Ferrybridge MFE Ltd

Annual Environment Report

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26th January 2017

Ferrybridge MFE Ltd
EPR/SP3239FU
Annual Report 2017

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1.0 INTRODUCTION

This document represents the Annual Performance Report for Ferrybridge MFE Ltd (FM1) and has been submitted in accordance 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 Multifuel 1
EPR Permit Number	EPR/SP3239FU/V005
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 Refuse Derived Fuels (RDF) supplied under long term fuel contracts with a range of waste recycling businesses. Much of this is processed from Local Authority collected waste streams. The energy produced by the combustion of RDF is converted to steam, which is then fed to a steam tubine generator. 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 Hitachi Zosen Inova (HZI) throughout the first half of 2015 and was handed over to Ferrybridge MFE Ltd for commercial operation on 25th July 2015.

In 2016, following a system failure during National Grid code compliance testing on April 26th 2016, the turbine was taken out of service for major repair. The facility continued to receive and incinerate waste while operating without R1 waste recovery status until the turbine returned to service on 12th October 2016, and after final National Grid code compliance testing has performed well to date.

In 2017, plant performance and availability has been very good with 91.9% availability for the 2 boilers and 99.3% availability for the turbine.

Boiler availability was impacted by the extended / additional outages required to carry out extensive repairs due to premature grate failures. Boiler 1 underwent an extended outage from 18th April to 29th April and a further 10 day outage from 11th September for grate replacement work. Boiler 2 was taken

off line for planned outage on 25th April for 10 days then underwent an additional 7 day outage from 1st June to convert sections of the water cooled grate to air cooled.

Other significant periods of maintenance impacting boiler availability were:

An ash expeller blockage on boiler 2 in January (56 hours)
Two superheater drain tube leaks on Boiler 2 in January and April (60 hours)

Turbine availability was excellent throughout 2017, performing well and without any significant losses.

2.1 Technical Information for the FM1 Multifuel Facility

- Maximum permitted waste throughput – 675,000 tonnes per annum
- Storage capacity – >10,000 tonnes
- Number of tipping bays – 11
- Number of boilers – 2
- Steam output per boiler – 145.2 t/hr at 430 °C and 70.0 Bar (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 has developed internal management systems in accordance with recognised standards and is working towards formal accreditation to the following standards:

- ISO 14001:2015 Environmental Management System
- OHAS 18001:2007 Safety Management System

2.2 Permitted Waste Types

Ferrybridge Multifuel 1 is permitted to accept wastes from several sections of the European Waste Catalogue, however currently only wastes with '19' codes as described in the table below are being accepted at the facility:

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	631,515	Tonnes
Electricity Exports	580,814	MWh
Incinerator Bottom Ash Produced	125,051	Tonnes
APC Residues	25,822	Tonnes

3.1 Solid Residue Outputs

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 PJP Group in Shafton, South Yorkshire where they 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 were sent to the Cardiff Castle Environmental site in 2016 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. Another recycled aggregate producer Carbon8 have built an APCr reprocessing facility in Leeds and will begin commissioning in April 2018 with a view to receive up to 5% of FM1's APCr for reprocessing into construction products in 2018/19.

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 periods of boiler maintenance, excess waste water is transported off site by road tanker for disposal at the Knostrop Water Treatment Facility in Leeds operated by FCC Environment.

3.3 Flue Gases

All gaseous emissions generated during combustion pass through an extensive flue gas cleaning process which begins in the boiler where optimal 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 monitoring equipment. In addition to the continuous monitoring, 6 monthly periodic extractive sampling is undertaken by an approved service supplier. The supplier is accredited by both the United Kingdom Accreditation Service (UKAS) and the Environment Agency's Monitoring Certification Scheme (MCERTS).

3.4 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 04/07/2017 are summarised below for both boiler lines.

Substance / Parameter	Emission Limit Value	Result Line 1	Result Line 2
Hydrogen fluoride	2 mg/m^3	<0.03 mg/m^3	<0.03 mg/m^3
Cadmium & thallium and their compounds (total)	0.05 mg/m^3	0.001 mg/m^3	0.001 mg/m^3
Mercury and its compounds	0.05 mg/m^3	0.001 mg/m^3	0.001 mg/m^3
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m^3	0.009 mg/m^3	0.008 mg/m^3
Dioxins / Furans (I-TEQ)	0.1 ng/m^3	0.0099 ng/m^3	0.029 ng/m^3
Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	No limit applies	0.0005 ng/m^3	0.0024 ng/m^3
Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	0.00003 ng/m^3	0.0002 ng/m^3
Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	0.0017 ng/m^3	0.0133 ng/m^3
Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	0.0096 ng/m^3	0.024 ng/m^3
Dioxins / furans (WHO-TEQ Fish)	No limit applies	0.0099 ng/m^3	0.026 ng/m^3
Dioxins / furans (WHO-TEQ Birds)	No limit applies	0.0170 ng/m^3	0.104 ng/m^3

