

Viridor (Greater Manchester) Limited

Bolton TRF

Annual Performance Report 2014



**Annual performance report for Bolton Thermal Recovery
Facility
Permit number BS3042 IM**

Year 2014

1 Introduction.

Bolton Thermal Recovery Facility, Raikes Lane, Bolton, BL3 2NH.

Operated by Viridor (Greater Manchester) Ltd as part of the Greater Manchester Waste Disposal Authority PFI contract.

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

For further copies of this report or any comment please contact S Entwistle Operations Manager at Greater Manchester Waste Ltd, Bolton Thermal 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) which enters the site via a weighbridge. Acceptable waste is discharged into a reception pit with a holding capacity of 1530m³ 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, it falls by gravity onto the inclined four hearth rocking grate. Primary combustion air is provided through grate and secondary combustion air is provided via ports in the roof of the furnace. Supplementary oil fired burners are used to ensure that the combustion temperature of the waste combustion gases are raised to a minimum of 850°C at all times when waste is being burned on the incinerator grates and particularly during start up and shut down.

Heat from the burning of the waste is used in the heat recovery boiler to raise steam which, in turn is used in the steam turbine driven alternator to generate electricity which is used for powering plant auxiliaries and the surplus is exported to the national grid.

On exiting the heat recovery boiler the combustion gases pass into a reaction area where lime and activated carbon are injected into the gas stream to remove acid gases and organic vapours. The gases then pass through a filter where the scrubbing agents and the dust in the combustion gases are collected before the cleaned gases are discharged to atmosphere via a 60 metres high chimney. A proportion of the scrubbing reagents are recycled in the process. Storage silos are provided for the lime, activated carbon, recycled reagent and the filter dust (APC ash). Ammonia is injected into the combustion gases, to control oxides of nitrogen release, as they pass through the heat recovery boiler.

Ash residues discharge from the incinerator grate and fall into a water quenching trough. The ash is drained of surplus moisture, ferrous metal is recovered and the remaining residue is stored before being sent for reuse.

Continuous emission monitors are installed to analyse the exhaust gases from the chimney and include particulates, sulphur dioxide, oxides of nitrogen, carbon monoxide, hydrogen chloride, TOC and ammonia.

Water is abstracted from the River Croal for use in the cooling tower and for process use. Excess water from the cooling tower is returned to the River Croal. Surface water from the combustion gas treatment and ash quenching area is recycled to the process. Solids filtered from the river water along with some of the river water is discharged to sewer.

3 Summary of plant operations

- (a) The plant is single furnace
(b)

| Permitted Waste types in tonnes | | |
|---------------------------------|---|--------|
| Waste type | Limitation | Total |
| Mixed Municipal waste | Domestic, bulky and street market collections | 72988 |
| Commercial Waste | Cardboard, packaging and confidential documents | 21.86 |
| Animal by- product | International catering waste | 0 |
| Trade waste | Similar to household waste | 763.38 |
| Confiscated Items | Brought in by police/customs | |
| | Total | 73773 |

- (c) **Total Plant operational hours** **6510 = 74%**
 Total turbine operational hours **6428= 73%**

| Bi annual Maintenance hours | April/May/June | November |
|-----------------------------|----------------|----------|
| Incineration Plant | 666 | 591 |
| Turbine | 675 | 595 |

| Significant plant failures | Hours |
|----------------------------|-------|
| Boiler Tube failure | 359 |
| Furnace refractory | 444 |
| Hydraulic Grate failure | 48 |
| | |
| | |

- (d)

| Residues Produced in tonnes | | |
|-----------------------------|-----------------------|-----------|
| Bottom Ash | Air Pollution Control | Metal |
| 16540 | 3088 | 1440 |
| Recovered | Hazardous Landfill | Recovered |

(e)

| Electricity Produced MW/h | | |
|---|----------|--------------|
| Generated | Exported | Average MW/h |
| 46977 | | 7.3 Gen |
| | 37613 | 5.85Exp |
| This is equivalent to supplying 5000 houses | | |

4 Summary of Plant Emissions

(a) Pollutants Measured continuously to Air

| Particulate | Total hydrocarbons (THC) | Hydrogen Chloride (HCl) | Carbon Monoxide (CO) | Sulphur Dioxide (SO ₂) | Oxides of Nitrogen (NO _x) | Ammonia (NH ₃) |
|-------------|--------------------------|-------------------------|----------------------|------------------------------------|---------------------------------------|----------------------------|
|-------------|--------------------------|-------------------------|----------------------|------------------------------------|---------------------------------------|----------------------------|

