STOKE ON TRENT ENERGY FROM WASTE PLANT

PERMIT No QP3234SX

WASTE INCINERATION DIRECTIVE

ANNUAL PERFORMANCE REPORT

2018

CONTENTS

Annual performance report for MES Environmental Stoke –on-Trent EfW Plant– Permit No. QP3234SX – Year 2018

Introduction

This report is produced under the Industrial Emissions Directive (chapter 4, Waste Incineration Directive), which requires the operator of an incineration or co-incineration plant to produce an annual report to the Regulator on the functioning and monitoring of the plant and to make this available to the public. In accordance with the requirements of the Directive, the following information is therefore provided:

Name of Company	*M E S Environmental*
Name of Plant	*Stoke EfW Facility*
Permit Number	*QP3234SX*
Address	*Sideway, Campbell Road, Stoke, ST4 4DX*
Phone	*01782 412131*
Contact name	*Mr. D. Rockey*
Position	*Plant Manager*
Further information, description of waste types burned and origin.	*Constructed in 1997 to burn in the region of 210,000 tonnes per annum of local domestic refuse and generate a nominal 14.2MW of electricity for the local community.*
(If you would like to make any comment on this report or if you would like any further information or to arrange a visit to the plant please telephone Mr. D. Rockey on the above number)	

Table 1 – General information

The plant provides a sustainable method of waste disposal and recovery for the whole of the North Staffordshire conurbation, comprising the districts of Stoke-on-Trent, Newcastle under Lyme, Staffordshire Moorlands the northern area of Stafford and limited quantities from East Staffordshire, Leicestershire and Derbyshire, which would usually be taken to landfill.

Household, commercial or industrial wastes, collected by the local authorities, comprise almost all of the wastes delivered to the plant.
In 2018 62.43% of all deliveries of were from local authorities in the primary catchment area throughout Staffordshire, for 2017 this figure was 73.15%.
In 2018 33.44% of waste came from other councils, this is waste that would have otherwise gone to landfill. This is an increase from 2017, for which the figure was 26.85%.
Only 4.13% of wastes were from private sector contracts.
Priority will always be given to the delivery of local authority wastes, as required by the terms of contractual arrangements, in order to ensure that safe, reliable, consistent, and sustainable disposal and recovery facilities are available at all times.
This also reduces reliance on and quantities of wastes delivered for disposal to landfill with little or no beneficial outcome. It also contributes significantly to the diversion of biodegradable municipal waste away from landfill consistent with the

European Union and Governments objectives under the terms of the EU Landfill Directive.

Non-technical Plant Description

The installation comprises an energy from waste facility (EFW) processing a maximum of 210,000 tonnes per year of municipal and other specified wastes.

The plant contains two incineration lines with a combined design capacity to process up to 24 tonnes of waste per hour. Each line has separate waste feed systems, furnaces, boilers and flue gas treatment equipment but share a common electricity generation system.

Heat produced during the incineration process is converted to electrical energy by generating steam in high-pressure boilers and expanding the steam through a steam turbine. Air-cooled condensers re-circulate condensate back to the boilers.

By this means the plant, when operating at full load, will typically generate around 14.2 MW of electricity and, after satisfying its own power needs, exports approximately 12 MW of electricity to the local electricity network. This assists in contributing to the Government's target of providing 15% of electricity generation from renewable energy sources by the year 2020.

The combined effect of the plant's energy recovery process and the recycling activities of the local authorities in the area results in the recovery of value from around 80% of the municipal wastes produced in the area, either in the form of electricity production, recycling or composting.

This demonstrates that the two processes have a strong environmental synergy and work in common to treat waste as a resource to be put to beneficial use.

As recycling performance and capacity within the primary catchment area increases, this provides further opportunity to divert additional materials away from landfill in conjunction neighbouring local authorities, who are more heavily reliant on landfill as their primary disposal route.

In 2018, 62,230 tonnes of waste were imported from other local councils that would otherwise have been disposed of at landfill.

In terms of plant operation, the incineration processes have been designed against the background of a detailed assessment of the prevailing environmental conditions at the site location and are based upon the Best Available Technology, as detailed both in the original Authorisation application and the application for the Permit issued under the Pollution Prevention and Control (England and Wales) Regulations. These include but are not limited to the following:-

- Well proven process plant developed specifically for incineration of municipal solid wastes,
- Efficient, comprehensive process control and monitoring systems to ensure optimum conditions for complete combustion of the wastes and to minimise emissions from the processes.
- Operations confined within buildings under slight negative pressure in order to contain and minimise emissions such as dust and odour.
- Qualified and experienced operating and maintenance personnel to implement procedures to ensure that the required high standards are maintained. Operating and Maintenance Procedures are established according to an internationally recognised system of quality assurance.

