

**STOKE ON TRENT ENERGY FROM WASTE PLANT**

PERMIT No QP3234SX

WASTE INCINERATION DIRECTIVE

ANNUAL REPORT

2016

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## **Annual performance report for MES Environmental Stoke –on-Trent EfW Plant– Permit No. QP3234SX – Year 2016**

### **Introduction**

This report is produced under the Waste Incineration Directive's Article 12(2) 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:

<i>Name of Company</i>	<i>M E S Environmental</i>
<i>Name of Plant</i>	<i>Stoke EfW Facility</i>
<i>Permit Number</i>	<i>QP3234SX</i>
<i>Address</i>	<i>Sideway, Campbell Road, Stoke, ST4 4DX</i>
<i>Phone</i>	<i>01782 412131</i>
<i>Contact name</i>	<i>Mr. D. Rockey</i>
<i>Position</i>	<i>Plant Manager</i>
<i>Further information, description of waste types burned and origin.</i>	<i>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.</i>
(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 2016 75.52% of all deliveries of were from local authorities in the primary catchment area throughout Staffordshire, for 2015 this figure was 75.36%.

In 2015, 1.82% of waste deliveries came from other councils, waste that would otherwise have gone to landfill. This figure increased slightly for 2016, at 24.48%. Only around 2.07% of wastes were from private sector contracts.

Priority will always be given however to the delivery of local authority wastes, as required by the terms of contractual arrangements, 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 2016, 44,574 tonnes imported from other local councils which 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 2000. 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 ISO14001 and a Quality Management System, certified to ISO9001, Health and Safety certified to OHSAS 18001 and a laboratory accredited by UKAS, accredited to ISO17025. 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) and 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 and 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.

An approved application for an extension to the EWC waste acceptance codes was received from the Environmental Agency early January 2017. The additional EWC codes 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 waste to the site, massively reducing the carbon foot print, 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 2016 are set out in Table 2 below.

**Annual waste throughputs**

<b><i>Waste Types</i></b>	<b><i>EWG codes</i></b>	<b><i>Tonnes burnt</i></b>	
<i>Mixed municipal wastes</i>	<i>20.03.01</i>	Stream 1	88257.5
		Stream 2	90040.5
		Total	178298
<i>Separately collected fractions</i>	<i>15.01.06 Packaging</i>	Total	3771
	<i>20.01.01 Paper &amp; card</i>		
	<i>20.01.08 Kitchen waste</i>		
	<i>20.02.01 Biodegradable</i>		
	<i>20.03.02 Market waste</i>		
	<i>20.03.03 Street sweepings</i>		
<i>Total burnt – all types</i>			182069

***Table 2 - Incinerated Wastes 2016***

## **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. 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 30 days from 07/08/16 to 05/09/16. Routine planned maintenance to boiler 2 commenced for 23 days from 31/07/16 to 22/08/16. The outage is staggered to reduce the need to divert waste to another facility or landfill. The common outage occurs to enable maintenance to take place on common/shared systems and the turbine.

The turbine system was shut down for 50 days commencing on the 10/07/16 and ending on the 28/08/16 due to a failure of the generator.

A full report on the outage work was supplied to the local Environment Agency compliance Officer.

The overall level of plant availability, in terms of operating hours, was comparable to previous years with boiler 1 and boiler 2 available for 7682 and 7824 hours respectively. This equates to individual availability of 87.45% for stream 1, and 89.07% for stream 2, of potential operating hours or 88.26% over all availability compared to an overall availability of 88.45% for 2012 and 86.58% for 2013, 84.45% for 2014 and 87.17 in 2015

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: and
- Residues from the flue gas treatment system (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 27% 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 2016.

<b>Residue</b>	<b>Annual tonnage</b>	<b>Percentage of input waste</b>	<b>Disposal destination.</b>
Bottom ash	34373	18.88	Reprocessing and re-use
Fly ash	6166	3.39	Reprocessing prior to landfill
Ferrous metals	2915	1.6	Recycling

***Table 3 - Residues produced & final destination 2016***



## 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 2016 the average calorific value of wastes delivered over the year was 8.27 MJ/kg. This is comparable with CV's of previous years; 8.3, 8.45, 8.74, 8.91, 8.11, 8.37, 8.7, 8.7, 8.4, 8.3, 8.15 and 8.19 MJ/kg (2004 to 2015 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 sufficient electrical power to supply the majority of the plant's own power 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<sub>2</sub> 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 in 2016 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.