Pollutants Measured continuously to Water

| Temperature | Free Chlorine | pH |
|-------------|---------------|----|
|-------------|---------------|----|

Pollutants Measured Periodically to Air

| Bi-annually | | | |
|------------------------------------|---|-------------------|----------------------------|
| Particulate | Total hydrocarbons (THC) | Hydrogen Chloride | Carbon Monoxide |
| Sulphur Dioxide (SO ₂) | Oxides of Nitrogen (NO _x) | Dioxins | Ammonia (NH ₃) |
| Nitrous Oxide N ₂ O | Dioxin-like PCB's (WHO-TEQ ¹ Humans/mammals) | | |

| Quarterly | | | |
|-------------------|----------------------------|-------------------------|--|
| Hydrogen Fluoride | Cadmium & thallium & their | Mercury & its compounds | SB,As,Pb,Co,Cu,Mn,and V and their compound (|

| | | | |
|------|-----------|--|----------|
| (HF) | compounds | | (Metals) |
|------|-----------|--|----------|

(b) % operations time when Continuous Emissions Monitoring equipment (CEM) were operating normal was 100%

(c) CEM's Data See Appendix

(d) Periodic emissions monitoring results.

| | First quarter | Second quarter | Third quarter | Fourth quarter |
|---------------------------|------------------------|--------------------------|-------------------------|--------------------------|
| Particulate | | 0.87 mg/m ³ | | 0.52 mg/m ³ |
| TOC | | N/D | | 0.52 mg/m ³ |
| HCL | | 5.8 mg/m ³ | | 10.7 mg/m ³ |
| HF | N/D | 0.92 mg/m ³ | N/D | 0.12 mg/m ³ |
| CO | | 3.74 mg/m ³ | | 5.38 mg/m ³ |
| SO ₂ | | 12.6 mg/m ³ | | 12.9 |
| NO _x | | 234 mg/m ³ | | 209 mg/m ³ |
| N ₂ O | | 9.76 mg/m ³ | | 3.14 mg/m ³ |
| NH ₃ | | 1.53 mg/m ³ | | 0.38 mg/m ³ |
| Dioxins& Furans | | 0.0016ng/m ³ | | 0.014ng/m ³ |
| metals | 0.06 | 0.010 mg/m ³ | 0.028 mg/m ³ | 0.0013 mg/m ³ |
| Cadmium Thallium | N/D | ND | 0.001 mg/m ³ | 0.001 mg/m ³ |
| Mercury | 0.003mg/m ³ | ND | 0.001 mg/m ³ | 0.002 mg/m ³ |
| Dioxins & furans 2.10.1 | | | | |
| Humans/animals | | 0.045ng/m ³ | | 0.0133ng/m ³ |
| Fish minimum | | 0.050 ng/m ³ | | 0.014ng/m ³ |
| Birds minimum | | 0.070 ng/m ³ | | 0.020ng/m ³ |
| PCBs (who-12) | | | | |
| Humans/animals minimum | | 0.013 ng/m ³ | | 0.003ng/m ³ |
| Fish minimum | | 0.001 ng/m ³ | | 0.0002ng/m ³ |
| Birds minimum | | 0.021 ng/m ³ | | 0.007ng/m ³ |
| PAH's (WID suite) | | 0.4673 ug/m ³ | | 5.7808ug/m ³ |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

5

Summary of plant compliance.2

(a)

| Percentage of time the plant was compliant with the permit conditions | | | | | | |
|---|------|------|------|-----------------|-----------------|-----------------|
| Particulate | TOC | HCL | CO | SO ₂ | NO _x | NH ₃ |
| 100% | 100% | 100% | 100% | 100% | 100% | 100% |

(b) **Non-Compliances**

(i) No none compliances.

(c) **Abnormal operations** (maximum 60 hrs per year)

One hour of abnormal operation

0.5 hrs NH₃ slippage due to with a control valve.

0.5 hrs HCL due to a blockage in the feed pipe.

(d) **Complaints**

No complaints received

(e) **Formal Enforcement Actions**

No formal enforcement action.

6

Summary of plant improvements

The following improvements have been carried out:

Installed automatic fire extinguisher equipment to all critical PLC Cabinets.

Modified bottom block on Vaughan crane to reduce damage to crane cables.

