WOLVERHAMPTON ENERGY FROM WASTE PLANT

PERMIT No AP3835SM

WASTE INCINERATION DIRECTIVE

ANNUAL REPORT

2010

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Annual performance report for MES Environmental Wolverhampton EfW Plant – Permit No. AP3835SM– Year 2010

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:

Name of Company	*M E S Environmental*
Name of Plant	*Wolverhampton EfW Facility*
Permit Number	*AP3835SM*
Address	*Crown Street, Wolverhampton W Midlands WV1 1QB*
Phone	*01902 458888*
Contact name	*Mr. M Wheeler*
Position	*Operations Manager*
Further information, description of waste types burned and origin.	*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.*
(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 M Wheeler on the above number)	

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 99.3% of all deliveries. In 2010 69.7 % of wastes were from the Wolverhampton area with a further 29.6 % from other local authorities, predominantly within the West Midlands. Only 0.7% 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 2010 over 32,192 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 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, accredited to IS014001 and a Quality Management System, accredited to IS09001
- 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 30th 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, of this 5% or 5,500 tonnes is allowed to be of separately collected fractions.

Separately collected fractions are generally wastes delivered by private sector (0.7% for 2010) customers with mixed municipal wastes comprising deliveries from local authorities.
Total deliveries for 2010 are set out in Table 2 below.

Annual waste throughputs

Waste Types	***EWC codes***	***Tonnes burnt***
Mixed municipal wastes	*20.03.01*	Stream 1 55140 Stream 2 52917 Total 108057
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 760
Total burnt – all types		108817

Table 2 - Incinerated Wastes 2010

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 2010 was a staggered outage with a common period of 8 days to enable work to be carried out on shared common systems and the turbine. Boiler 1 was off line for 15 days from the 08th to the 22nd of May with Boiler 2 off for 14 days from the 3rd to the 16th of May. The idea behind staggering the outage is to reduce the amount of diverted waste which may end up in landfill.

However the overall level of plant availability, in terms of operating hours, was consistent with expectations with boiler 1 and boiler 2 available for 7977 and 7966 hours respectively. This was equivalent individually to 91.06% and 90.94% of potential operating hours or 91% overall. This was slightly lower compared to 2009 and is attributed to additional short time shutdowns caused by air fans blocking with fluff type material from one of the waste streams, the source of the material was identified and is no longer allowed on site.

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 2010.

Residue	Annual tonnage	Percentage of input waste	Disposal destination.
Bottom ash	23214	21.33%	Landfill
Fly ash	3411	3.13%	Reprocessing prior to landfill
Ferrous metals	829	0.76%	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 2010 the average calorific value (CV) of wastes delivered over the year was 8.2 Mj/Kg. This is comparable with previous years (2009 8.28Mj/Kg)

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_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. 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.

Electrical power production (in MW/hrs) 1 MW/hr = 10,000 X 100 watt light bulbs powered for 1 hour			
Imported	Production	Site use	Exported
178.8	52641	8585	44056

Table 4 - Electrical power production 2010

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.

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. During any water emission to external sewer there is a water sample taken and the sample sent to external laboratory for analysis. In 2010 the cumulative volume of water discharged to sewer was 3m3.

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 Monitors (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, as required, and compared with corresponding emission limit values as 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. (Wolverhampton plant submits these reports monthly).

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. The requirement for Dioxin sampling is for two samples a year, the quarter 3 Dioxin sample was deemed unrepresentative due to a poor waste stream and therefore a retest was undertaken and is reported in quarter 4.