<b>Electrical power production (in MWhrs)</b>			
1 MWh = 10,000 X 100 watt light bulbs powered for 1 hour			
Imported	Production	Site use	Exported
1708	86521	13824	72697

***Table 4 - Electrical power production***

## 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 Carbons, 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.

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

**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 2016 the cumulative volume of water discharged to sewer was 5227 tonnes.

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 which are only monitored periodically shown below in Table 6.

<b>Pollutant</b>	<b>ELV</b>	<b>Stream</b>	<b>Qtr 1</b>	<b>Qtr 2</b>	<b>Qtr 3</b>	<b>Qtr 4</b>	<b>Ave</b>
Cd/Th (mg/m <sup>3</sup> )	0.05 mg/m <sup>3</sup>	1	0.0022	0.0052	0.0019	0.0011	0.03699
		2	0.0017	0.0021	0.0015	0.2802	
		Annual Ave	0.00195	0.00365	0.0017	0.14065	
Hg (mg/m <sup>3</sup> )	0.05 mg/m <sup>3</sup>	1	0.0049	0.0094	0.0228	0.0161	-
		2	0.0045	0.0109	0.0135	0.0053	
		Annual Ave	0.0047	0.01015	0.01815	0.0107	
Hf (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>	1	0.012	0.01	0.004	0.005	0.015375
		2	0.012	0.012	0.064	0.004	
		Annual Ave	0.012	0.011	0.034	0.0045	
Group III Metals (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>	1	0.0989	0.1862	0.0849	0.0314	0.114588
		2	0.0733	0.174	0.1833	0.0847	
		Annual Ave	0.0861	0.1801	0.1341	0.05805	
Dioxins (ng/m <sup>3</sup> )	0.1 ng/m <sup>3</sup>	1	0.0174		0.1908		
		2	0.0118		0.0441		
		Annual Ave	0.0146		0.11745		0.066025

***Table 6 Emissions of periodically monitored pollutants 2016***

## 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 2.6% for year 2016

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<sub>3</sub> 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 85% and 55% lower than 10 minute or ½ hourly and daily limits respectively.

<b>Substance</b>	<b>Stream 1 (% operating time within limits)</b>	<b>Stream 2 (% operating time within limits)</b>	<b>Combined (% operating time within limits)</b>
Hydrogen Chloride	99.4	99.1	99.25
Sulphur Dioxide	99.99	99.99	99.99
Oxides of Nitrogen	99.1	100	99.55
Volatile Organic Carbon	100	100	100
Particulates	100	100	100
Carbon Monoxide	100	100	100

***Table 7 - Percentage of plant operating time within limits***

### *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 2016, 4 schedule 1 incidents were reported for stream 1 and 6 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 2016 stream 1 had 0.5 hrs of abnormal periods of operation and for stream 2 this figure was also 0.5 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.

No enforcement notices were issued by the Environment Agency in respect of any aspect of plant operations in 2016.

Although technical performance continued to be delivered at high levels throughout, constant and thorough reviews of management and operating systems are undertaken and subjected to a rigorous process of external audit and validation.

## **6. Summary of plant improvements:**

During the major outage in July and August the major focus was the continued overhaul of the turbine system and associated systems, focusing on the generator, which was removed for a full overhaul.

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.

## **7. 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 either 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:

Mr. S Thompson  
Environment Manager  
MES Environmental  
Crown Street  
Wolverhampton  
WV1 1QB

## **Appendices**



## Appendix 1 Performance Reports 2016

Permit Reference Number: QP3234SX  
Installation; Hanford Waste Services Limited

Operator: MES Environmental Limited  
Form Number: Agency Form / QP3234SX / DR1

### Reporting of Waste Disposal and Recovery for the year .....2016

Wates description	Disposal route	Tonnes	Recovery tonnes
<b>2016</b>			
<b>1) Hazardous Wastes</b>			
Named haz. Waste (Specify each separately)	Reprocess Fly ash (APC)	6166	0
Other hazardous wastes			
<b>Total hazardous waste</b>		<b>6166</b>	<b>0</b>
<b>2) Non-Hazardous Wastes</b>			
Named non-haz. Waste (Specify each separately)	Reprocess IBA	34373	0
Other non-hazardous wastes	Recycling (Fe)	2915	2915
<b>Total non-hazardous waste</b>		<b>37288</b>	
<b>TOTAL WASTE</b>	<b>-</b>	<b>43454</b>	

