

**WOLVERHAMPTON ENERGY FROM WASTE PLANT**

PERMIT No AP3835SM

WASTE INCINERATION DIRECTIVE

ANNUAL REPORT

2008

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## **Annual performance report for MES Environmental Wolverhampton EfW Plant – Permit No. AP3835SM– Year 2008**

### **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>Wolverhampton EfW Facility</i>
<i>Permit Number</i>	<i>AP3835SM</i>
<i>Address</i>	<i>Crown Street, Wolverhampton W Midlands WV1 1QB</i>
<i>Phone</i>	<i>01902 458888</i>
<i>Contact name</i>	<i>Mr. J Burn</i>
<i>Position</i>	<i>Operations Manager</i>
<i>Further information, description of waste types burned and origin.</i>	<i>Constructed in 1998 to burn in the region of 110,000 tonnes per annum of local domestic refuse and generate a nominal 8MW of electricity for the local community.</i>
<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 J Burn on the above number)</i>	

**Table 1 – General information**

The plant provides a sustainable method of waste disposal and recovery, predominantly for the area within the administrative boundary of Wolverhampton Metropolitan Borough Council, with smaller quantities of wastes accepted, where capacity and demand exists, from other local authorities within the general vicinity of the plant.

Household, commercial or industrial wastes, collected by the local authorities, comprise almost all of the wastes delivered to the plant, at around 99.11% of all deliveries. In 2008 74.22% of wastes were from the Wolverhampton area with a further 24.89% from other local authorities, predominantly within the West Midlands. Only 0.89% 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 110,000 tonnes per year of municipal and other specified wastes.

The plant contains two incineration lines with a combined design capacity to process up to 14 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 8 MW of electricity and, after satisfying its own power needs, exports approximately 7.1 MW of electricity to the local electricity network. This assists in contributing to the Government's target of providing 10% of electricity generation from renewable energy sources by the year 2010.

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 2008 over 26000 tonnes of wastes were imported from the Sandwell, Walsall, South Staffordshire and Worcester areas which would otherwise have been disposed of by 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 deNO<sub>x</sub> 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, accredited to ISO14001 and a Quality Management System, accredited to ISO9001
- 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 AP3835SM) 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 (Variation Number HP3536XC) was issued on the 30<sup>th</sup> April 2008 and which amended the periodic emission limit values for particulate matter, hydrogen chloride, carbon monoxide, sulphur dioxide and oxides of nitrogen. The values in each case are now the same as the corresponding ½ hourly or 10 minute ELV's for continuous emission monitoring.

### **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 7 tonnes per hour.

Although this creates a technical capacity for around 120,000 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 110,000 tonnes of mixed municipal waste and 5,500 tonnes of separately collected fractions.

Separately collected fractions are generally wastes delivered by private sector customers with mixed municipal wastes comprising deliveries from local authorities. Total deliveries for 2008 are set out in Table 2 below.

## Annual waste throughputs

<b>Waste Types</b>	<b>EWC codes</b>	<b>Tonnes burnt</b>
<i>Mixed municipal wastes</i>	20.03.01	Stream 1 53814 Stream 2 52464 Total 106278
<i>Separately collected fractions</i>	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 953
<i>Total burnt – all types</i>		107231

**Table 2 - Incinerated Wastes 2008**

### 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. Other stoppages tend 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 generally relatively small jobs the time taken to complete is often extended whilst waiting for boilers to cool down before work can commence and then to bring back up to operating temperatures.

Routine planned maintenance in 2008 was a dual outage with both boilers offline simultaneously to enable works scheduled maintenance works to be carried on systems common to both boilers. Boiler 1 was off line for 13 days from the 15<sup>th</sup> to the 27<sup>th</sup> of June with Boiler 2 off for 19 days from the 4<sup>th</sup> to the 22<sup>nd</sup>.

However the overall level of plant availability, in terms of operating hours, was consistent with expectations with boiler 1 and boiler 2 available for 8214 and 8052 hours respectively. This was equivalent individually to 93.51% and 91.67% of potential operating hours or 92.59% overall. This was an improvement compared to 2007 where overall availability was 87.7%.

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 25% 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. Although bottom ash from the plant is not currently recycled MESE are currently actively investigating alternatives to landfill in conjunction with its local authority 'partners'

Table 3 shows the total quantities of the various residues produced in 2008.