Pollutant	ELV	Stream	*Qtr 1*	*Qtr 2*	*Qtr 3*	*Qtr 4*
Cd/Th (mg/m³)	0.05 mg/m3	1	0.0013	0.0024	0.0033	0.0678
		2	0.0011	0.0020	0.0055	0.0002
		Overall Ave	0.0012	0.0022	0.0044	0.034
Hg (mg/m³)	0.05 mg/m3	1	0.0212	0.0021	0.0185	0.0255
		2	0.334	0.0020	0.0199	0.034
		Overall Ave	0.1776	0.0020	0.0192	0.01445
Hf (mg/m³)	2 mg/m3	1	<0.05	<0.05	0.06	<0.03
		2	<0.04	<0.07	0.08	<0.03
		Overall Ave	0.045	0.06	0.07	<0.03
Group III Metals (mg/m³)	0.5 mg/m3	1	0.2267	0..0490	0.0668	0.0678
		2	0.1073	0.0336	0.2470	0.1334
		Overall Ave	0.167	0.0413	0.1569	0.1006
Dioxins (ng/m³)	0.1 ng/m3	1	0.26	0.0507	-	0.0317
		2	1.63	0.0346	-	0.0388
		Overall Ave	0.945	0.0426	-	0.0352

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 equates to 0.04% for the year of 2010.

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 2010 there were 5 occasions of abnormal operation (see Table 9) comprising of 3 on stream 1 and 2 on stream 2. (1.5 hrs per stream)

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_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 86% and 64% 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	99.98%	99.98%	99.98%
Sulphur Dioxide	100%	100%	100%
Oxides of Nitrogen	100%	100%	100%
Volatile Organic Carbon	99.97%	99.99%	99.98%
Particulates	100%	100%	100%
Carbon Monoxide	100%	100%	100%

Table 7 - Percentage of plant operating time within limits

A summary of all emissions anomalies for 2010 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 2010 there were 6 occasions where a 'Schedule 1' unauthorised release was reported and is shown in Table 8 below.

Date	Time	Substance / Location	Anomaly
18/01/10	20:30 – 21:29	VOC stream 2	Wet waste
19/01/10	10:26 – 16:36	PCDDs / PCDFs	Extractive test, retest undertaken. Retest O.K
21/01/10	11:21 – 17:25	PCDDs / PCDFs	Extractive test, retest undertaken. Retest O.K
19/07/10	12:30 – 12:59	VOC stream 1	Large clinker on fuel bed.
28/08/10	07:30 – 08:29	VOC stream 1	Poor quality waste
08/09/10	02:00 – 02:59	VOC stream 1	Wet waste

Table 8 – Unauthorised Releases 2010

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 2010.

Date	Time	Substance / Location	Anomaly
08/01/10	09:00 – 09:29	HCl stream 2	Lime turbine failure – new turbine fitted
13/04/10	12:30 – 12:59	HCl stream 1	Lime turbine failure – new turbine fitted
23/04/10	10:30 – 10:59	HCl stream 1	Lime turbine failure – new turbine fitted
18/08/10	03:30 – 04:29	HCl stream 2	Lime pump failure
18/08/10	05:00 – 05:29	HCl stream 1	Lime pipe collapsed internally

Table 9 – Abnormal Operations 2009

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 no such occasions during 2010.

All of incidents are 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 2010.

6. Summary of plant improvements:

Other than works carried out during the major outage in June and ongoing routine maintenance work, the one major area of plant improvement for 2010 was the continuation of upgrades to the Lime abatement system. To help insure that the system is as effective as possible and that no abnormal operations or schedule 1 situations occur, a dual preparation tank was installed and a dual back up system is being developed. Commissioning of the system is due within the next 12 months. The implementation of the computerised maintenance system, COSWIN, is nearing completion and although in daily use still needs further populating and improving to full fill all of the plants needs.

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 Dudley 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. M Wheeler 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:

Stuart Thompson
Environmental Manager
MES Environmental
Crown Street
Wolverhampton
WV1 1QB

Appendices

Appendix 1 Performance Reports 2010

Permit Reference Number: AP3835SM **Operator : MES Environmental Limited**
Installation; Wolverhampton Waste Services Limited Form Number : Agency Form / AP3835SM / R1

Reporting of Waste Disposal and Recovery for the year ……2010……

Waste Description	Disposal Route	Tonnes	Recovery Tonnes
1) Hazardous Wastes			
Named haz. Waste (Specify each separately)	Reprocess Fly ash (APC)	3411	0
Other hazardous wastes			
Total hazardous waste		3411	0
2) Non-Hazardous Wastes			
Named non-haz. Waste (Specify each separately)	Landfill IBA	23214	0
Other non-hazardous wastes	Recycling (Fe)	829	829
Total non-hazardous waste		24043	829
TOTAL WASTE	-	27454	829