3.5 Annual Mass Emissions Summary

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

Parameter	Annual Total Line 1 / Tonnes	Annual Total Line 2 / Tonnes
NO	308.3	224.7
NO_2	6.4	3.6
NO_x	458.7	429.6
CO	24.3	25.5
SO_2	21.2	21.9
HCl	12.6	13.1
NH_3	0.1	0.1
TOC	0.0	0.0
Dust	4.0	3.0

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 were 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 PERFORMANCE

The management and staff of FM1 are committed to maintaining the environmental performance of the plant. All members of staff are currently undergoing one to one environmental induction training to evaluate and develop their responsibilities and contribution to environmental compliance at FM1.

Following an initial 'gap analysis audit by Lloyds Register Quality Assurance (LRQA, the Environmental Management System was reviewed and revised in line with the ISO14001:2015 International Standard in 2017. LRQA will return to FM1 in January and March 2018 to complete a 2 stage verification audit of site systems and documents against the requirements of the standard.

A programme of Environmental Audits was developed and implemented during 2017 with 10 audits being carried out during the calender year. All negative findings from the audits are tracked and monitored internally to ensure actions are completed.

An emergency exercise involving a simulated environmental incident was carried out in November and findings identified in the report have resulted in environmental improvements for spill response.

5.1 Environmental Incidents

There were three environmental incidents during 2017 which were reported to the EA in accordance with the notification procedure and forms from Schedule 5 of the Environmental Permit.

- On 10th July, the permitted ½ hr average CO limit of 100mg/m^3 was exceeded twice for boiler line 2. The root cause for the events was a high differential pressure across the bag filter house.
- On 31st August, the permitted ½ hr average CO limit of 100mg/m^3 was exceeded for boiler line 2. The event occurred when the wet O2 monitor was out of service, and the surrogate measurement from the dry O2 analyser located in the stack was in use by the CCS resulting in a delayed reaction to changing combustion conditions.
- On 26th September, the permitted ½ hr average CO limit of 100mg/m3 was exceeded for boiler line 2. At the time of the event, the turbine was undergoing compliance testing for National Grid which involved a period of time where the steam was sent to bypass and the turbine was off load which created difficulties controlling the steam flow.

All of these incidents have been investigated and actions implemented to reduce the likelihood of recurrence.

5.2 Environmental Complaints

There were 8 environmental complaints received in 2017 by FM1 from external complainants, the Police, the Environment Agency or members of the Community Liaison Group (CLG).

On 24th January, a complaint received through the CLG alleged drivers attending the FM1 site were drivers parking up overnight and discarding bottled urine on the A162 resulting in the issue of a general warning was issued to all suppliers.

On 25th January, a complaint received through the CLG was received about the FM1 car park lighting shining down Stranglands Lane, immediate action was taken to prevent further complaints.

On 31st January, a complaint forwarded by the EA alleged odour from site was affecting residents in Knottingley, an internal investigation found no cause for odour and no further complaints received.

On 14th March, a complaint received from a member of public alleged a vehicle had left FM1 and was spilling waste onto the Old A1 at Brotherton. The FM1 Plant Manager narrowed the culprit down to 2 vehicles and informed the suppliers.

On 22nd June, a complaint received from a member of public alleged their own vehicle parked in Townville had been covered in dust blown from the FM1 site, an internal investigation found no cause for dust and no further complaints were received.

On 24th October, a complaint received by email from a member of public alleged numerous vehicle offences involving vehicles associated with the FM1 site, the complainant did not respond following numerous attempts to contact them by the FM1 Plant Manager.

On 26th October, a complaint received from local police stated three vehicles had been stopped for exceeding the road weight limit through Ferrybridge, on investigation, only one had visited FM1 and was not a regular visitor so the supplier involved was contacted and informed for future deliveries.

On 20th November, a complaint received from a member of public alleged vehicles attending FM1 were exceeding the road weight limit through Ferrybridge amongst other offences. The FM1 Plant Manager responded and explained that action would be taken if registration numbers were supplied.

5.3 Table of Environmental Performance (01/01/2017 to 31/12/2017)

Breaches of Permit Conditions	None
Breaches of Permitted Emission Limit Values	4 x (½ hr average CO limit of 100mg/m^3)
Non-Permitted Discharges	None
Periods of WID Abnormal Operation	13 x 30 minutes
Enforcement Notices	None

APPENDIX 1 – Ferrybridge Multifuel Energy Annual Returns

In accordance with Condition 4.2.2 of EPR/SP3239FU/V005.

