Viridor (Greater Manchester) Limited

Bolton ERF

Annual Report 2018-2019

Annual performance report for Bolton Thermal Recovery Facility
Permit number BS3042 IM
Year 2018-2019

1 Introduction

Bolton Energy Recovery Facility (ERF), Raikes Lane, Bolton, BL3 2NH, was operated by Viridor as part of the Greater Manchester Waste Disposal Authority (GMWDA) PFI contract up to the end of September 2017

From October, Viridor has operated the site under an 18 month interim contract (with an option to extend by a further 6 months) when the PFI with the GMWDA was terminated due to austerity measures

The plant burns mixed municipal waste from Bolton MBC, Bury MBC, Salford CC, Rochdale MBC and, from June 2015, Blackburn & Darwen MBC in varying quantities. The plant also incinerates commercial waste, trade waste and confiscated items from the police and customs.

On September 17th 2017 the site suffered a major fire within the turbine hall which effectively ceased burning operations. The rebuild of the turbine hall commenced in January 2018 and continued through to June, on completion this allowed the site to commence burning operations, which began in early July 2018. The site continues to shred waste from household waste recycling centres within Greater Manchester for use on site and for onward shipment to Viridor's ERF in Runcorn.

For further copies of this report or any comment please contact M.Chinn, Plant Manager, at Viridor, Bolton Energy Recovery Facility, Raikes Lane, Bolton, BL3 2NH

2 Plant Description

The installation is a single incinerator designed to have a capacity to burn municipal waste at approximately 16 tonnes an hour. Waste types are brought to the site by road transport (mainly council collection vehicles and bulk transfer vehicles) which enters the site via a weighbridge

Acceptable waste is discharged into a reception pit with a holding capacity of 1530m^3 and any excess is discharged onto the floor of the tipping hall, both of which are enclosed within a building. Waste is transferred from the reception pit to the incinerator feed hopper by crane operated grab. From the hopper, the waste falls by gravity onto the inclined four hearth rocking grate.

Primary, combustion air is provided by two primary air fans upwards through the grate and secondary combustion air is provided by a separate fan, via ports in the roof of the furnace.

Supplementary oil fired burners maintain the waste combustion gases above 850^{0}C at all times when waste is being burned on the incinerator grates. During start up periods the same auxiliary burners pre-heat the furnace to 850^{0}C before waste is fed in. When the furnace is being shut down the burners maintain the furnace temperature above 850^{0}C until all waste is burnt off
Heat from the burning waste passes into the heat recovery steam generator (HRSG), or boiler, which produces superheated steam at 40bar 400^{0}C. At the moment the plant is waiting for the turbine install following ~~due to~~ the fire in 2017~~, then the steam will be passed to a steam turbine which will drive a generator to produce electricity at 11kV. On site transformers will bring the voltage down to 415v for powering plant auxiliaries and another set of transformers will export the surplus to the national grid by raising the voltage to 33kV.~~

~~In the event that the turbine/generator set is off-line, the site imports electricity via the same transformers but in the reverse direction i.e. 33kV down to 11kV~~

~~The site has an additional standby connection to a 6.6kV electricity supply for emergency use i.e. it has sufficient capacity to allow the plant to be safely shut down in the event of a failure of the 33kV connection. There are electrical interlocks in place which prevent the site being connected to both the 33kV and the 6.6kV at the same time.~~

Combustion gases entering the first pass of the HRSG are treated with a very dilute ammonia solution which is injected to control the oxides of nitrogen (NOx). This ammonia injection is controlled by a selective, non-catalytic reduction (SNCR) system. Feedback signals of the NOx concentration are fed to the SNCR from the continuous emissions monitoring system (CEMS) at the chimney. Recipes within the SNCR regulate the ammonia injection concentration to ensure NOx emission limit values (ELV's) are met

On exiting the HRSG the combustion gases pass into a flue gas treatment (FGT) system where lime and activated carbon are injected into the gas stream to remove acid gases, dioxins, organic vapours, heavy metals and other pollutants

The gases then pass through a four cell bag filter where the lime, carbon and particulates within the combustion gases are collected before the cleaned gases are discharged to atmosphere via a 60 metre high chimney. A proportion of the scrubbing reagents are recycled in the process to minimise the use of lime. The combination of lime, carbon and particulates are collectively known as Atmospheric Pollution Control Residue (APCr)

Storage silos are provided for the lime, activated carbon, recycled reagent and the APCr

Incinerator bottom ash (IBA) is discharged from the incinerator grate and falls into a water quenching trough. The ash is drained of surplus water as it moves up a slow moving, inclined chain ash conveyor before dropping onto an inclined belt conveyor. An over-band magnet recovers ferrous metal from the ash and the residual ash is stored within a covered building before being sent for reuse

Duty and standby CEMS are installed in the gas ducting upstream of the chimney stack to continuously analyse the exhaust gases from the process. These include particulates, sulphur dioxide, NOx, carbon monoxide, hydrogen chloride, TOC and ammonia

