Scrap Metal	366.8	0.0068
2015	Scrap Metal	986.88	0.0182
2014	Scrap Metal	485.36	0.0128

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Operator's comments :

APC residue has been produced at by the plant at a rate of 44.6 kg per tonne of waste processed. This is an increase of 4% over the previous year. It is not possible to draw any firm conclusion from this.

APCr disposal route has changed from treatment/landfill to recovery during this year and as a result no products from the EfW are sent to landfill.

IBA generation appears to remain consistent with the previous year however IBA now undergoes a recovery process which included recovery of metals. As a result it is no longer necessary to remove metal from the ash at the EfW. The total IBA produced per tonne of waste (including metal) indicating that waste may be becoming more volatile. This is reflected in an increase in CV observed at the plant.

Signed 
 (authorised to sign as representative of Operator)

Date.....30 January 2017.....

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Reporting of Water Usage for the year2016.....

Water Source	Usage (m ³)	Specific Usage (m ³ /t)
Mains water	12619	0.236
TOTAL WATER USAGE	12619	0.236

Trends in Water Usage Parameter			
	Named Water source	Total Water usage	Water per unit output (t)
2014	Main town water	4264	0.113
2015	Main town water	14891	0.27
2016	Main town water	12619	0.236

Operator's comments :

The defective super heaters reported in the last annual report were replaced in April 2016. This resulted in a reduction in water consumption as the requirement to vent steam medium pressure steam has been reduced.

Signed
(authorised to sign as representative of Operator)



A P Middlewick

Date.....30 January 2017.....

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Reporting of Energy Usage for the year2016..... *The performance indicators should reflect those in Schedule 5 of the Permit*

Energy Source	Energy Usage		
	Quantity	Primary Energy (MWh)	CO ₂ Produced (tonnes)**
Electricity * MWh	5756	1496.82	2354
Oil litres	130800	130.8	413.8
TOTAL	-	12794	2767.8

* Conversion factor for delivered electricity to primary energy = 2.6

** CO₂ values taken from UK Govt GHG conversion factors for company reporting

Trends in Energy Usage			
Year	Parameter		
	Primary Energy usage (MWh)	CO ₂ Produced (t)	CO ₂ (t) per unit output (t)
2016	14967.68	2767.8	0.0517
2015	14894.6	3149	0.058
2014	12015.9	3164.31	0.08387

Operator's comments :

Oil consumption has fallen by a small amount compared to the previous year while an improvement in operating efficiency has reduced the requirement for the support burner additional fuel has been required to re-start the plant following extended shut down periods while modifications were made to the boiler earlier in the year.

While electricity consumed by the plant shows a significant CO₂ production, this has mostly been derived from parasitic load on the plant. Electricity drawn from the national grid has reduced by 25% between 2015 and 2016 as a result of more consistent operation of the turbine.

Signed
(authorised to sign as representative of Operator)


A P Middlewick

Date.....30 January 2017.....



TITLE:	Cyclerval Annual Report 2016 HP3538CR		
DOC REF:	5272 REPT 30 2016	REVISION No:	A

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Reporting of Performance Indicators for the period ...1 January 2016...to.31 December 2016..

<i>Annual Production/Treatment</i>		
Mass of waste thermally treated on a dry basis	53,457	Tonnes

Environmental Performance Indicators

Parameter	Annual Average	Units
Oil usage	130.8	tonnes
Mass of bottom ash produced	9236.5	Tonnes
Mass of APC residues produced	2384	Tonnes
Mass of alkaline reagent used	353.8	Tonnes
Mass of urea used	83.5	Tonnes
Mass PAC used	20.1	Tonnes
Water Use	12619	Tonnes
Electrical energy imported to site	438	MWh
Electricity Generated	26,790	MWh
Electricity Exported to Grid	21,617	MWh
Energy Exported as Heat	0	

Trends in Environmental Performance				
Year	Parameter	Per tonne of treated waste	Parameter	Per tonne of treated waste
2016	Bottom Ash	0.1727 tonne	Water Used	0.236 tonne
2015		0.1723 tonne		0.275 tonne
2014		0.1633 tonne		0.113 tonne
2016	APC residue	0.0446 tonne	Electricity imported	0.00819MWh
2015		0.0427 tonne		0.0120 MWh
2014		0.045 tonne		0.042 MWh
2016	Alkaline Reagent	0.00662 tonne	Electricity Generated	0.516 MWh
2015		0.00689 tonne		0.49 MWh
2014		0.01 tonne		0.3935 MWh
2016	Urea Used	0.00156 tonne	Electricity Exported to grid	0.404 MWh
2015		0.00143 tonne		0.409 MWh
2014		0.00082 tonne		0.3165 MWh
2016	PAC used	0.00038 tonne		
2015		0.00028 tonne		
2014		0.000234 tonne		

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Operator's comments :

Overall use of resources and generation of outputs have remained consistent with the previous year's performance.

Urea consumption has increased over the past year. This will need to be monitored over the coming year to ascertain whether the trend continues.

Electricity generated and exported have remained consistent with the previous year's performance however import of electricity has diminished significantly. This reflects the reliability with which the turbine has operated outside the planned shut down.

There remains no market for the export of heat however the plant's stakeholders are continuing to investigate methods by which the heat may be used.

Signed 
(authorised to sign as representative of Operator)

Date.....30 January 2017.....