Trends in Waste Disposal and Recovery Year	Parameter		
	Named Waste	Total Waste	Waste per unit output
2009			
	APC	3378	0.073T/MWh
		3378	0.073T/MWh
	IBA	23986	0.521T/MWh
	Fe	1216	0.026T/MWh
		25202	0.547T/MWh
		28580	0.62T/MWh

Operator's comments :Waste per unit output above expressed in terms of nett exported energy of 46,039MWh in 2009.

If expressed in terms of gross energy production of 54,405MWh figures are adjusted to 0.062, 0.44 & 0.022T/MWh for APCR, IBA and recycled tins respectively. (0.524T/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 ……2010……

Water Source	Usage (m^3)	Specific Usage (m^3/t)
Mains water	49030	0.450m3/t
Site borehole		
River abstraction		
Canal abstraction		
TOTAL WATER USAGE	49030	0.450m3/t

Trends in Water Usage Year	Parameter		
	Named Water source	Total Water usage	Water per unit output
2009	Mains supply	46060	1.0m3/MWh
	Canal		
		46060	1.0m3/MWh

Operator's comments : Water per unit output above expressed in terms of nett exported energy of 46039 MWh in 2009.

If expressed in terms of gross energy production of 54405MWh figures are adjusted to 0.85m3/MWh

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 / E1

Reporting of Energy Usage for the year ……2010……

Energy Source	Energy Usage Quantity	Primary Energy (MWh)	CO_2 Produced (tonnes)
Electricity	MWh	8764	3769
Natural Gas	tonnes	N/A	
Gas Oil	tonnes	95.13	350
Recovered Fuel Oil	tonnes	N/A	
TOTAL	-		4119

Trends in Energy Usage Year	Parameter		
	Primary Energy usage	CO_2 Produced (tonnes)	CO_2 per unit output
2009			
	8474	3881	0.084T/MWh
	64.71	238	0.005T/MWh
		4119	0.089T/MWh

Operator's comments : CO_2 per unit output above expressed in terms of nett exported energy of 46039MWh in 2009.

If expressed in terms of gross energy production of 54405 MWh figures are adjusted to 0.071 and 0.004T/MWh for electricity and gas oil consumption respectively. (0.075T/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/ PI1

Reporting of Performance Indicators for the period …01/01/2010..… to …31/12/2010…….

Annual Production/Treatment	
Total municipal waste incinerated (excluding separately collected fractions)	108057tonnes
Total other wastes Incinerated	760 tonnes
Electrical energy generated and exported	44056 MWhrs
Electrical energy generated and used on installation	8585 MWhrs

Environmental Performance Indicators

Parameter	Quarterly Average	Units
Electrical energy imported to site	**1.64**	kWhrs/ tonne of waste incinerated (dry basis)
Fuel oil consumption	**0.87**	kg/ tonne of waste incinerated (dry basis)
Mass of bottom ash produced	**213.33**	kg/ tonne of waste incinerated (dry basis)

Trends in Environmental Performance Year	Parameter	
2009	Electrical energy imported to site	**1.34** Kwhrs / tonne waste incinerated
	Fuel oil consumption	**0.59** kg / tonne waste incinerated
	Mass of bottom ash produced	**218.07** kg / tonne of waste incinerated

Mass of APC residues produced	**31.35**	kg/ tonne of waste incinerated (dry basis)
Mass of other solid residues produced	**7.62**	kg/ tonne of waste incinerated (dry basis)
Urea consumption	**2.0**	kg/ tonne of waste incinerated (dry basis)
Activated carbon consumption	**0.036**	kg/ tonne of waste incinerated (dry basis)
Lime consumption	**8.81**	kg/ tonne of waste incinerated (dry basis)
Water consumption	**0.45**	m^3/ tonne of waste incinerated (dry basis)

