



Ferrybridge MFE Ltd  
EPR/SP3239FU  
Annual Report 2016

## 1.0 Introduction

This document represents the Annual Performance Report for Ferrybridge MFE Ltd (FM1) and has been submitted in compliance with Chapter IV Article 62 of the Industrial Emissions Directive (IED):

*'The operator shall supply the competent authority, on request, with data enabling the competent authority to verify the compliance with the following:- (a) give an account of the running of the process and the emissions into air and water compared with the emission standards in the IED.'*

## 2.0 Facility Information

Plant Operator	Ferrybridge MFE Ltd
Name of Plant	Ferrybridge MFE Ltd
EPR Permit Number	EPR/SP3239FU
Plant Address	Kirkhaw Lane Knottingley West Yorkshire WF11 8DX
Telephone No	01977 636 700

Ferrybridge MFE Ltd is the first Energy From Waste (EfW) plant to be built for and operated by Multifuel Energy Ltd (MEL) a joint venture between SSE Plc and Wheelabrator Technologies Inc. The plant burns Waste Derived Fuels (WDF) supplied under long term fuel contracts with a range of waste recycling businesses. Much of this is processed from local council waste streams. The energy produced by the combustion of WDF is converted to steam, which is then fed to a steam turbine generator set. The electricity produced is exported to the National Grid. The plant is designed to achieve a high efficiency and achieves benchmark figures for the industry. The steam turbine is designed with interstage steam pass out to enable future installation of CHP should capacity market considerations be enabled.

The Plant was commissioned by HZI throughout the first half of 2015 and was handed over for commercial operation on 25<sup>th</sup> July 2015, although construction activities continued for several months beyond this date. 2016 marked the first full running year for the plant. Due to a failure in the system during Grid Code Compliance Testing on April 26<sup>th</sup> 2016, the turbine was taken out of service for major repair. The turbine returned to service on 12<sup>th</sup> October 2016 after final Grid Code Compliance Tests and has performed very well since then. During this period, the plant ran with a suspended R1 status.

### 2.1 Technical Details of the Plant:-

- Maximum permitted waste throughput – 675,000 tonnes per annum
- Storage capacity – at least 10,000 tonnes
- Number of tipping bays – 11
- Number of boilers – 2



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- Steam output per boiler – 145.2 t/hr at 430 °C and 70.0 Bara (turbine inlet)
- Maximum generating capacity – 85 MW gross (generator terminals)
- Flue gas treatment – exhaust gas recirculation, furnace spray quenching, ammonia injection (SNCR), powder activated carbon, HZI semi-dry lime reactor, bag filters and final discharge to 2 x 100m stacks.

Ferrybridge MFE Ltd is regulated by the Environment Agency and has developed management systems to comply with:-

- ISO 14001:2004
- OHAS 18001:2007

and is working towards formal accreditation to the above standards.

## 2.2 Permitted Waste Types

Ferrybridge is permitted to take a large number of groups of wastes, as defined by their EWC code. "20" codes, which correspond to Municipal Wastes which have not been processed are not accepted at the facility. The below table corresponds to the wastes currently being accepted at the facility, and is by no means exhaustive of the types of wastes which can be accepted.

EWC Code                      Description

19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

## 3.0 OPERATIONAL INFORMATION

Total Waste Incinerated	573,035	Tonnes
Electricity Exports	299,218	MWh
Incinerator Bottom Ash Produced	119,760	Tonnes
APC Residues	22,824	Tonnes

### 3.1 Solid Residue Outputs



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The Incinerator Bottom Ash (IBA) is transported by Hargreaves Services PLC to Ballast Phoenix Processing Facility situated in Sheffield. The IBA is reprocessed into a number of different graded aggregates, ferrous and non-ferrous metal products, which are then utilised in the construction and metal industry.

Ferrous metals removed during on site processing of IBA are forwarded to SIMS Metal Management (and also Smith's Metals during 2016). The metals are separated into individual fractions, and are sent on for utilisation in the metal industry.

The fine particulate matter, known as Air Pollution Control Residue (APCr), is removed from the process by a fabric filter and discharge from the reactor. The APCr is sent to Castle Environmental in Ilkeston, Derbyshire where it is used to neutralise spent acid wastes from other processes before final disposal at non-hazardous landfill. FM1 is currently working with Castle Environmental in their development of a treatment process which allows APCr to be used in concrete blocks. Trial loads from FM1 have been sent to the Cardiff Castle Environmental site where they have successfully been used in the block making process. This process is something that both FM1 and Castle Environmental are considering with regards to all APCr from FM1 in the future.

In line with Ferrybridge MFE Limited's corporate responsibility, Duty of Care audits have been conducted at these final disposal points.

### 3.2 Water Discharges from Site

The plant is designed to have zero effluent discharge and only surface rain water is discharged to Fryston Beck. Waste water is designed to be utilised in the plant via the bottom ash expellers. During 2015 and the first half of 2016, excess quantities of salt contaminated water from the water treatment plant caused more waste water to be produced than consumed by the plant. This excess waste water was being disposed of by Enviroclear at the FCCE facility in Knostrop, Leeds. The plant has now been modified to recycle the water treatment plant waste water as plant process water. This has removed the need for off-site disposal of water and has reduced the consumption of town's water for process water make up.