- Multi-stage high efficiency flue gas cleaning systems comprising deNOx Selective Non-Catalytic Reduction (SNCR) for the removal of oxides of nitrogen, activated carbon and lime semi-dry acid gas scrubbing for controlling acid gas, dioxins/furans and mercury emissions.
- Final stage flue gas abatement for particulate materials using fabric filtration.
- 76 metre chimney stacks for effective dispersion of the low emission concentrations
- Residues from the combustion process and from the flue gas cleaning system disposed of by approved means, maximising recycling wherever possible.
- Residues transported in appropriate vehicles, suitably enclosed and covered to ensure that no spillage occurs.
- Operation of the installation under an Environmental Management System certified to IS014001, a Quality Management System certified to IS09001, and a Health and Safety system certified to OHSAS 18001. The organisation also maintains the globally recognised RoSPA Gold standard award
- Waste water from the process is neutralised and recycled as far as is practicable to minimise the quantities released to sewers.
- Provision of bunds or double skinned vessels for storage of fuel and chemicals to prevent accidental and inappropriate discharge to the public sewers and watercourse.

The Plant is regulated under the terms of a Permit issued by the Environment Agency (reference QP3234SX) which contains conditions to ensure that the requirements of the Waste Incineration Directive are incorporated and will be met.

A variation to the permit (reference FP3632XM) was also issued in May 2008 which amended continuous emission limit monitoring for CO from ½ hourly to 10 minute averages as set out in table 2.2.2 and 2.2.2a of the permit
Periodic emission limit values for particulates and hydrogen chloride were also amended to bring these in line with values for continuous monitoring.

A variation to the permit (Variation Number EPR/QP3234SX/V005) was issued on 10/02/17. The variation added a new accepted EWC code (18 01 04) in order to reflect the changes in the waste industry and wastes available after increased recycling and pre-processing as taken place. The latest additions have been added to enable local NHS trust hospitals to deliver their non-hazardous waste to the site, reducing the carbon footprint, establishing best practise when dealing with waste and reduce the cost of disposal.

Summary of plant operation

The plant is designed to process a heterogeneous mix of municipal type wastes in two identical streams each burning up to 12 tonnes per hour.

Although this creates a technical capacity for around 210,000 tonnes per annum, in reality waste deliveries are typically less than the nominal capacity when taking into consideration periods of planned maintenance and are well within the permit limitations of 210,000 tonnes of mixed municipal waste and 10,500 tonnes of separately collected fractions.

Local authority wastes deliveries are comprised entirely of mixed municipal wastes whilst private sector deliveries may be a combination of these and / or separately collected fractions.

Total deliveries for 2018 are set out in Table 2 below.

Annual waste throughputs

Waste Types	***EWC codes***	***Tonnes burnt***
Mixed municipal wastes	*20.03.01*	Stream 1 92,425 Stream 2 87,760 Total 180,085
Separately collected fractions	*15.01.06 Packaging* *20.01.01 Paper & card* *20.01.08 Kitchen waste* *20.02.01 Biodegradable* *20.03.02 Market waste* *20.03.03 Street sweepings*	Total 6,008
Total burnt – all types		186,093

Table 2 - Incinerated Wastes 2018

Plant operational hours in the year and reasons for any significant outages

Each boiler is designed to operate continuously throughout the year, although regular routine preventative maintenance programmes are in place to ensure performance efficiency is maintained and to prevent the development of major problems resulting in significant plant outages.

Routine maintenance activities represent the principal reason for significant outages with other stoppages tending to be short term shutdowns of individual streams, for one or two days, to deal with smaller scale issues such as tube leaks or minor repair works. Whilst these are relatively small jobs to repair the time taken to complete is extended whilst waiting for boilers to cool down before work can commence and then to bring back up to operating temperatures.

Annual routine planned maintenance to boiler 1 commenced for 21 days from 15/07/18 to 05/08/18. Routine planned maintenance to boiler 2 commenced for 21 days from 02/04/18 to 23/04/18. The outage is staggered to reduce the need to divert waste to another facility or landfill. The turbine system was shut down for 11 days commencing on the 23/07/18 and ending on the 03/08/18.
A full report on the outage work was supplied to the local Environment Agency compliance Officer.