Modified End Product gearbox drive to stop damage to the keyway
Installed hand rail around edge of the roof area on the amenities /workshop to prevent falls from height.

Re-designed grate teeth to reduce weight and optimise the gaps between the grate teeth.

7 Summary of information made available

- (a) Bolton Thermal Recovery Liaison Forum meets every three months in February, May, September and December. Representatives attend from the three ward Councils, Local Residents Associations, Environmental Agency, Bolton Environmental Health Organisation and Greater Manchester Waste Disposal Authority. The agenda covers the following topics:-

- 1 Complaints
- 2 Plant Performance
- 3 Waste Incinerated, Bottom Ash, APC ash produced
- 4 Electricity Generated
- 5 Report on TRF Emission Performance and Monitoring program
- 6 Environment Agency Report/Comments
- 7 GMW Environment Department Report
- 8 AOB.

Minutes from the meeting are circulated to all present.

- (b) Bolton Thermal Recovery Information is available at:

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

Bolton Environment Department
Weston House
Weston Street
Bolton
Lancashire
BL3 2AR.

Karen Hall
Communications Manager
Viridor Laing (Greater Manchester) Ltd.
Unit 4 Hurstwood court
Bolton
BL3 2NP.

Appendix

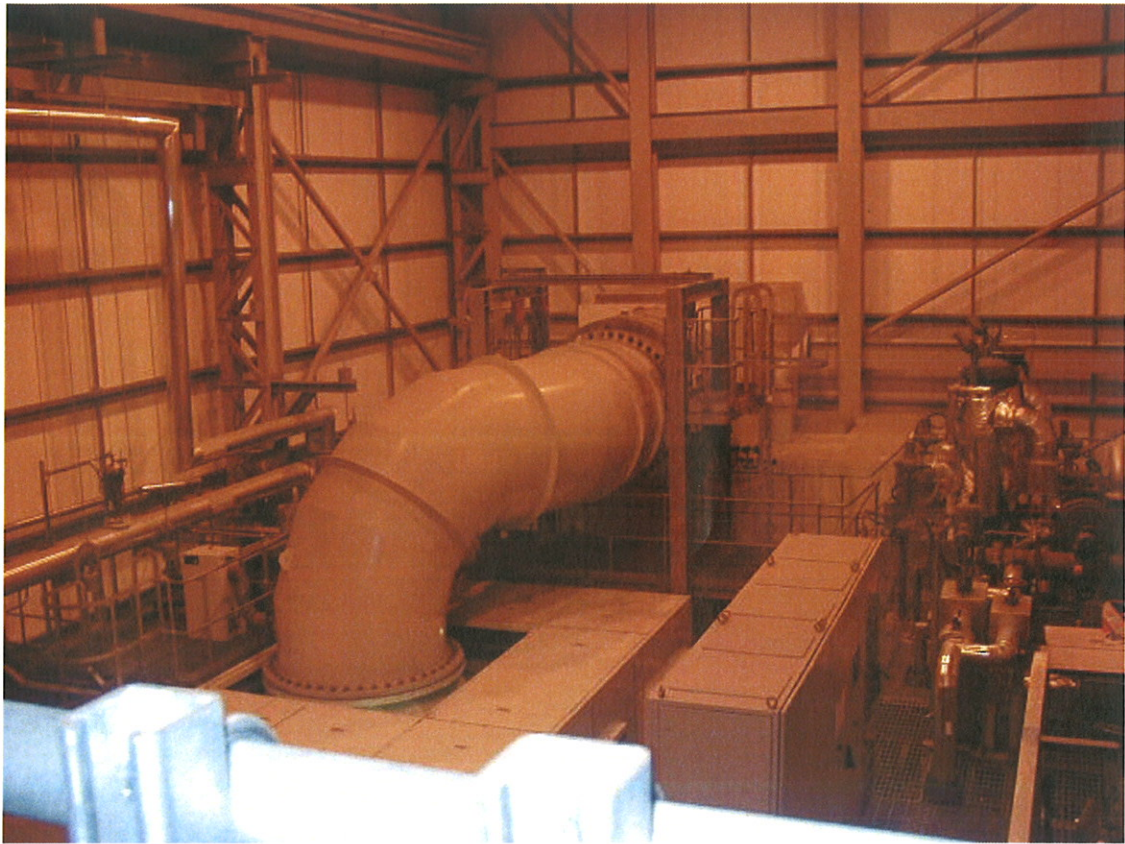
Jan - Dec

2014

| 2014 | Jan-14 | | | | | | | | | | Feb-14 | | | | | | Mar-14 | | | | | | Apr-14 | | | | | | May-14 | | | | | | Jun-14 | | | | | | | |
|----------------------------|-------------|-----------------|-------|-----------------|------|-------|-----------------|-------------|-----------------|-------|-----------------|-----|-------|-----------------|-------------|-----------------|--------|-----------------|-----|------|-----------------|-------------|-----------------|-------|-----------------|-----|-------|-----------------|-------------|-----------------|-------|-----------------|-----|------|-----------------|-------|------|-------|-------|------|------|------|