Residue	Annual tonnage	Percentage of input waste	Disposal destination.
Bottom ash	22916	21.37%	Landfill
Fly ash	3211	2.99%	Reprocessing prior to landfill
Ferrous metals	894	0.83%	Recycling

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

## 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 8.5 Mj/kg.

In 2008 the average calorific value (CV) of wastes delivered over the year was 8.46Mj/Kg. This is marginally higher than the corresponding values of 8.26 and 8.23 Mj/kg in the preceding 2 years representing an increase of around 2.4%. This is most likely to be attributable to the expansion of local authority recycling schemes which are progressively removing greater quantities of material with little or no calorific value such as green 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 over 10,000 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. Typically, at design performance the plant exports 7 MWe from processing around 100,000 tonnes and falls well 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 quantities of power imported during the times when the plant or part of the plant is shutdown 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
144	52119	5828	46291

**Table 4 - Electrical power production 2008**

**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, 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. Further details of associated plant performance shown are also 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. During any water emission to external sewer there is a water sample taken and the sample sent to external laboratory for analysis. In 2008 the cumulative volume of water discharged to sewer was 14m<sup>3</sup>.

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 (CEM's) Operation

The CEM`s 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 CEM`s failure.

CEM's 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, as required, 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.

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 and reported periodically shown below in Table 6

Pollutant	ELV	Stream	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Cd/Th (mg/m <sup>3</sup> )	0.05 mg/m <sup>3</sup>	1	0.0023	0.0016	0.0023	0.0076
		2	0.0005	0.0025	0.0029	0.0025
		Overall Ave	0.0014	0.0021	0.0026	0.0051
Hg (mg/m <sup>3</sup> )	0.05 mg/m <sup>3</sup>	1	0.0026	0.0002	0.0021	0.0018
		2	0.0058	0.0001	0.0043	0.0001
		Overall Ave	0.0042	0.0002	0.0032	0.0010
Hf (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>	1	0.1	<0.2	<0.04	<0.04
		2	0.1	<0.1	<0.03	<0.05
		Overall Ave	0.1	<0.2	<0.04	<0.05
Group III Metals (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>	1	0.0895	0.3488	0.0751	0.2726
		2	0.1892	0.1735	0.0473	0.0459
		Overall Ave	0.1394	0.2612	0.0612	0.1593
Dioxins (ng/m <sup>3</sup> )	0.1 ng/m <sup>3</sup>	1	-	0.0283	-	0.0225
		2	-	0.0233	-	0.2525
		Overall Ave	-	0.0258	-	0.1375

**Table 6 Emissions of periodically monitored pollutants**

### **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 comparatively small and when expressed as a percentage of operating time within limits range from 0 to 0.06% depending upon the substance measured.

These are based on the numbers of 10 minute or ½ hourly average readings taken by emissions monitoring instruments and, in reality, although each complete 10 minute or ½ hour period has been considered in this evaluation, the duration during which any limit was exceeded is usually for a much shorter time.

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.

In 2008 there were 12 occasions of abnormal operation (see Table 8) comprising 9 on stream 1 and 3 on stream 2.

Table 7 below sets out the percentage of time that the plant was operating within its permitted limits, for each continuously monitored parameter and 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 85% and 58% 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	99.98%	99.99%	99.99%
Sulphur Dioxide	99.99%	100%	99.99%
Oxides of Nitrogen	100%	100%	100%
Volatile Organic Carbon	100%	100%	100%
Particulates	99.94%	99.99%	99.97%
Carbon Monoxide	100%	99.98%	99.99%

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

A summary of all emissions anomalies for 2008 is given below

### *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 2008 there is currently only 1 occasion where a 'Schedule 1' unauthorised release was reported and is shown in Table 8 below.

Initial periodic test results for Dioxins, in Quarter 4, do however indicate that emission limits on stream 2 are in excess of the ELV of 0.1ng/m<sup>3</sup>. These results however conflict with historical levels which are much lower and arrangements have therefore been made for re-tests to be carried out.

<b>Date</b>	<b>Time</b>	<b>Substance / Location</b>	<b>Anomaly</b>
4 June	Various times throughout the day	CO Boiler 2	<95% of readings (94.4%) were within 10 minute average ELV. High readings were caused by fluctuating combustion conditions and extreme variations in waste quality.

**Table 8 – Unauthorised Releases 2008**

### *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 general policy to initiate the shut down process after only ½ hour of any abnormal operation, unless it is clear that the problem can be resolved well within the 4 hour period. Whilst this does not necessarily affect the level of incidence of abnormal operation it significantly reduces the number of operating hours in this situation.