There was an increase in the overall level of plant availability compared to previous years, with boiler 1 and boiler 2 available for 8005 and 7711 hours respectively. This equates to individual availability of 91.38% for stream 1, and 88.02% for stream 2, of the potential operating hours. This gives an average overall availability of 89.70%, compared to an overall availability of 86.52% in 2017, 88.26% in 2016, 87.17% in 2015, and 84.45% in 2014.

Further details on plant performance are contained in Appendix 1

Residues produced

There are two main sources of residues arising from the operation of the plant comprising:

- Bottom ash from the combustion process (including metals discharged within the ash
- Residues from the flue gas treatment system - Air Pollution Control Residue (Fly ash)

Burned out bottom ash residues are discharged from the lower end of each grate into a water filled ash discharger, where it is quenched and then ejected onto a conveyor system. Larger items are screened out and ferrous metals removed by magnetic separation.

Residues from the flue gas treatment process are discharged in an enclosed system into double skinned heavy duty bags prior to removal from site for treatment and disposal.

The residual material represents approximately 10% of the original refuse volume and around 20% of its weight with bottom ash discharged into the residues storage bunker.

The storage capacity for bottom ash residues and separated ferrous metals is sufficient to ensure 4 days storage. Collections for delivery to disposal or treatment sites are made on Mondays to Fridays and are scheduled to ensure sufficient storage capacity is maintained at all times.

Bottom ash is now widely used in the UK and Europe as a substitute for valuable primary aggregate materials in the construction of roads and embankments. Bottom ash from all three MESE sites is now reprocessed to further remove both ferrous and trace non-ferrous metals.

Table 3 shows the total quantities of the various residues produced in 2018.

Residue	Annual tonnage	Percentage of input waste	Disposal destination.
Bottom ash	34411	18.49	Reprocessing and re-use
Fly ash	5605	3.01	Reprocessing prior to landfill
Ferrous metals	2404	1.29	Recycling

Table 3 - Residues produced & final destination 2018

Electricity production

All deliveries to the plant are weighed and, in conjunction with the quantities of electricity produced, details used to determine the calorific values of wastes delivered. This can vary seasonally and is dependent upon the types of wastes delivered but, typically, are in the order of between 8 and 8.5 MJ/kg.

In 2018 the average calorific value of wastes delivered over the year was 8.37 MJ/kg. This is comparable with CV's of previous years; 8.7, 8.7, 8.4, 8.3, 8.15, 8.19, 8.27 and 8.16 MJ/kg (2010 to 2017 respectively). Variations are most likely to be attributable to the expansion of local authority recycling schemes, which are progressively removing greater quantities of material with both high and low or zero CV wastes such as paper, plastic, green and organic kitchen waste, bottles and tins.

The combustion of municipal waste at the plant not only produced enough electrical power to supply the majority of the plant's own needs, but sufficient also to meet the power demands for around 20,000 households during the year.

This reduces the demand for electricity produced in a conventional fossil fuel power stations and the use of a renewable energy source not only saves the depletion of an irreplaceable natural resource but also reduces the associated CO_2 production and pollution from the mining operation and transportation of the fossil fuel.

The Sector Guidance note IPPC S5.06 contains a guide value of 5 to 8 MWe exported per 100,000 tonnes of waste. At design performance the plant would export 12 MWe from processing around 180,000 tonnes which is equivalent to 6.7MWe per 100,000 tonnes and within the range of guide values.

Details of electrical power produced, used and exported from the plant is set out in Table 4 below together with details of small quantities of power imported during the times when the plant or part of the plant is shut-down for servicing.

Electrical power production (in MWhrs) 1 MWh = 10,000 X 100 watt light bulbs powered for 1 hour			
Imported	Production	Site use	Exported
1281	93160	14345	78815

Table 4 - Electrical power production 2018

Plant emissions monitoring

Emissions to air and water are continuously monitored in accordance with legal and regulatory requirements. Emissions to air are either combustion emissions from the stack or fugitive emissions from the storage of materials and chemicals on site.

Stack emissions (Particulates, Hydrogen Chloride, Sulphur Dioxide, Volatile Organic Compounds, Ammonia, Carbon Monoxide and Oxides of Nitrogen) are monitored and recorded continuously on site. Periodic (Bi annual) checks of these are also made by accredited external testing laboratories together with further quarterly or bi-annual checks as may be required by the permit of Dioxins, Mercury, Hydrogen Fluoride, Cadmium / Thallium and other metals.