Water is abstracted from the River Croal, in accordance with the site Abstraction Licence, for use in the twin cell, hybrid cooling tower and other parts of the process such as water in the quench trough. Blow down water from the cooling tower is returned to the River Croal in accordance with the Environmental Permit

Surface water from the FGT system and ash quenching areas is recycled back to the process. Solids filtered from the river water, by sand-bed filters, are discharged to sewer in accordance with the site Consent to Discharge

3 Summary of plant operations

3.1 Waste Inputs

Permitted Waste types in tonnes		
Waste type	Limitation	Total
Mixed Municipal waste	Domestic, bulky and street market collections	28179.35
Commercial Waste	Cardboard, packaging and confidential documents	11.62t
Animal by- product	International catering waste	0
Trade waste	Similar to household waste	1284.54t
Confiscated Items	Brought in by police/customs	
	Total	29475.51

3.2 Plant performance

Total Plant operational hours - 1925hrs = 22% availability	
Total turbine operational hours were = 0 due to fire	
Planned shutdown (from 23rd Oct to the 12th Dec)	1187hrs
Significant plant failures	
Boiler tube failure – 5 off	344hrs
Boiler feed pump	696hrs
Turbine hall fire	4608hrs

3.3

Residues Produced in tonnes		
Bottom Ash	Air Pollution Control	Metal
3755.93	711.44	224.92
Recovered	Processed to form non-hazardous filter cake prior to landfill	Recovered

3.4

Electricity Produced MW/h		
Generated	Exported	Average MW/h
0	0	0
		0
0		

A summary of plant performance is attached as Appendix 2

4 Summary of Plant Emissions

4.1 Pollutants Measured continuously to Air

Particulate	Total hydrocarbons (THC)	Hydrogen Chloride (HCl)	Carbon Monoxide (CO)	Sulphur Dioxide (SO_2)	Oxides of Nitrogen (NOx)	Ammonia (NH_3)

4.2 Pollutants Measured continuously to Water

Temperature	Free Chlorine	pH

4.3 Pollutants Measured Periodically to Air

Bi-annually			
Particulate	Total hydrocarbons (THC)	Hydrogen Chloride	Carbon Monoxide
Sulphur Dioxide (SO_2)	Oxides of Nitrogen (NOx)	Dioxins/Furans I-TEQ	Ammonia (NH_3)
Nitrous Oxide N_2O	Dioxin-like PCB's (WHO-TEQ humans/mammals, birds & fish)	PAH's	Dioxin/furans (WHO-TEQ humans/mammals, birds & fish)

Quarterly			
Hydrogen Fluoride (HF)	Cadmium & thallium & their compounds	Mercury & its compounds	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (Heavy metals)

4.4 Continuous Emissions Monitoring System (CEMS)

The CEMS was operating normally for 100% of the burning hours

4.5 CEM's Data

See Appendix 1

4.6 Periodic emissions monitoring

Periodic emissions monitoring results (mg/m^3 unless stated)

	Jan- Mar	Apr-Jun	Jul-Sept	Oct-Dec
Particulate	No testing this period -plant not operational	No testing this period - plant not operational	0.79	1.53
TOC				
HCL			0.0 9.5	1.277 9.42
HF			0.14	
CO			7.27	7.225
SO_2			14.46	18.99
NOx			194.7	184.7
N_2O			0.039	
Dioxins& Furans				
NH_3			4.6	4.22
Metals			0.03	
Cadmium/ Thallium			0.0015	
Mercury			0.027	
Dioxins & furans (WHO-TEQ)				
Humans/mammals				
Fish minimum				
Birds minimum				
Dioxin –like PCBs (WHO-TEQ)				
Humans/mammals				
Fish minimum				
Birds minimum				
PAH's (WID suite)				

5 Summary of plant compliance

5.1 Compliance with permit conditions for continuous monitoring

Percentage of time the plant was compliant with the permit conditions						
Particulate	TOC	HCL	CO	SO_2	NOx	NH_3
100%	100%	100%	100%	100%	100%	99.993%

5.2 Non-compliances

None

5.3 Abnormal operations (maximum 60 hrs per year)

No abnormal hours were claimed April 2018 to March 2019

5.4 Complaints

No complaints received this year

5.5 Formal Enforcement Actions

1 CCS4 IMS 95988—Ammonia exceedance
3 CCS3 IMS 96061 – Lime release
1 CCS3 IMS 103605 – Turbine hall fire

In 2018 the site received a total of four CCS 3 scores and one CCS 4 score. Below is a summary of the scores and progress on the actions assigned.

A CCS 4 score was received in CAR report issued 10.08.2018 (EA ref: BS3042IM/0312208) . The score relates to a half hourly Ammonia ELV exceedance which occurred on the 03.07.2018. The exceedance was caused by a double oxygen correction in the NO_x raw data on the CEMS unit. Resulting in a higher level of NO_x present within the gas stream. The facility abatement system began ammonia dosing into the gas passage, which passed through into the stack and emitted to the atmosphere. The oxygen correction error on the CEMS unit was rectified and no further ammonia exceedances have been reported.