Table 9 identifies the situations in which abnormal operating conditions were applied in 2008.

<b>Date</b>	<b>Time</b>	<b>Substance / Location</b>	<b>Anomaly</b>
4 January	12.00 – 12.59	HCl Boiler 1	Lime turbine failure – new turbine fitted
13 January	03.00 – 03.29	HCl Boiler 2	Lime turbine failure – new turbine fitted
14 February	09.00 – 09.29	SO2 Boiler 1	Large clinker fell from furnace wall onto fuel bed causing disruption to normal combustion – Clinker broke up and passed out of combustion zone
15 March	13.00- 14.29	Particulates Boiler 1	Blockage in bag-house cell – blockage cleared
8 May	09.30 – 09.59	Particulates Boiler 1	Dust surge when lime scrubber tower blockage cleared – dust content subsided over time
14 May	14.30- 14.59	HCl Boiler 1	Lime turbine failure – new turbine fitted
31 August	13.30- 13.59	Particulates Boiler 2	Increased dust readings when checking bag house cells for damaged filter socks
23 October	17.00- 17.29	Particulates Boiler 1	Increased dust readings during clearance of a large blockage in the scrubber tower
12 November	12.00 – 12.29 14.00 - 14.29	Particulates Boiler 1	Increased dust readings when changing filters in the bag house
13 November	12.00 - 12.59	Particulates Boiler 1	Increased dust readings when changing filters in the bag house
19 November	13.30 – 13.59	Particulates Boiler 2	Increased dust readings when changing filters in the bag house

**Table 9 – Abnormal Operations 2008**

*Non reportable incidents*

In addition to unauthorised releases and abnormal operations there are also situations where incidents will occur that are not required to be reported to the Environment Agency if these either result in no emission being made to atmosphere or occur during start up or shut down mode.

There were 17 such occasions in 2008 the majority of which related to VOC ‘spikes’ during change over of the calibration gas bottle (11) or poor reference samples (2) occurring at various intervals throughout the year. There were also 3 occasions where spurious readings were recorded for CO, NOx and HCl in March on stream 2

and 1 for particulates in September despite the fact that boilers were offline at the time

All of these incidents were recorded on the daily shift log.

#### *Enforcement Notices*

No enforcement notices were issued by the Environment Agency in respect of any aspect of plant operations in 2008.

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

Other than works carried out during the major outage in April and ongoing routine maintenance work no specific plant improvements have been carried out during 2008.

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 Stoke.

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 their facilities by interested groups. Last year numerous schools, colleges and industry or environmental groups visited sites and the same will happen this year.

For information about the facility or to arrange a visit, please contact the Operations Manager Mr. J Burn on 01902 458888

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

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

Mr. P Wright  
Senior Policy Manager  
MES Environmental  
Crown Street  
Wolverhampton  
WV1 1QB

## **Appendices**

**Appendix 1 Performance Reports 2008**

**Permit Reference Number: AP3835SM**  
 Installation; Wolverhampton Waste Services Limited

**Operator : MES Environmental Limited**  
 Form Number : Agency Form / AP3835SM / R1

**Reporting of Waste Disposal and Recovery for the year .....2008.....**

<b>Waste Description</b>	<b>Disposal Route</b>	<b>Tonnes</b>	<b>Recovery Tonnes</b>
<b>1) Hazardous Wastes</b>			
<b>Named haz. Waste (Specify each separately)</b>	<b>Reprocess Fly ash (APC)</b>	<b>3211</b>	<b>0</b>
<b>Other hazardous wastes</b>			
<b>Total hazardous waste</b>		<b>3211</b>	<b>0</b>
<b>2) Non-Hazardous Wastes</b>			
<b>Named non-haz. Waste (Specify each separately)</b>	<b>Landfill IBA</b>	<b>22916</b>	<b>0</b>
<b>Other non-hazardous wastes</b>	<b>Recycling (Fe)</b>	<b>894</b>	<b>894</b>
<b>Total non-hazardous waste</b>		<b>23810</b>	<b>894</b>
<b>TOTAL WASTE</b>	<b>-</b>	<b>27021</b>	<b>894</b>