Fugitive emissions monitoring, for substances having no specific emissions limit value specified in the permit, is part of the general maintenance regime carried out on site.

Table 5 below sets out the frequencies of monitoring for the various substances specified within the permit and in order to comply with the requirements of the Waste Incineration Directive, with further details of associated plant performance shown in Table 6 and Appendices 1 and 2.

Pollutants measured	Continuously	Periodically
Particulates	✓	✓
Oxides of Nitrogen	✓	✓
Sulphur Dioxide	✓	✓
Carbon Monoxide	✓	✓
Ammonia	✓	
Total Organic Carbon	✓	✓
Hydrogen Chloride	✓	✓
Mercury		✓
Cadmium and Thallium		✓
Group III metals		✓
PCDD and PCDF		✓
Hydrogen Fluoride		✓

Table 5 - Emissions monitoring frequencies

Emissions to water are monitored by equipment built into the on-site effluent treatment plant which aims to recycle 100% of water from site for reuse on site excluding sewerage. In 2018, the cumulative volume of water discharged to sewer was 3518 M^3.

Any emissions which exceed the limits that are imposed upon the operation are reported to the Environment Agency without delay along with plans for the prevention of further occurrences.

Continuous Emissions Monitor`s (CEMs) Operation

The CEMs equipment operated satisfactorily throughout the year with minor breakdowns on individual sampling streams being responded to by CBISS, the company contracted to service the equipment. At no time was the plant shut down due to CEMs failure.

CEMs equipment continuously measures and records information on emission limits for the substances set out in Table 5 above with 10 minute, ½ hourly and daily average values recorded and compared with corresponding emission limit values set out in the permit. Monthly reports are prepared for each substance although these only need to be submitted to the Environment Agency every 6 months.

Periodic testing is undertaken quarterly by independent and appropriately certified testing laboratories with separate annual validation tests also carried out by an alternative certified testing laboratory on behalf of the Environment Agency.

A summary CEM data for all continuously monitored substances is shown at Appendix 2 with a summary of results for substances that are only monitored periodically shown below in Table 6.
Note: All data supplied is subject to uncertainty of measurement, which is not included here.

Pollutant	**ELV**	**Stream**	***Qtr 1***	***Qtr 2***	***Qtr 3***	***Qtr 4***	***Average***
Cd/Tl (mg/m^3)	0.05 mg/m3	1	0.0010	0.0018	0.0010	0.0049	
		2	0.0012	0.0015	0.0013	0.0038	
		Average	**0.0011**	**0.0017**	**0.0012**	**0.0044**	**0.0021**
Hg (mg/m^3)	0.05 mg/m3	1	0.0025	0.0044	0.0015	0.0027	
		2	0.0021	0.0015	0.0012	0.0022	
		Average	**0.0023**	**0.0030**	**0.0014**	**0.0025**	**0.0023**
HF (mg/m^3)	2 mg/m3	1	0.0400	0.0200	0.0200	0.0100	
		2	0.0200	0.0100	0.0100	0.0600	
		Average	**0.0300**	**0.0150**	**0.0150**	**0.0350**	**0.0238**
Group III Metals (mg/m^3)	0.5 mg/m3	1	0.0546	0.0639	0.0388	0.0535	
		2	0.0544	0.0513	0.0418	0.0899	
		Average	**0.0545**	**0.0576**	**0.0403**	**0.0717**	**0.0560**
Dioxins (I-TEQ) (ng/m^3)	0.1 ng/m3	1	0.0218		0.0155		
		2	0.0195		0.0131		
		Average	**0.0207**		**0.0143**		**0.0175**

Table 6 Emissions of periodically monitored pollutants 2018

Summary of plant compliance

Description of non-compliances and abnormal operations notified to the Environment Agency.

Set against the total operational hours on each stream plant performance is of an extremely high level. The numbers of occasions where emission limit values have been exceeded are very small and when expressed as a percentage of operating time within limits range, equates to 0.2% for the year 2018.

This is primarily based on the numbers of ½ hourly average readings taken by emissions monitoring instruments and, in reality, although each complete half hour has been considered in this evaluation the duration during which any limit was exceeded is usually for a much shorter period.

The permit also recognises that equipment can malfunction and allows, in certain circumstances, for the plant to remain in service under abnormal operating conditions with increased emission limit values. This allows for short term continuous emissions monitoring or purification equipment to be rectified.