| | particulate | NH ₃ | NOx | SO ₂ | THC | HCL | CO ⁺ | particulate | NH ₃ | NOx | SO ₂ | THC | HCL | CO ⁺ | particulate | NH ₃ | NOx | SO ₂ | THC | HCL | CO ⁺ | particulate | NH ₃ | NOx | SO ₂ | THC | HCL | CO ⁺ | particulate | NH ₃ | NOx | SO ₂ | THC | HCL | CO ⁺ | | | | | | | |
| Half hour limit emission | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 30 | 10 | 400 | 200 | 20 | 60 | 150 | 30 | 10 | 400 | 200 | 20 | 60 | 150 | 30 | 10 | 400 | 200 | 20 | 60 | 150 | 30 | 10 | 400 | 200 | 20 | 60 | 150 | 30 | 10 | 400 | 200 | 20 | 60 | 150 | | | | | | | |
| Monthly Max half hour | 1.6 | 3.5 | 258.0 | 42.7 | 11.0 | 33.32 | 3.3 | 2.16 | 7.7 | 222.9 | 38.48 | 4.8 | 35.22 | 3.0 | 3.7 | 5.0 | 279.5 | 40.0 | 8.2 | 32.3 | 2.6 | 3.5 | 4.3 | 269.2 | 32.88 | 8.3 | 36.61 | 2.1 | 4.9 | 13.4 | 297.3 | 36.9 | 4.7 | 18.2 | 12.0 | 0.213 | 10.0 | 336.6 | 39.48 | 16.1 | 39.7 | 27.6 |
| Monthly Mean half hour | 0.7 | 0.4 | 145.9 | 3.3 | 1.1 | 8.2 | 0.9 | 0.7 | 0.6 | 139.2 | 5.3 | 1.3 | 8.6 | 0.5 | 1.9 | 0.3 | 141.3 | 4.7 | 1.0 | 8.8 | 0.2 | 1.5 | 1.4 | 144.9 | 4.4 | 0.2 | 8.7 | 0.4 | 0.2 | 1.8 | 196.4 | 6.1 | 0.5 | 7.1 | 61.0 | 0.0 | 2.2 | 177.2 | 6.2 | 0.3 | 8.0 | 3.8 |
| Monthly Minimum half hour | 0.0 | 0.0 | 102.1 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 101.6 | 0.0 | 0.7 | 0.5 | 0.0 | 0.4 | 0.0 | 102.3 | 0.0 | 0.0 | 0.7 | 0.0 | 0.6 | 0.0 | 108.0 | 0.0 | 0.0 | 1.6 | 0.0 | 0.0 | 0.0 | 111.0 | 0.0 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 102.7 | 0.0 | 0.0 | 0.5 | 0.0 |
| Daily emission limit | 10 | n/a | 200 | 50 | 10 | 10 | 50 | 10 | n/a | 200 | 50 | 10 | 10 | 50 | 10 | n/a | 200 | 50 | 10 | 10 | 50 | 10 | n/a | 200 | 50 | 10 | 10 | 50 | 10 | 10 | n/a | 200 | 50 | 10 | 10 | 50 | | | | | | |
| Monthly Maximum daily avg. | 1.0 | 1.0 | 159.3 | 5.6 | 2.9 | 9.4 | 2.4 | 1.3 | 1.3 | 159.2 | 8.6 | 2.1 | 9.1 | 1.4 | 2.5 | 1.0 | 150.7 | 9.8 | 3.0 | 9.8 | 0.8 | 1.8 | 2.3 | 156.5 | 7.4 | 1.1 | 9.5 | 1.8 | 0.2 | 2.0 | 193.1 | 8.9 | 0.2 | 8.6 | 10.3 | 0.1 | 3.9 | 195.5 | 10.6 | 0.8 | 9.3 | 11.0 |