<b>Trends in Waste Disposal and Recovery</b>			
<b>Year</b>	<b>Parameter</b>	<b>Total Waste</b>	<b>Waste per unit output</b>
<b>2007</b>			
	<b>APC</b>	<b>3347</b>	<b>0.076T/MWh</b>
		<b>3347</b>	<b>0.076T/MWh</b>
	<b>IBA</b>	<b>21906</b>	<b>0.497T/MWh</b>
	<b>Fe</b>	<b>1297</b>	<b>0.029T/MWh</b>
		<b>23203</b>	<b>0.526T/MWh</b>
		<b>26550</b>	<b>0.602T/MWh</b>

**Operator's comments :Waste per unit output above expressed in terms of nett exported energy of 44093 MWh in 2007.  
If expressed in terms of gross energy production of 48902MWh figures are adjusted to 0.068, 0.448 & 0.027T/MWh for  
APCR, IBA and recycled tins respectively. (0.543T/MWh overall)**

**Signed .....**

**Date.....**

**(authorised to sign as representative of Operator)**



Permit Reference Number: AP3835SM

Operator : MES Environmental Limited

Installation; Wolverhampton Waste Services Limited

Form Number : Agency Form AP3835SM / WU1

**Reporting of Water Usage for the year .....2008.....**

Water Source	Usage (m <sup>3</sup> )	Specific Usage (m <sup>3</sup> /t)
Mains water	48976	0.457m3/t
Site borehole		
River abstraction		
Canal abstraction		
TOTAL WATER USAGE	48976	0.457m3/t

Trends in Water Usage			
Year	Parameter	Total Water usage	Water per unit output
2007	Mains supply	53924	1.22m3/MWh
	Canal		
		53924	1.22m3/MWh

Operator's comments : Water per unit output above expressed in terms of nett exported energy of 44093 MWh in 2007.

If expressed in terms of gross energy production of 48902MWh figures are adjusted to 1.10m3/MWh

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

Date.....

Permit Reference Number: AP3835SM

Operator : MES Environmental Limited

Installation; Wolverhampton Waste Services Limited

Form Number : Agency Form / AP3835SM / E1

Reporting of Energy Usage for the year .....2008.....

Energy Source	Energy Usage		CO <sub>2</sub> Produced (tonnes)
	Quantity	Primary Energy (MWh)	
Electricity	MWh	5972	2568
Natural Gas	tonnes	N/A	
Gas Oil	tonnes	64.34	236
Recovered Fuel Oil	tonnes	N/A	
<b>TOTAL</b>	-		<b>2804</b>

Trends in Energy Usage			
Year	Parameter	CO <sub>2</sub> Produced (tonnes)	CO <sub>2</sub> per unit output
2007	Primary Energy usage	4205	0.095T/MWh
		287	0.007T/MWh
		4492	0.102T/MWh

Operator's comments : CO<sub>2</sub> per unit output above expressed in terms of nett exported energy of 44093 MWh in 2007.

If expressed in terms of gross energy production of 48902 MWh figures are adjusted to 0.086 and 0.006T/MWh for electricity and gas oil consumption respectively. (0.092T/MWh overall)

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

Date.....

Permit Reference Number: AP3835SM

Operator : MES Environmental Limited

Installation; Wolverhampton Waste Services Limited

Form Number : Agency Form / AP3835SM/ PI1

**Reporting of Performance Indicators for the period ...01/01/2008..... to ...31/12/2008.....**

<b>Annual Production/Treatment</b>	
Total municipal waste incinerated (excluding separately collected fractions)	106278 tonnes
Total other wastes Incinerated	953 tonnes
Electrical energy generated and exported	46291 MWhrs
Electrical energy generated and used on installation	5828 MWhrs

**Environmental Performance Indicators**

<b>Parameter</b>	<b>Quarterly Average</b>	<b>Units</b>
Electrical energy imported to site	<b>1.34</b>	kWhrs/ tonne of waste incinerated (dry basis)
Fuel oil consumption	<b>0.60</b>	kg/ tonne of waste incinerated (dry basis)
Mass of bottom ash produced	<b>213.71</b>	kg/ tonne of waste incinerated (dry basis)

<b>Trends in Environmental Performance</b>		
<b>Year</b>	<b>Parameter</b>	
<b>2007</b>	Electrical energy imported to site	<b>47.63</b> Kwhrs / tonne waste incinerated
	Fuel oil consumption	<b>0.75</b> kg / tonne waste incinerated
	Mass of bottom ash produced	<b>209.92</b> kg / tonne of waste incinerated