Although the permit restricts the period of abnormal operating conditions above to a maximum of 4 hours on any one occasion, or no more than 60 hours of abnormal operation on each line per year, boilers are generally shutdown after the first ½ hour of abnormal operation.

Table 7, below sets out the percentage of time that the plant was operating within its permitted limits for each continuously monitored parameter, both on individual and combined streams. No figures are included below for NH_3 as, whilst this is continuously measured and monitored, there is no limit specified for emissions within the permit.

It is also important to consider that in addition to the high levels of performance indicated in terms of operating times actual emission levels were also considerably lower than prescribed daily averages. Across all parameters actual emissions were, on average over 87% and 61% lower than 10 minute or ½ hourly and daily limits respectively.

Substance	Stream 1 (% operating time within limits)	Stream 2 (% operating time within limits)	Combined (% operating time within limits)
Hydrogen Chloride	**99.68**	**99.07**	**99.37**
Sulphur Dioxide	**100.00**	**99.69**	**99.84**
Oxides of Nitrogen	**100.00**	**99.69**	**99.84**
Volatile Organic Carbon	**99.69**	**100.00**	**99.85**
Particulates	**99.99**	**99.99**	**99.99**
Carbon Monoxide	**100.00**	**100.00**	**100.00**

Table 7 - Percentage of plant operating time within limits 2018

Unauthorised releases

Unauthorised releases relate to circumstances in which permitted emission limit values have been exceeded in situations not considered to comply with the exceptions provided for in abnormal operation.

Levels of unauthorised releases are tightly controlled and prompt remedial action is taken to address the situation with boilers closed down as soon as is practicable where necessary.

In 2018, 2 schedule 1 incidents were reported for stream 1 and 5 were reported for stream 2.

Abnormal Operations

As with any type of plant or machinery, there will inevitably be occasions where problems or breakdowns are experienced.

Abnormal operations are technically unavoidable stoppages, disturbances, or failures of the abatement plant or measurement devices, during which the concentrations into air and the purified water of the regulated substances may exceed normal emission limit values

As referred to earlier this is recognised within the permit, which provides for the plant to continue to operate within limited circumstances for up to 4 hours to enable restoration of normal operations or failed equipment or its replacement as quickly as possible.

In practice MES Environmental have adopted a policy to initiate the shut down process after only ½ hour of any abnormal operation and whilst this does not necessarily affect the level of incidence of abnormal operation it significantly reduces the number of operating hours in this situation.

During 2018, stream 1 had 2.5 hrs of abnormal periods of operation, and for stream 2 this figure was 1.0 hrs.

Non reportable incidents

Non reportable incidents are discussed at managerial level with the Environment Agency, when required, and where possible evidence produced to verify the situation.

Enforcement Notices

No enforcement notices were issued by the Environment Agency in respect of any aspect of plant operations in 2018.

Summary of plant improvements

There were a number of significant upgrades and major periodic work carried out in 2018, these include but are not limited to:

- The major outage saw an extensive strip down and overhaul of the grate system and ash dischargers. Feeder tables were replaced on boiler 2.

- A new bag purge air cleaning system was fitted to the bag house with the aim of increasing the efficiency of the system.

- The second phase of the ash-storage bunker wall replacement project was undertaken and this work is now complete.

Notwithstanding this, the operational and environmental efficiency and effectiveness of the plant infrastructure and systems are constantly monitored to identify potential areas for improvement.

Key performance indicators are considered at regular management meetings to identify trends and variations in performance, not only at an individual plant level but in comparison with sister plants at Wolverhampton and Dudley.

This provides a focus for Managers to consider possible areas for improvement and/or situations where action may be necessary in the future.

Summary of information made available

MES Environmental operate an inclusive policy of involving the public in their Operations by encouraging escorted tours of the facility by interested groups. Last year numerous schools, colleges and industry or environmental groups visited the site and the same will happen this year.

For information about the facility or to arrange a visit, please contact the Plant Manager Mr D Rockey on 01782 412131

All information sent to the Environment Agency including the operation permit details is available on the public register, which is accessible on the Environment Agency website.