| | Jul-14 | | | | | | | Aug-14 | | | | | | | Sep-14 | | | | | | | Oct-14 | | | | | | | Nov-14 | | | | | | | Dec-14 | | | | | | |
|----------------------------|-------------|-----------------|-------|-----------------|-------|------|-----------------|-------------|-----------------|-------|-----------------|-------|------|-----------------|-------------|-----------------|-------|-----------------|-------|------|-----------------|-------------|-----------------|-------|-----------------|-----|-------|-----------------|-------------|-----------------|-------|-----------------|-----|-------|-----------------|--------|------|-------|-------|------|------|------|
| | particulate | NH ³ | NOx | SO ² | THC | HCL | CO ⁺ | particulate | NH ³ | NOx | SO ² | THC | HCL | CO ⁺ | particulate | NH ³ | NOx | SO ² | THC | HCL | CO ⁺ | particulate | NH ³ | NOx | SO ² | THC | HCL | CO ⁺ | particulate | NH ³ | NOx | SO ² | THC | HCL | CO ⁺ | | | | | | | |
| Half hour limit emission | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 30 | 10 | 400 | 200 | 20 | 60 | 150 | 30 | 10 | 400 | 200 | 20 | 60 | 150 | 30 | 10 | 400 | 200 | 20 | 60 | 150 | 30 | 10 | 400 | 200 | 20 | 60 | 150 | 30 | 10 | 400 | 200 | 20 | 60 | 150 | | | | | | | |
| Monthly Max half hour | 0.2 | 5.3 | 319.1 | 158.8 | 3.545 | 69.6 | 11.2 | 0.1 | 4.3 | 302.5 | 31.0 | 1.395 | 36.5 | 7.0 | 0.2 | 10.0 | 308.2 | 29.8 | 4.479 | 19.9 | 4.9 | 0.1 | 4.1 | 284.6 | 34.4 | 4.8 | 17.34 | 18.6 | 6.493 | 3.4 | 295.4 | 26.19 | 6.9 | 15.77 | 92.5 | 0.1 | 6.1 | 280.6 | 119.8 | 11.1 | 22.4 | 42.0 |
| Monthly Mean half hour | 0.0 | 1.3 | 169.7 | 6.4 | 0.1 | 7.8 | 1.5 | 0.0 | 1.3 | 176.7 | 3.0 | 0.0 | 8.5 | 2.5 | 0.0 | 1.2 | 169.4 | 7.1 | 0.5 | 8.3 | 1.2 | 0.0 | 0.7 | 166.5 | 8.2 | 0.5 | 8.2 | 1.8 | 0.7 | 1.0 | 171.2 | 10.1 | 0.6 | 8.8 | 5.5 | 0.1 | 1.4 | 152.7 | 7.6 | 0.6 | 7.8 | 3.3 |
| Monthly Minimum half hour | 0.0 | 0.0 | 88.3 | 0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 99.3 | 0.1 | 0.0 | 1.3 | 0.7 | 0.0 | 0.0 | 78.4 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 98.5 | 0.0 | 0.0 | 1.4 | 0.0 | 0.1 | 0.0 | 99.1 | 1.6 | 0.0 | 2.4 | 0.0 | 0.0 | 85.7 | 0.0 | 0.0 | 0.5 | 0.0 | |
| daily emission limit | 10 | n/a | 200 | 50 | 10 | 10 | 50 | 10 | n/a | 200 | 50 | 10 | 10 | 50 | 10 | n/a | 200 | 50 | 10 | 10 | 50 | 10 | n/a | 200 | 50 | 10 | 10 | 50 | 10 | 10 | n/a | 200 | 50 | 10 | 10 | 50 | | | | | | |
| Monthly Maximum daily avg. | 0.0 | 2.6 | 187.6 | 11.8 | 0.7 | 9.2 | 6.1 | 0.0 | 1.9 | 194.5 | 4.2 | 0.0 | 9.2 | 5.9 | 0.0 | 3.4 | 192.6 | 12.6 | 1.2 | 9.2 | 3.7 | 0.0 | 1.2 | 178.3 | 12.7 | 1.3 | 9.3 | 7.2 | 0.1 | 1.7 | 181.2 | 11.9 | 1.4 | 9.1 | 21.0 | 0.1 | 3.2 | 183.0 | 11.5 | 4.0 | 8.9 | 13.1 |

* CO now 10 min averages with 150 limit and a daily limit of 50 MG/M³



January 2013