Parameter	Quarterly	Units
Mass of APC residues produced	<b>29.94</b>	kg/ tonne of waste incinerated (dry basis)
Mass of other solid residues produced	<b>8.34</b>	kg/ tonne of waste incinerated (dry basis)
Urea consumption	<b>2.42</b>	kg/ tonne of waste incinerated (dry basis)
Activated carbon consumption	<b>0.08</b>	kg/ tonne of waste incinerated (dry basis)
Lime consumption	<b>9.55</b>	kg/ tonne of waste incinerated (dry basis)
Water consumption	<b>0.457</b>	m <sup>3</sup> / tonne of waste incinerated (dry basis)

Trends in Environmental Performance		
<b>2007</b>	Mass of APC residues produced	<b>32.07</b> kg / tonne of waste incinerated
	Mass of other solid residues produced	<b>12.43</b> kg / tonne of waste incinerated
	Urea consumption	<b>3.33</b> kg / tonne of waste incinerated
	Activated carbon consumption	<b>0.21</b> kg / tonne of waste incinerated
	Lime consumption	<b>10.88</b> kg / tonne of waste incinerated
	Water consumption	<b>0.517</b> m <sup>3</sup> / tonne of waste incinerated

**Operator's comments :**

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

Date.....

## APPENDIX 2

### Continuously Monitored Emissions to Air (mg/m<sup>3</sup>\*) from Emission Point A1 – 2008

<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	116	Monthly ½ Hrly Max	86	32	51	42	116	54	14	40	43	41	57
Annual ½ Hrly Mean		4	Monthly ½ Hrly Mean	5	4	5	4	5	5	2	4	4	5	5	5
<b>Daily Ave ELV 10</b>	Annual Daily Max	9	Monthly Daily Max	8	8	8	7	8	9	5	9	7	8	9	7
	Annual Daily Mean	5	Monthly Daily Mean	5	4	6	4	6	5	2	4	4	5	5	5

<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	255	Monthly ½ Hrly Max	81	255	77	122	97	75	104	122	58	128	93
Annual ½ Hrly Mean		12	Monthly ½ Hrly Mean	14	13	14	11	11	11	7	12	10	13	13	12
<b>Daily Ave ELV 50</b>	Annual Daily Max	20	Monthly Daily Max	19	18	20	17	14	16	10	19	14	19	19	20
	Annual Daily Mean	12	Monthly Daily Mean	14	14	14	11	11	11	7	12	10	13	13	13

<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	325	Monthly ½ Hrly Max	253	279	281	262	240	239	300	295	295	325	293
Annual ½ Hrly Mean		168	Monthly ½ Hrly Mean	141	161	161	161	162	163	163	177	186	186	185	174
<b>Daily Ave ELV 200</b>	Annual Daily Max	195	Monthly Daily Max	170	171	171	190	192	193	172	189	194	195	192	180
	Annual Daily Mean	168	Monthly Daily Mean	141	161	161	161	162	163	163	177	186	186	185	174

<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	37	Monthly ½ Hrly Max	22	6	23	15	26	15	37	20	13	20	36
Annual ½ Hrly Mean		2	Monthly ½ Hrly Mean	1	1	1	3	3	1	0	2	3	1	1	2
<b>Daily Ave ELV 10</b>	Annual Daily Max	6	Monthly Daily Max	2	2	5	6	6	2	1	5	5	4	4	4
	Annual Daily Mean	2	Monthly Daily Mean	1	1	1	3	3	1	0	2	3	1	1	2

<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	38	Monthly ½ Hrly Max	27	38	14	14	12	14	13	4	7	7	11
Annual ½ Hrly Mean		2	Monthly ½ Hrly Mean	3	2	2	1	2	3	2	1	1	1	1	1
<b>Daily Ave No ELV</b>	Annual Daily Max	7	Monthly Daily Max	5	5	3	3	7	6	3	1	2	2	2	1
	Annual Daily Mean	2	Monthly Daily Mean	3	2	2	1	2	4	2	1	1	1	1	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	64	Monthly ½ Hrly Max	28	18	64	19	31	18	30	18	18	33	41
Annual ½ Hrly Mean		4	Monthly ½ Hrly Mean	4	3	2	1	5	5	5	4	5	5	6	5
<b>Daily Ave ELV 10</b>	Annual Daily Max	9	Monthly Daily Max	7	8	4	5	9	8	9	7	8	9	9	7
	Annual Daily Mean	4	Monthly Daily Mean	4	3	2	1	5	4	5	4	5	5	6	5

<b>CO</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	<b>10 minute Av ELV 150</b>	Annual 10 min Max	71	Monthly 10 min Max	43	70	51	70	69	36	19	55	46	47	71
Annual 10 min Mean		17	Monthly 10 min Mean	17	19	16	23	26	15	8	14	21	17	14	12
<b>Daily Ave ELV 50</b>	Annual Daily Max	47	Monthly Daily Max	29	39	27	47	47	23	16	32	32	36	29	20
	Annual Daily Mean	17	Monthly Daily Mean	17	19	16	23	26	15	8	14	21	17	14	12

\* Figures reported to the nearest whole number.