Extra copies of this report are available by request from either the above referenced persons or by writing to:

David Lavender
Environmental Manager & QA Manager
MES Environmental
Crown Street
Wolverhampton
WV1 1QB

Appendices

Appendix 1 Performance Reports 2018

Permit Reference Number: QP3234SX **Operator: MES Environmental Limited**

Installation; Hanford Waste Services Limited Form Number: Agency Form / QP3234SX / DR1

Reporting of Waste Disposal and Recovery for the year 2018

Wates description	Disposal route	Tonnes	Recovery tonnes
2018			
1) Hazardous Wastes			
Named haz. Waste (Specify each separately)	Reprocess Fly ash (APC)	5605	0
Other hazardous wastes			
Total hazardous waste		5605	0
2) Non-Hazardous Wastes			
Named non-haz. Waste (Specify each separately)	Reprocess IBA	34411	0
Other non-hazardous wastes	Recycling (Fe)	2404	2404
Total non-hazardous waste		36815	
TOTAL WASTE	-	42420	

Wates description	Disposal route	Tonnes	Recovery tonnes
2017			
1) Hazardous Wastes			
Named haz. Waste (Specify each separately)	Reprocess Fly ash (APC)	5632	0
Other hazardous wastes			
Total hazardous waste		5632	0
2) Non-Hazardous Wastes			
Named non-haz. Waste (Specify each separately)	Reprocess IBA	34217	0
Other non-hazardous wastes	Recycling (Fe)	2806	2806
Total non-hazardous waste		37023	
TOTAL WASTE	-	42655	

Signed …… Date……..

(Authorised to sign as representative of Operator)

Permit Reference Number: QP3234SX **Operator: MES Environmental Limited**

Installation; Hanford Waste Services Limited Form Number: Agency Form / QP3234SX / WU1

Reporting of Water Usage for the year 2018

2018 - Water source	Usage (m^3)	Usage (m^3/t)
Mains water	**35638**	
Site borehole		
River abstraction		
Canal abstraction	**39766**	
TOTAL WATER USAGE	**75404**	**0.41**

2017 - Water source	Usage (m^3)	Usage (m^3/t)
Mains water	**37226**	
Site borehole		
River abstraction		
Canal abstraction	**42811**	
TOTAL WATER USAGE	**80037**	**0.44**

Signed ……. **Date……..**
(Authorised to sign as representative of Operator)

Permit Reference Number: QP3234SX **Operator: MES Environmental Limited**

Installation; Hanford Waste Services Limited Form Number: Agency Form / QP3234SX / EU1

Reporting of Energy Usage for the year 2018

2018 - Source		Calculated	CO_2 Produced (tonnes)
Electricity	MWh	15626	6719.2
Natural Gas	tonnes	N/A	
Gas Oil	tonnes	211	775.2
Recovered Fuel Oil	tonnes	N/A	
TOTAL	-		7494.4

2017 - Source		Calculated	CO_2 Produced (tonnes)
Electricity	MWh	15640	6725.2
Natural Gas	tonnes	N/A	
Gas Oil	tonnes	259	951.6
Recovered Fuel Oil	tonnes	N/A	
TOTAL	-		7676.8

Signed ……. **Date……..**
(Authorised to sign as representative of Operator

Permit Reference Number: QP3234SX **Operator: MES Environmental Limited**

Installation; Hanford Waste Services Limited Form Number: Agency Form / QP3234SX / PP1

Reporting of Performance Indicators for the period 01/01/2018 to 31/12/2018

Annual Production/Treatment	
Total municipal waste incinerated (excluding separately collected fractions)	180,085 tonnes
Total other wastes Incinerated	6,008 tonnes
Electrical energy generated and exported	78,815 MWh
Electrical energy generated and used on installation	14,345 MWh

Environmental Performance Indicators

2018

Parameter	Average	Units
Electrical energy imported to site	6.88	kWhrs/ tonne of waste incinerated (dry basis)
Fuel oil consumption	1.37	L / tonne of waste incinerated (dry basis)
Mass of bottom ash produced	184.9	kg/ tonne of waste incinerated (dry basis)
Mass of APC residues produced	30.12	kg/ tonne of waste incinerated (dry basis)
Mass of other solid residues produced	12.92	kg/ tonne of waste incinerated (dry basis)
Urea consumption	1.54	kg/ tonne of waste incinerated (dry basis)
Activated carbon consumption	0.05	kg/ tonne of waste incinerated (dry basis)
Lime consumption	10.81	kg/ tonne of waste incinerated (dry basis)
Water consumption	0.41	m^3/ tonne of waste incinerated (dry basis)