Wates description	Disposal route	Tonnes	Recovery tonnes
<b>2015</b>			
<b>1) Hazardous Wastes</b>			
Named haz. Waste (Specify each separately)	Reprocess Fly ash (APC)	6028	0
Other hazardous wastes			
<b>Total hazardous waste</b>		<b>6028</b>	<b>0</b>
<b>2) Non-Hazardous Wastes</b>			
Named non-haz. Waste (Specify each separately)	Reprocess IBA	36403	0
Other non-hazardous wastes	Recycling (Fe)	2736	2736
<b>Total non-hazardous waste</b>		<b>39139</b>	
<b>TOTAL WASTE</b>	<b>-</b>	<b>45167</b>	

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 .....2016**

<b>2016 - Water source</b>	<b>Usage (m<sup>3</sup>)</b>	<b>Usage (m<sup>3</sup>/t)</b>
<b>Mains water</b>	<b>40346</b>	
<b>Site borehole</b>		
<b>River abstraction</b>		
<b>Canal abstraction</b>	<b>36918</b>	
<b>TOTAL WATER USAGE</b>	<b>77264</b>	<b>0.42</b>

<b>2015 - Water source</b>	<b>Usage (m<sup>3</sup>)</b>	<b>Usage (m<sup>3</sup>/t)</b>
<b>Mains water</b>	<b>34409</b>	
<b>Site borehole</b>		
<b>River abstraction</b>		
<b>Canal abstraction</b>	<b>28103</b>	
<b>TOTAL WATER USAGE</b>	<b>62512</b>	<b>0.35</b>

Signed .....  
(Authorised to sign as representative of Operator)

Date.....

**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 .....2016**

2016 - Source		Calculated	CO <sub>2</sub> Produced (tonnes)
Electricity	MWh	15532	6678.8
Natural Gas	tonnes	N/A	
Gas Oil	tonnes	259.8	954.5
Recovered Fuel Oil	tonnes	N/A	
<b>TOTAL</b>	<b>-</b>	<b>15791.8</b>	<b>7633.3</b>

2015 - Source		Calculated	CO <sub>2</sub> Produced (tonnes)
Electricity	MWh	15443	6640.5
Natural Gas	tonnes	N/A	
Gas Oil	tonnes	376.6	1383.6
Recovered Fuel Oil	tonnes	N/A	
<b>TOTAL</b>	<b>-</b>	<b>15819.6</b>	<b>8024.1</b>

Signed .....  
(Authorised to sign as representative of Operator)

Date.....

**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 ...01/01/2016..... to ...31/12/2016**

<b>Annual Production/Treatment</b>	
Total municipal waste incinerated (excluding separately collected fractions)	178298 tonnes
Total other wastes Incinerated	3771 tonnes
Electrical energy generated and exported	72697 MW hrs
Electrical energy generated and used on installation	13824 MW hrs

**Environmental Performance Indicators**

2016

Parameter	Average	Units
Electrical energy imported to site	9.38	kWhrs/ tonne of waste incinerated (dry basis)
Fuel oil consumption	1.72	kg/ tonne of waste incinerated (dry basis)
Mass of bottom ash produced	188.8	kg/ tonne of waste incinerated (dry basis)
Mass of APC residues produced	33.87	kg/ tonne of waste incinerated (dry basis)
Mass of other solid residues produced	16	kg/ tonne of waste incinerated (dry basis)
Urea consumption	0.98	kg/ tonne of waste incinerated (dry basis)
Activated carbon consumption	0.03	kg/ tonne of waste incinerated (dry basis)
Lime consumption	11.69	kg/ tonne of waste incinerated (dry basis)
Water consumption	0.42	m <sup>3</sup> / tonne of waste incinerated (dry basis)

Signed .....  
(authorised to sign as representative of Operator)

2015

Parameter	Average	Units
Electrical energy imported to site	1.46	kWhrs/ tonne of waste incinerated (dry basis)
Fuel oil consumption	25.1	kg/ tonne of waste incinerated (dry basis)
Mass of bottom ash produced	203	kg/ tonne of waste incinerated (dry basis)
Mass of APC residues produced	33.5	kg/ tonne of waste incinerated (dry basis)
Mass of other solid residues produced	15.2	kg/ tonne of waste incinerated (dry basis)
Urea consumption	1.1	kg/ tonne of waste incinerated (dry basis)
Activated carbon consumption	0.04	kg/ tonne of waste incinerated (dry basis)
Lime consumption	10.97	kg/ tonne of waste incinerated (dry basis)
Water consumption	0.35	m <sup>3</sup> / tonne of waste incinerated (dry basis)

Date.....