Trends in Environmental Performance		
2009	Mass of APC residues produced	**30.71** kg / tonne of waste incinerated
	Mass of other solid residues produced	**11.06** kg / tonne of waste incinerated
	Urea consumption	**2.29** kg / tonne of waste incinerated
	Activated carbon consumption	**0.08** kg / tonne of waste incinerated
	Lime consumption	**9.25** kg / tonne of waste incinerated
	Water consumption	**0.419** m3 / tonne of waste incinerated

Operator's comments :

Signed …… **Date……..**

(authorised to sign as representative of Operator)

APPENDIX 2

Continuously Monitored Emissions to Air (mg/m3*) from Emission Point A1 – 2010

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	91	Monthly ½ Hrly Max	49	33	32	91	41	41	39	61	34	19	45	28
	Annual ½ Hrly Mean	4	Monthly ½ Hrly Mean	4	5	4	4	3	4	3	4	5	4	4	4
Daily Ave ELV 10	Annual Daily Max	7	Monthly Daily Max	7	6	7	5	5	6	5	7	6	6	7	7
	Annual Daily Mean	4	Monthly Daily Mean	4	5	4	4	3	4	3	4	5	4	4	4

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	152	Monthly ½ Hrly Max	64	152	73	67	78	87	99	79	59	118	94	79
	Annual ½ Hrly Mean	10	Monthly ½ Hrly Mean	7	14	12	8	10	9	6	6	6	13	14	12
Daily Ave ELV 50	Annual Daily Max	23	Monthly Daily Max	12	19	16	16	17	18	9	10	9	21	23	18
	Annual Daily Mean	10	Monthly Daily Mean	7	14	12	8	10	9	6	6	6	13	14	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	309	Monthly ½ Hrly Max	307	295	286	254	207	263	277	270	256	260	284	309
	Annual ½ Hrly Mean	179	Monthly ½ Hrly Mean	183	180	180	179	174	179	182	183	183	179	180	171
Daily Ave ELV 200	Annual Daily Max	197	Monthly Daily Max	197	193	183	185	181	184	189	190	191	182	184	190
	Annual Daily Mean	179	Monthly Daily Mean	183	180	180	179	174	179	182	183	183	179	180	171

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	58	Monthly ½ Hrly Max	35	10	8	21	21	14	26	58	30	22	12	20
	Annual ½ Hrly Mean	2	Monthly ½ Hrly Mean	1	1	2	2	1	1	2	4	3	5	1	3
Daily Ave ELV 10	Annual Daily Max	8	Monthly Daily Max	1	3	4	4	6	2	4	7	8	8	2	5
	Annual Daily Mean	2	Monthly Daily Mean	1	1	2	2	1	1	2	4	3	5	1	3

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	53	Monthly ½ Hrly Max	53	21	4	3	9	20	14	12	16	8	6	26
	Annual ½ Hrly Mean	1	Monthly ½ Hrly Mean	1	1	1	1	1	1	1	1	1	2	1	2
Daily Ave No ELV	Annual Daily Max	5	Monthly Daily Max	5	2	1	1	2	2	1	1	2	3	2	4
	Annual Daily Mean	1	Monthly Daily Mean	1	1	1	1	1	1	1	1	1	2	1	2

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	30	Monthly ½ Hrly Max	24	10	13	20	30	3	2	2	3	11	3	9
	Annual ½ Hrly Mean	2	Monthly ½ Hrly Mean	5	3	4	6	3	1	1	1	1	1	1	1
Daily Ave ELV 10	Annual Daily Max	8	Monthly Daily Max	8	5	8	8	7	2	1	1	1	1	1	1
	Annual Daily Mean	2	Monthly Daily Mean	5	3	4	6	3	1	1	1	1	1	1	1

CO	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10 minute Av ELV 150	Annual 10 min Max	1111	Monthly 10 min Max	33	32	1111	46	62	51	53	53	89	86	36	82
	Annual 10 min Mean	18	Monthly 10 min Mean	13	13	24	15	16	13	15	18	20	31	12	23
Daily Ave ELV 50	Annual Daily Max	50	Monthly Daily Max	20	22	25	28	29	24	36	32	37	50	18	35
	Annual Daily Mean	18	Monthly Daily Mean	13	13	24	15	16	13	15	18	20	31	12	23

* Figures reported to the nearest whole number.