2017

Parameter	Average	Units
Electrical energy imported to site	3.56	kWhrs/ tonne of waste incinerated (dry basis)
Fuel oil consumption	1.70	L / tonne of waste incinerated (dry basis)
Mass of bottom ash produced	186.0	kg/ tonne of waste incinerated (dry basis)
Mass of APC residues produced	30.6	kg/ tonne of waste incinerated (dry basis)
Mass of other solid residues produced	15.3	kg/ tonne of waste incinerated (dry basis)
Urea consumption	1.17	kg/ tonne of waste incinerated (dry basis)
Activated carbon consumption	0.06	kg/ tonne of waste incinerated (dry basis)
Lime consumption	9.8	kg/ tonne of waste incinerated (dry basis)
Water consumption	0.44	m^3/ tonne of waste incinerated (dry basis)

Signed ……. **Date……..**

(authorised to sign as representative of Operator)

APPENDIX 2

Continuously Monitored Emissions to Air (mg/m3*) from Emission Point A1 – 2018

HCl	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 60	Annual ½ Hrly Max	887	Monthly ½ Hrly Max	26	31	20	48	63	33	55	127	70	28	887	33
	Annual ½ Hrly Mean	7	Monthly ½ Hrly Mean	6	7	7	7	8	8	8	9	8	7	8	6
Daily Ave ELV 10	Annual Daily Max	26	Monthly Daily Max	8	8	9	9	9	9	10	26	12	9	22	8
	Annual Daily Mean	7	Monthly Daily Mean	6	7	7	7	8	8	8	9	8	7	8	6

SO_2	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 200	Annual ½ Hrly Max	70	Monthly ½ Hrly Max	70	59	44	43	40	40	41	53	52	34	42	52
	Annual ½ Hrly Mean	16	Monthly ½ Hrly Mean	25	21	17	15	10	10	12	15	15	13	14	22
Daily Ave ELV 50	Annual Daily Max	36	Monthly Daily Max	30	32	20	19	12	13	16	36	19	15	16	36
	Annual Daily Mean	16	Monthly Daily Mean	25	21	17	15	10	10	12	15	15	13	14	22

NOx	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 400	Annual ½ Hrly Max	324	Monthly ½ Hrly Max	294	324	198	228	193	191	194	219	290	251	205	204
	Annual ½ Hrly Mean	173	Monthly ½ Hrly Mean	158	170	180	178	168	171	177	175	171	173	172	178
Daily Ave ELV 200	Annual Daily Max	187	Monthly Daily Max	186	187	182	182	176	178	180	181	180	179	180	181
	Annual Daily Mean	173	Monthly Daily Mean	158	170	180	178	168	171	177	175	171	173	172	178

VOC	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 20	Annual ½ Hrly Max	30	Monthly ½ Hrly Max	5	3	3	18	12	20	15	30	15	9	15	12
	Annual ½ Hrly Mean	1	Monthly ½ Hrly Mean	1	1	1	0	1	0	1	1	1	0	0	1
Daily Ave ELV 10	Annual Daily Max	5	Monthly Daily Max	3	1	1	1	1	1	1	2	5	1	1	1
	Annual Daily Mean	1	Monthly Daily Mean	1	1	1	0	1	0	1	1	1	0	0	1

NH_3	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av No ELV	Annual ½ Hrly Max	118	Monthly ½ Hrly Max	5	7	7	22	6	5	18	31	33	24	118	13
	Annual ½ Hrly Mean	2	Monthly ½ Hrly Mean	1	2	2	2	1	1	2	2	4	2	2	3
Daily Ave No ELV	Annual Daily Max	7	Monthly Daily Max	2	3	4	4	2	2	5	5	7	4	4	6
	Annual Daily Mean	2	Monthly Daily Mean	1	2	2	2	1	1	2	2	4	2	2	3

Particulates	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 30	Annual ½ Hrly Max	33	Monthly ½ Hrly Max	2	1	5	2	16	1	14	33	2	1	7	22
	Annual ½ Hrly Mean	0.1	Monthly ½ Hrly Mean	0	0	0	0	0	0	0	1	0	0	0	0
Daily Ave ELV 10	Annual Daily Max	3	Monthly Daily Max	0	0	1	0	1	1	1	3	1	0	1	2
	Annual Daily Mean	0.1	Monthly Daily Mean	0	0	0	0	0	0	0	1	0	0	0	0

CO	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10 Min Av ELV 150	Annual 10 min Max	562	Monthly 10 min max	68	69	163	499	138	171	153	196	350	562	140	140
	Annual 10 min Mean	8	Monthly 10 min mean	3	4	7	9	9	8	6	8	12	8	9	10
Daily Ave ELV 50	Annual Daily Max	49	Monthly Daily Max	8	7	13	23	16	11	14	37	49	11	14	13
	Annual Daily Mean	8	Monthly Daily Mean	3	4	7	9	9	8	6	8	12	8	9	10

* Figures reported to the nearest whole number.