## APPENDIX 2

### Continuously Monitored Emissions to Air (mg/m3\*) from Emission Point A1 – 2016

<b>HCL</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 60</b>	Annual ½ Hrly Max	164	Monthly ½ Hrly Max	20	38	26	62	22	30	164	16	73	31	44	35
	Annual ½ Hrly Mean	7	Monthly ½ Hrly Mean	6	5	3	5	7	7	9	8	10	8	8	7
<b>Daily Ave ELV 10</b>	Annual Daily Max	38	Monthly Daily Max	8	11	6	9	10	9	29	9	38	9	9	9
	Annual Daily Mean	7	Monthly Daily Mean	6	5	3	5	7	7	9	8	10	8	8	7

<b>SO<sub>2</sub></b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 200</b>	Annual ½ Hrly Max	226	Monthly ½ Hrly Max	192	173	169	226	156	78	44	32	118	56	73	69
	Annual ½ Hrly Mean	23	Monthly ½ Hrly Mean	24	35	29	28	27	18	16	15	24	19	20	20
<b>Daily Ave ELV 50</b>	Annual Daily Max	94	Monthly Daily Max	39	42	36	39	36	26	35	17	94	23	25	26
	Annual Daily Mean	23	Monthly Daily Mean	24	35	29	28	27	18	16	15	24	19	20	20

<b>NO<sub>x</sub></b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 400</b>	Annual ½ Hrly Max	376	Monthly ½ Hrly Max	219	369	373	197	270	263	294	271	376	367	296	339
	Annual ½ Hrly Mean	183	Monthly ½ Hrly Mean	178	182	182	183	183	183	184	185	182	185	180	184
<b>Daily Ave ELV 200</b>	Annual Daily Max	225	Monthly Daily Max	184	221	193	183	197	185	207	195	198	225	185	197
	Annual Daily Mean	183	Monthly Daily Mean	178	182	182	183	183	183	184	185	182	185	180	184

<b>VOC</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 20</b>	Annual ½ Hrly Max	30	Monthly ½ Hrly Max	13	6	14	6	7	19	11	9	15	15	4	30
	Annual ½ Hrly Mean	1	Monthly ½ Hrly Mean	1	1	1	1	1	1	1	1	1	0	0	1
<b>Daily Ave</b>	Annual Daily Max	12	Monthly Daily Max	2	2	2	1	2	2	2	1	12	2	1	1

<b>ELV 10</b>	Annual Daily Mean	1	Monthly Daily Mean	1	1	1	1	1	1	1	1	1	0	0	1
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<b>NH<sub>3</sub></b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av No ELV</b>	Annual ½ Hrly Max	56	Monthly ½ Hrly Max	56	28	17	7	9	22	26	4	28	56	13	12
	Annual ½ Hrly Mean	2	Monthly ½ Hrly Mean	8	3	2	0	0	0	0	0	3	1	2	1
<b>Daily Ave No ELV</b>	Annual Daily Max	24	Monthly Daily Max	24	6	4	0	1	1	2	0	13	7	4	2
	Annual Daily Mean	2	Monthly Daily Mean	8	3	2	0	0	0	0	0	3	1	2	1

<b>Particulates</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 30</b>	Annual ½ Hrly Max	26	Monthly ½ Hrly Max	22	20	4	5	14	16	26	10	25	7	12	5
	Annual ½ Hrly Mean	3	Monthly ½ Hrly Mean	1	2	1	1	1	1	2	5	5	2	1	1
<b>Daily Ave ELV 10</b>	Annual Daily Max	11	Monthly Daily Max	2	7	2	2	4	2	5	6	11	4	8	3
	Annual Daily Mean	3	Monthly Daily Mean	1	2	1	1	1	1	2	5	5	2	1	1

<b>CO</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>10 Min Av ELV 150</b>	Annual 10 min Max	407	Monthly 10 min max	317	141	147	137	171	407	316	176	294	278	96	204
	Annual 10 min Mean	17	Monthly 10 min mean	13	14	11	19	22	19	18	20	24	14	14	11
<b>Daily Ave ELV 50</b>	Annual Daily Max	179	Monthly Daily Max	20	22	23	29	32	28	35	26	179	23	17	17
	Annual Daily Mean	17	Monthly Daily Mean	13	14	11	19	22	19	18	20	24	14	14	11

\* Figures reported to the nearest whole number.