**Continuously Monitored Emissions to Air (mg/m<sup>3</sup>\*) from Emission Point A2 – 2008**

<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	155	Monthly ½ Hrly Max	155	19	74	59	52	31	30	19	36	39	39	38
	Annual ½ Hrly Mean	4	Monthly ½ Hrly Mean	4	4	5	4	5	6	4	4	4	4	5	5
<b>Daily Ave ELV 10</b>	Annual Daily Max	10	Monthly Daily Max	9	6	7	7	8	8	6	6	7	10	8	7
	Annual Daily Mean	4	Monthly Daily Mean	4	4	4	4	4	6	4	4	4	4	5	5

<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	131	Monthly ½ Hrly Max	110	92	93	101	109	131	119	72	74	94	109	118
	Annual ½ Hrly Mean	11	Monthly ½ Hrly Mean	14	17	17	13	9	10	12	10	8	9	9	9
<b>Daily Ave ELV 50</b>	Annual Daily Max	25	Monthly Daily Max	18	25	24	19	16	16	18	15	14	17	14	14
	Annual Daily Mean	11	Monthly Daily Mean	14	17	17	13	9	9	12	9	8	9	9	9

<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	455	Monthly ½ Hrly Max	302	336	455	308	288	222	327	306	325	306	315	293
	Annual ½ Hrly Mean	170	Monthly ½ Hrly Mean	146	159	172	165	164	154	167	178	186	185	184	177
<b>Daily Ave ELV 200</b>	Annual Daily Max	192	Monthly Daily Max	177	183	174	192	181	182	181	190	190	187	189	182
	Annual Daily Mean	170	Monthly Daily Mean	146	159	163	166	164	161	167	178	186	185	184	177

<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	39	Monthly ½ Hrly Max	14	7	39	7	21	11	13	21	20	11	28	21
	Annual ½ Hrly Mean	2	Monthly ½ Hrly Mean	2	1	2	1	2	2	3	4	3	2	5	3
<b>Daily Ave ELV 10</b>	Annual Daily Max	8	Monthly Daily Max	4	3	2	3	4	4	5	7	8	5	8	5
	Annual Daily Mean	2	Monthly Daily Mean	2	1	1	1	2	2	3	4	3	2	5	2

<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	69	Monthly ½ Hrly Max	37	7	69	6	4	10	13	12	13	6	11
Annual ½ Hrly Mean		1	Monthly ½ Hrly Mean	2	1	4	1	1	1	2	1	1	1	0	0
<b>Daily Ave No ELV</b>	Annual Daily Max	6	Monthly Daily Max	5	3	3	1	1	2	6	3	2	2	2	1
	Annual Daily Mean	1	Monthly Daily Mean	2	1	1	1	1	1	2	1	1	1	0	0

<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	42	Monthly ½ Hrly Max	6	12	15	20	22	16	26	42	32	20	33
Annual ½ Hrly Mean		4	Monthly ½ Hrly Mean	1	3	2	2	6	4	4	5	5	4	5	3
<b>Daily Ave ELV 10</b>	Annual Daily Max	9	Monthly Daily Max	2	6	6	7	9	8	9	7	8	6	9	7
	Annual Daily Mean	4	Monthly Daily Mean	2	3	2	2	5	4	4	5	5	4	5	3

<b>CO</b>	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	<b>10 Minute Av ELV 150</b>	Annual 10 min Max	436	Monthly 10 min Max	71	47	78	81	67	436	65	63	94	63	76
Annual 10 min Mean		24	Monthly 10 min Mean	29	22	24	21	24	22	21	25	31	20	31	19
<b>Daily Ave ELV 50</b>	Annual Daily Max	45	Monthly Daily Max	45	36	33	43	39	29	43	39	42	43	41	42
	Annual Daily Mean	24	Monthly Daily Mean	29	22	24	21	24	18	21	25	30	20	31	18

\* Figures reported to the nearest whole number.