Continuously Monitored Emissions to Air (mg/m3*) from Emission Point A2 – 2018

HCl	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 60	Annual ½ Hrly Max	92	Monthly ½ Hrly Max	21	21	29	39	32	36	39	92	46	36	30	16
	Annual ½ Hrly Mean	8	Monthly ½ Hrly Mean	7	8	8	8	8	8	8	8	8	8	8	8
Daily Ave ELV 10	Annual Daily Max	17	Monthly Daily Max	8	8	10	10	10	9	10	17	10	9	8	9
	Annual Daily Mean	8	Monthly Daily Mean	7	8	8	8	8	8	8	8	8	8	8	8

SO_2	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 200	Annual ½ Hrly Max	245	Monthly ½ Hrly Max	71	79	127	111	88	113	89	245	146	82	88	53
	Annual ½ Hrly Mean	16	Monthly ½ Hrly Mean	9	16	23	24	16	18	18	15	14	9	12	12
Daily Ave ELV 50	Annual Daily Max	35	Monthly Daily Max	18	22	35	34	25	25	27	27	23	17	20	19
	Annual Daily Mean	16	Monthly Daily Mean	9	16	23	24	16	18	18	15	14	9	12	12

NOx	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 400	Annual ½ Hrly Max	363	Monthly ½ Hrly Max	286	342	246	192	267	363	352	337	328	238	196	280
	Annual ½ Hrly Mean	178	Monthly ½ Hrly Mean	182	179	178	178	175	180	179	174	173	178	178	179
Daily Ave ELV 200	Annual Daily Max	200	Monthly Daily Max	200	183	181	180	185	187	187	189	179	180	180	189
	Annual Daily Mean	178	Monthly Daily Mean	182	179	178	178	175	180	179	174	173	178	178	179

VOC	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av ELV 20	Annual ½ Hrly Max	2	Monthly ½ Hrly Max	1	2	1	1	1	0	1	0	0	1	1	1
	Annual ½ Hrly Mean	0	Monthly ½ Hrly Mean	0	0	0	0	0	0	0	0	0	0	0	0
Daily Ave ELV 10	Annual Daily Max	1	Monthly Daily Max	0	0	0	0	0	0	0	0	0	0	0	1
	Annual Daily Mean	0	Monthly Daily Mean	0	0	0	0	0	0	0	0	0	0	0	0

NH_3	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av	Annual ½ Hrly Max	78	Monthly ½ Hrly Max	38	78	28	8	11	73	23	36	31	19	18	37
No ELV	Annual ½ Hrly Mean	4	Monthly ½ Hrly Mean	2	2	2	3	2	5	7	9	4	2	3	5
Daily Ave	Annual Daily Max	22	Monthly Daily Max	6	5	8	4	6	9	13	22	9	3	7	13
No ELV	Annual Daily Mean	4	Monthly Daily Mean	2	2	2	3	2	5	7	9	4	2	3	5

Particulates	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av	Annual ½ Hrly Max	49	Monthly ½ Hrly Max	8	25	9	23	3	8	31	23	49	3	14	11
ELV 30	Annual ½ Hrly Mean	2	Monthly ½ Hrly Mean	1	1	2	3	1	2	2	2	1	1	2	2
Daily Ave	Annual Daily Max	12	Monthly Daily Max	4	2	3	8	1	3	12	12	2	1	4	3
ELV 10	Annual Daily Mean	2	Monthly Daily Mean	1	1	2	3	1	2	2	2	1	1	2	2

CO	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10 Min Av	Annual 10 min Max	1394	Monthly 10 min max	453	1394	145	124	195	444	167	160	125	306	157	237
ELV 150	Annual 10 min Mean	14	Monthly 10 min mean	15	16	16	15	16	11	10	13	13	15	17	15
Daily Ave	Annual Daily Max	33	Monthly Daily Max	24	29	22	19	33	17	15	26	24	20	23	25
ELV 50	Annual Daily Mean	14	Monthly Daily Mean	15	16	16	15	16	11	10	13	13	15	17	15

* Figures reported to the nearest whole number.