### Continuously Monitored Emissions to Air (mg/m3\*) from Emission Point A2 – 2016

<b>HCL</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 60</b>	Annual ½ Hrly Max	256	Monthly ½ Hrly Max	39	52	35	256	21	44	57	65	60	45	49	21
	Annual ½ Hrly Mean	7	Monthly ½ Hrly Mean	7	6	7	5	5	7	8	8	8	7	7	7
<b>Daily Ave ELV 10</b>	Annual Daily Max	16	Monthly Daily Max	9	9	9	10	8	10	14	16	10	9	9	9
	Annual Daily Mean	7	Monthly Daily Mean	7	6	7	5	5	7	8	8	8	7	7	7

<b>SO<sub>2</sub></b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 200</b>	Annual ½ Hrly Max	243	Monthly ½ Hrly Max	181	243	125	242	83	96	160	102	127	69	92	117
	Annual ½ Hrly Mean	28	Monthly ½ Hrly Mean	35	35	31	33	33	7	22	19	26	28	30	29
<b>Daily Ave ELV 50</b>	Annual Daily Max	51	Monthly Daily Max	41	42	34	40	39	51	29	40	34	33	32	33
	Annual Daily Mean	28	Monthly Daily Mean	35	35	31	33	33	7	22	29	26	28	30	29

<b>NO<sub>x</sub></b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 400</b>	Annual ½ Hrly Max	323	Monthly ½ Hrly Max	254	220	194	187	189	245	287	323	199	310	234	305
	Annual ½ Hrly Mean	179	Monthly ½ Hrly Mean	179	177	178	178	179	177	180	180	180	180	179	180
<b>Daily Ave ELV 200</b>	Annual Daily Max	218	Monthly Daily Max	186	186	180	179	180	180	185	218	197	194	181	184
	Annual Daily Mean	179	Monthly Daily Mean	179	177	178	178	179	177	180	180	180	180	179	180

<b>VOC</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 20</b>	Annual ½ Hrly Max	20	Monthly ½ Hrly Max	5	20	8	3	11	15	1	4	1	1	1	1
	Annual ½ Hrly Mean	0.5	Monthly ½ Hrly Mean	1	1	1	1	1	1	0	1	0	0	0	0
<b>Daily Ave ELV 10</b>	Annual Daily Max	2	Monthly Daily Max	1	2	1	1	1	2	1	2	1	0	0	0
	Annual Daily Mean	0.5	Monthly Daily Mean	1	1	1	1	1	1	0	1	0	0	0	0



<b>NH<sub>3</sub></b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av No ELV</b>	Annual ½ Hrly Max	19	Monthly ½ Hrly Max	12	5	2	2	2	19	10	14	16	16	14	10
	Annual ½ Hrly Mean	2	Monthly ½ Hrly Mean	1	0	0	0	0	2	1	2	3	3	4	3
<b>Daily Ave No ELV</b>	Annual Daily Max	11	Monthly Daily Max	3	1	0	0	0	11	3	7	8	6	5	5
	Annual Daily Mean	2	Monthly Daily Mean	1	0	0	0	0	2	1	2	3	3	4	3

<b>Particulates</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>½ Hourly Av ELV 30</b>	Annual ½ Hrly Max	36	Monthly ½ Hrly Max	11	5	1	3	1	24	23	7	36	5	6	22
	Annual ½ Hrly Mean	1	Monthly ½ Hrly Mean	1	1	1	1	1	1	2	1	1	1	1	1
<b>Daily Ave ELV 10</b>	Annual Daily Max	7	Monthly Daily Max	1	2	1	1	1	7	4	2	2	1	2	2
	Annual Daily Mean	1	Monthly Daily Mean	1	1	1	1	1	1	2	1	1	1	1	1

<b>CO</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>10 Min Av ELV 150</b>	Annual 10 min Max	319	Monthly 10 min max	130	319	112	152	270	242	319	142	199	128	184	191
	Annual 10 min Mean	12	Monthly 10 min mean	11	10	9	10	11	23	11	13	10	10	11	12
<b>Daily Ave ELV 50</b>	Annual Daily Max	64	Monthly Daily Max	18	25	28	23	37	64	24	24	18	18	25	15
	Annual Daily Mean	12	Monthly Daily Mean	11	10	9	10	11	23	11	13	10	10	11	12

\* Figures reported to the nearest whole number.