Continuously Monitored Emissions to Air (mg/m3*) from Emission Point A2 – 2010

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	97	Monthly ½ Hrly Max	62	34	42	22	20	37	28	97	28	42	40	29
	Annual ½ Hrly Mean	4	Monthly ½ Hrly Mean	4	4	3	3	4	4	3	4	4	4	4	4
Daily Ave ELV 10	Annual Daily Max	9	Monthly Daily Max	7	5	4	6	6	7	5	9	6	7	7	7
	Annual Daily Mean	4	Monthly Daily Mean	4	4	3	3	4	4	3	4	4	4	4	4

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	167	Monthly ½ Hrly Max	73	93	145	45	167	125	62	86	96	59	91	40
	Annual ½ Hrly Mean	8	Monthly ½ Hrly Mean	6	8	5	4	11	7	6	7	6	10	17	13
Daily Ave ELV 50	Annual Daily Max	27	Monthly Daily Max	10	12	8	8	16	16	11	10	10	16	25	27
	Annual Daily Mean	8	Monthly Daily Mean	6	8	5	4	11	7	6	7	6	10	17	13

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	322	Monthly ½ Hrly Max	313	231	280	298	272	312	306	317	322	290	321	295
	Annual ½ Hrly Mean	176	Monthly ½ Hrly Mean	177	165	168	171	169	178	179	181	186	182	183	178
Daily Ave ELV 200	Annual Daily Max	196	Monthly Daily Max	192	177	179	181	184	191	185	185	186	192	195	196
	Annual Daily Mean	176	Monthly Daily Mean	177	165	168	171	169	178	179	181	186	182	183	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	40	Monthly ½ Hrly Max	40	22	39	11	13	23	13	28	16	15	17	34
	Annual ½ Hrly Mean	2	Monthly ½ Hrly Mean	6	5	0	0	1	2	1	1	3	3	4	3
Daily Ave ELV 10	Annual Daily Max	8	Monthly Daily Max	8	7	1	1	3	3	2	3	5	6	7	7
	Annual Daily Mean	2	Monthly Daily Mean	6	5	0	0	1	2	1	1	3	3	4	3

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	53	Monthly ½ Hrly Max	19	12	9	12	10	53	11	16	20	51	11	13
No ELV	Annual ½ Hrly Mean	1	Monthly ½ Hrly Mean	0	1	0	0	1	1	1	0	5	4	1	1
Daily Ave	Annual Daily Max	20	Monthly Daily Max	1	2	0	1	3	5	2	2	12	20	3	2
No ELV	Annual Daily Mean	1	Monthly Daily Mean	0	1	0	0	1	1	1	0	5	4	1	1

Particulates	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
½ Hourly Av	Annual ½ Hrly Max	18	Monthly ½ Hrly Max	10	2	2	18	2	1	1	3	6	8	11	8
ELV 30	Annual ½ Hrly Mean	1	Monthly ½ Hrly Mean	2	0	0	3	0	0	0	1	1	2	1	2
Daily Ave	Annual Daily Max	7	Monthly Daily Max	4	0	1	7	1	0	0	1	2	3	1	3
ELV 10	Annual Daily Mean	1	Monthly Daily Mean	2	0	0	3	0	0	0	1	1	2	1	2

CO	Annual Summary		Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10 Minute Av	Annual 10 min Max	529	Monthly 10 min Max	110	529	11	10	25	30	52	66	71	96	85	77
ELV 150	Annual 10 min Mean	17	Monthly 10 min Mean	31	29	5	3	9	9	12	7	24	21	26	24
Daily Ave	Annual Daily Max	49	Monthly Daily Max	49	45	7	6	17	17	27	13	43	45	40	42
ELV 50	Annual Daily Mean	17	Monthly Daily Mean	31	29	5	3	9	9	12	7	24	21	26	24

* Figures reported to the nearest whole number.