Form: Performance 1;

- 2017 Annual Reporting of Waste Disposal and Recovery (01/01/2017 to 31/12/2017)
- 2017 Annual Reporting of Water and Other Raw Material Usage (01/01/2017 to 31/12/2017)
- 2017 Annual Reporting of other performance indicators (01/01/2017 to 31/12/2017)

Form: Energy 1;

- 2017 Annual Reporting of Energy Usage/Export (01/01/2017 to 31/12/2017)

Permit Number : EPR/SP3239FU

Operator : Ferrybridge MFE Limited

Facility : Ferrybridge Multifuel Facility

Form Number : Performance 1 / 30/11/2012

2017 Annual Reporting of Waste Disposal and Recovery (01/01/2017 to 31/12/2017)

Waste Description	Disposal Route	Tonnes	Recovery Tonnes
1) Hazardous Wastes			
APC Residues	D9	25,821.91	
Batteries	R13	0.02	0.02
Spent Filters	D14	0.68	
Spent Resin	R13	0.125	0.125
Total Hazardous Waste		25,822.735	0.145
2) Non-Hazardous Wastes			
IBA	R5	125,051.37	125,051.37
Ferrous Metal	R4	1,745.82	1,745.82
Process Water	D8	2,823.42	
Wood	R3	12.44	12.44
Dry Mixed Recyclables	R13	0.24	0.24
Anti Freeze	R13	1.00	1.00
Total Non-Hazardous Waste		129,634.29	126,810.87
TOTAL WASTE		155457.025	126,811.015

Operator's comments :

R3 – Recycling/reclamation of organic substances, R4 – Metals recovered, R5 – Processed for re use, R13 - Temporary storage of wastes pending any of the operations numbered R1 to R12, D8 - Biological treatment not specified, D9 – Acid neutralisation followed by non-hazardous landfill, D14 - Repackaging prior to submission to any of the operations numbered D1 to D13.

Signed ..... Date 26/1/18

(authorised to sign as representative of Ferrybridge MFE Limited)

2017 Annual Reporting of Water and Other Raw Material Usage (01/01/2017 to 31/12/2017)

Raw Material	Usage	Unit	Specific Usage	Unit
Mains water	77,215	m^3	0.122	m^3/t
Total water usage	158,268	m^3	0.251	m^3/t
Ammonia	281.90	Tonnes	0.446	kg/t
Activated carbon	197.16	Tonnes	0.312	kg/t
Lime/hydrated lime or sodium bicarbonate	10,213	Tonnes	16.172	kg/t

Operator's comments :

Fuel burn (01/01/2017 to 31/12/2017) = 631,515 tonnes

Signed ..... Date 26/1/18

(authorised to sign as representative of Ferrybridge MFE Limited)

2017 Annual Reporting of other performance indicators (01/01/2017 to 31/12/2017)

Parameter	Result
Number of periods of abnormal operation	13 periods - 390 mins
Cumulative hours of abnormal operation for this calendar year	6.5 hours

Operator's comments :

WID abnormal periods this period (01/01/2017 to 31/12/2017):

22/02/2017 – Boiler A1 1 period (0.5 hours) (CEMS H_2 gas bottle pressure loss)
17/05/2017 – Boiler A1 1 period (0.5 hours) (CEMS IP address issue)
19/05/2017 – Boiler A1 1 period (0.5 hours) CEMS IP address issue)
18/05/2017 – Boiler A1 2 periods (1.0 hours) CEMS IP address issue)
18/05/2017 – Boiler A2 1 period (0.5 hours) CEMS IP address issue)
03/07/2017 – Boiler A1 6 periods (3.0 hours) (SO2 monitoring issue)
30/10/2017 - Boiler A2 1 period (0.5 hours) (PM for daylight saving time change crashed PC for 20 minutes)

Signed ..... Date 26/1/18
(authorised to sign as representative of Ferrybridge MFE Limited)

Permit Number : EPR/SP3239FU

Operator : Ferrybridge MFE Limited

Facility : Ferrybridge Multifuel Facility

Form Number :Energy 1 / 30/11/2012

2017 Annual Reporting of Energy Usage/Export (01/01/2017 to 31/12/2017)

Energy Source	Energy Usage	Unit	Contained Energy (MWh)
Electricity Produced	633,906	MWh	
Electricity Imported	53,104	MWh	
Electricity Exported	580,814	MWh	
Gas Oil	602	tonnes	
Steam/hot water Exported	0	MWh	

Operator's comments :

Signed ..... Date 26/1/18

(authorised to sign as representative of Ferrybridge MFE Limited)