### 3.3 Flue Gases

All gaseous emissions generated during combustion pass through an extensive flue gas cleaning process which begins in the boiler where good combustion conditions are maintained and ammonia is added to control and reduce oxides of nitrogen. Gases exit the boiler and enter a gas scrubber where hydrated lime is injected to neutralise acid gases and activated carbon is added to remove metals and dioxins. Finally gases pass through the bag filter house to remove any remaining particulates. The cleaned gases are then released into the atmosphere through the chimney stacks.

In compliance with the IED and Environmental Permit requirements, the flue gases are continuously monitored using MCERTS accredited equipment. In addition to the continuous monitoring, a periodic extractive sampling campaign is undertaken by an approved service supplier. The organisation used for analysis and monitoring are accredited by the United Kingdom Accreditation Service (UKAS) and the Environment Agency's Monitoring Certification Scheme (MCERTS).



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**Extractive Testing Results**

In addition to the continuous monitoring of stack gases, further testing is conducted periodically on samples removed from the stack over shorter timescales. The results of the testing performed in the week commencing 11/07/2016 are summarised below for both boiler lines.



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Substance / Parameter	Emission		
	Limit Value / mg/m <sup>3</sup>	Result Line 1 / mg/m <sup>3</sup>	Result Line 2 / mg/m <sup>3</sup>
Hydrogen fluoride	2	<0.02	<0.02
Cadmium & thallium and their compounds (total)	0.05	<0.001	0.0006
Mercury and its compounds	0.05	0.002	0.002
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5	0.013	0.04
Dioxins / Furans (I-TEQ)	0.0001	0.000035	0.00004
Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	No limit applies	0.00000239	0.00000071



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Substance / Parameter	Emission		
	Limit Value / mg/m <sup>3</sup>	Result Line 1 / mg/m <sup>3</sup>	Result Line 2 / mg/m <sup>3</sup>
Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	0.00000012	0.00000004
Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	0.00000389	0.00000322
Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	0.000032	0.00004
Dioxins / furans (WHO-TEQ Fish)	No limit applies	0.000037	0.00004
Dioxins / furans (WHO-TEQ Birds)	No limit applies	0.000076	0.00007

#### Annual Emissions

The annual mass emissions of the continuously monitored emissions are summarised below.

Parameter	Annual Total Line 1 / Tonnes	Annual Total Line 2 / Tonnes
NO	315	206
NO <sub>2</sub>	5.4	2.4
NO <sub>x</sub>	433	390
CO	18.4	18.3
SO <sub>2</sub>	14.6	20.1
HCl	12.6	8.9
NH <sub>3</sub>	0	0.1
TOC	0	0



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Dust	4	2.2
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#### 4.0 Use of Rejected Heat

Every practicable opportunity to use the heat rejected at the steam condensers for beneficial local use is investigated. The necessary works have been conducted in 2016 to install pipework to allow heat offtake from the steam turbine. This is in line with a number of potential heat "customers" becoming available both in the short and long term, and discussions with Wakefield Metropolitan District Council. The site is currently not able to further explore heat offtake agreements due to being tied to a capacity market contract.

#### 5.0 Environmental Controls

The management and staff of FM1 are committed to maintaining the environmental performance of the plant. All operational staff have been briefed on the conditions in the Permit through extensive training by an external consultant during 2016. Nevertheless, the following incidents occurred during 2016:-

- On 25<sup>th</sup> January 2016 the permitted ½ hr average CO limit of 100mg/m<sup>3</sup> was exceeded when boiler line 2 produced an average of 123 mg/m<sup>3</sup> due to a feed hopper chute blockage.
- On 13<sup>th</sup> February 2016 the permitted ½ hr average CO limit of 100mg/m<sup>3</sup> was exceeded when boiler line 1 produced an average of 176 mg/m<sup>3</sup> due to a large item of plastic entering the boiler and having a large oxygen demand.
- On 21<sup>st</sup> February 2016 the permitted ½ hr average CO limit of 100mg/m<sup>3</sup> was exceeded for 2 consecutive hours causing a breach of the daily limit (50 mg/m<sup>3</sup>) also, due to ash blockages in the ash extraction system on start up. Clearing of these blockages caused ingress of air to the boiler.
- On 2 separate occasions during w/c 03/07/2016 the CEMS was run for a number of hours with an invalid calibration. This was due to a leak removing calibration gas from the system and therefore the automatic calibration conducted by the system was not valid.

All of these incidents have been investigated and actions implemented to prevent recurrence.

Table 5.1 Environmental Incidents.

Permit Breaches	1 period of CEMS calibration failure
Exceedance of Permitted Limits	4 x 30 minute, 1 x daily
Non-permitted Discharges	None
Abnormal Operations	30 minutes
Enforcement Notices	None
Complaints	4 complaints during the year. 3 odour complaints and 1 light pollution complaint.





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	<p>Odour 1 – 15<sup>th</sup> January from Ferrybridge C Power Station. South side tipping hall door was defective and in the open position for this day. Complaint probably justified.</p> <p>Odour 2 – 4<sup>th</sup> February from Ferrybridge C Power Station. Operations reminded to ensure south tipping hall door closed inbetween deliveries.</p> <p>Odour 3 – 9<sup>th</sup> November from Oakhill Caravan Park resident. Inconclusive, as the wind direction was blowing in the opposite direction to Oakhill for some of the times of the logged odours by the resident. Odour log importance has been reinforced to FMFEL Operators.</p> <p>Lighting 1 – 20<sup>th</sup> June. Lighting on top of silos left switched on. Staff reminded to switch off when access not required.</p>
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