In EA CAR report issued 14.08.2018 (EA ref: BS3042IM/0310862) three separate CCS 3 scores were received as a result of a lime release emission to air. Two related to site procedures and training and a third to the actual lime release. All assigned actions have since been completed.

A final CAR report was issued 09.11.2018 (EA ref: BS3042IM/0312759). This report relates to the findings of the 2017 turbine fire investigation. A CCS 3 scored was issued for condition breach 2.3.5 (Management system & operating procedures). The action assigned related to the actions from the Viridor investigation report and these actions are on-going.

6 Summary of plant improvements

The following improvements have been carried out during this financial year:

- Boiler tube replacements
    - First pass north wall
    - Superheater replacement
    - Replace drain lines on headers
    - Joggle tubes on north wall doors
- New style teeth fitted to grate 4 (rev10 or Cronite C1) This revision has proved to be beneficial in grate longevity, the quality of the combustion process and the quality of the bottom ash
- Grate 4 repairs
- Spare boiler feed pump purchased
- Repairs to tipping hall roof
- Repairs to office block roof
- New attenuator fitted in fan ducting
- New access ladder for new crane in turbine hall
- Pit wall replaced with new

- Upgrade of cable trays and junction boxes
- Upgrade of fire alarm system to include new fire pumps
- Internal and external lighting upgraded to LEDs as and when needed
- Reposition of secondary airvents in furnace
- Two attemperator valves refurbished
- New duplex filter fitted in river water intake line
- Re build of turbine hall to accept steam
- Two new cooling tower motors installed

7 Summary of information made available

All Bolton Energy Recovery Facility information contained in this report is available at:

Environment Agency
Appleton House
430 Birchwood Boulevard
Birchwood
Warrington
WA3 7WD

Martin Chinn
Plant Manager
Bolton Energy Recovery Facility
Raikes Lane
Bolton
BL3 2NH

Appendix 1

2018

Monthly Emissions

Jan-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Mean half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Minimum half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Feb-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Mean half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Minimum half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.	0.0	0.0	0.0.	0.0	0.0	0.0	0.0

Mar-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Mean half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Minimum half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.							

Apri-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Mean half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Minimum half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.							

May-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Mean half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Minimum half hour	0.0	0.0	0.0	0.00	0.0	0.0	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.							

Jun-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Mean half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Minimum half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.							

Jul-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	7.9	20.2	376.4	27.0	0.0	17.3	20.7
Monthly Mean half hour	0.4	1.3	180.2	10.1	0.0	8.9	1.5
Monthly Minimum half hour	0.1	0.0	65.8	0.0	0.0	0.4	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.	0.8	4.6	194.7	14.5	0.0	9.5	7.3

Aug-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	2.0	9.4	286.9	66.1	0.0	17.4	20.5
Monthly Mean half hour	0.1	1.0	153.1	10.5	0.0	9.1	0.5
Monthly Minimum half hour	0.1	0.0	94.5	1.1	0.0	2.7	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.	0.1	2.9	177	14.1	0.0	9.4	3.7

Sept-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	0.9	7.2	262.8	25.5	0.0	13.7	1.4
Monthly Mean half hour	0.1	2.8	143.5	10.8	0.0	9.1	0.1
Monthly Minimum half hour	0.1	0.3	101.5	1.7	0.0	4.7	0.0
Daily emission limit	10	n/a	200	50	10	10	50
Monthly Maximum daily avg.	0.2	3.4	152.9	12.9	0.0	9.2	0.4

Oct-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	1.5	7.4	288.3	25.2	7.2	17.4	1.3
Monthly Mean half hour	0.2	2.9	138.4	11.0	0.7	9.2	0.4
Monthly Minimum half hour	0.1	0.2	101.8	2.6	0.0	3.3	0.0
Daily emission limit	10.0	n/a	200.0	50.0	10.0	10.0	50.0
Monthly Maximum daily avg.	0.7	3.7	150.4	12.9	1.1	9.5	3.3

Nov-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Mean half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly Minimum half hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daily emission limit	10.0	n/a	200.0	50.0	10.0	10.0	50.0
Monthly Maximum daily avg.	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Dec-18	particulate	NH_3	NOx	SO_2	THC	HCL	CO (10 min)
Half hour limit emission limit	30	10	400	200	20	60	150
Monthly Max half hour	4.3	9.1	260.4	52.3	3.2	14.9	9.6
Monthly Mean half hour	0.9	2.7	158.4	14.8	1.0	8.8	2.5
Monthly Minimum half hour	0.5	0.1	103.9	3.4	0.0	2.4	0.3
Daily emission limit	10.0	n/a	200.0	50.0	10.0	10.0	50.0
Monthly Maximum daily avg.	1.5	4.2	184.7	19	1.3	9.4	7.2

Appendix 3

Site Organogram