Cory Environmental

Riverside Resource Recovery Facility

Annual Performance Report: 2014

Environmental Permit: BK0825IU

Riverside Resource Recovery Ltd
Norman Road
Belvedere
DA17 6JY

1. Introduction

The Riverside Resource Recovery Energy from Waste facility at Belvedere in the London Borough of Bexley, is Cory Environmental's single most significant development project. The facility is an important strategic river-served waste management facility for London, helping the capital to manage its own waste, keeping over 100,000 HGVs off the capital's congested roads each year and making a real contribution to London's ability to meet its landfill diversion targets.

With the Riverside Resource Recovery facility continuing to be fully operational, the Environment Agency has renewed the facility R1 certification; this means that the facility is classified as a recovery operation. The facility processes 670,000 tonnes of waste from across London and exports 470,000 - 480,000 Mega Watt hours of electricity to the National Grid (enough to power c.100,000 homes).

Cory's river operations are a key aspect of the process for Riverside, with over 85% of the waste being brought to the plant on barges along the River Thames. The Incinerator Bottom Ash (IBA) produced by Riverside is also taken away on the river to an IBA processing facility at Tilbury Docks.

The plant operates within a Health, Safety, Environmental and Quality Management System which is compliant with OHSAS 18001, ISO 14001 and ISO 9001and is independently audited.

2. Operational Overview

RRRL processes waste from the Western Riverside Waste Authority Boroughs, London Borough of Bexley, City of London, Westminster City Council and Commercial customers. River-borne waste is loaded into sealed containers at the four, Cory Environmental owned, river served transfer stations and is brought to RRRL by tug pulled barges. This waste is unloaded at the jetty and transferred on dock tractors and trailers to the tipping hall. Waste from the London Borough of Bexley arrives by road.

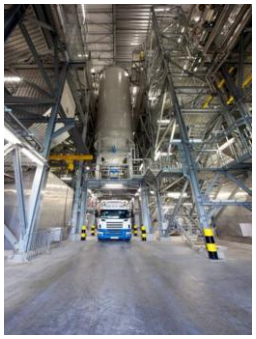
The waste is tipped into the site waste bunker where grab cranes transfer the waste into hoppers to be fed into the three combustion lines. The waste is incinerated at temperatures greater than 850°C using highly efficient moving grate combustion technology.

The ash produced from the incineration process is termed Incineration Bottom Ash (IBA) and accounts for approximately 28% of the facility's waste throughput. The ash

is passed through a quench bath and discharge vessel, which separates large metal items from the IBA. The IBA then enters the site ash bunker. Grab cranes are used to load IBA into hoppers which fill container boxes and are transported on dock tractors and trailers to the jetty where they are loaded on to barges and sent to be processed into aggregate (IBAA) at Tilbury docks. IBA from Riverside has been used in high-profile projects like the M25 widening scheme and DP World London Gateway projects.

The heat from the incineration process converts the water in the specialist highly efficient boilers into steam which drives a steam turbine to produce electricity which is exported to the National Grid and also provides the facility with its own electricity requirements. The steam is turned back into water and re-circulated in a series of air cooled condensers to further improve the plant's efficiency.

The flue gas goes through extensive cleaning processes to ensure it meets the requirements of the environmental permit. Oxides of nitrogen are reduced to nitrogen and water vapour by injection of aqueous ammonia within the furnace. Within the scrubber reactor vessel, hydrated lime is injected to neutralise the acidic gases and powdered activated carbon is injected to absorb heavy metals and dioxin/furans. Particulate matter is removed by passing the flue gas through a series of fabric filter bags. The porous nature of the filter bags will allow the cleaned gas through, which is released to atmosphere through the site stack, but not the powdered residue.



The resultant residue left on the filter bags is termed Air Pollution Control residue (APCr) and this is collected in 3 silos. APCr accounts for approximately 3-4% of the facility's waste throughput and at present and is sent for disposal at a licensed hazardous waste site. In 2014, methods for recycling APCr were trialled and, after proving to be successful, the facility now recycles 40-45% of the APCr produced at site.

3. Summary of Plant Operational Performance

The facility has three incineration lines, with the capability to burn over 2000 tonnes per day. The permitted volume of waste throughput is set at 670,000 tonnes in the planning consent, with 585,000 tonnes of that total being delivered via the river network.

The actual Plant Operational Performance in 2014 is provided below:

Operating Hours (3 lines)	-	24935.41
Waste Incinerated	-	669861 Tonnes
Electricity Produced	-	534828 MWh
Electricity Exported	-	480339 MWh
Incinerator Bottom Ash	-	179474 Tonnes
Air Pollution Control Residues	-	17593 Tonnes
Metal Recovered	-	705 Tonnes

Based on Operational Performance in 2014, RRRL has been awarded the coveted R1 status which means it is officially classified as a recovery facility rather than a disposal facility.

4. Summary of Plant Emissions

There are no point source emissions to water, air or land except from the sources and emissions points listed in the site PPC Permit.

4.1 Emissions to Air

Flue gases are released to atmosphere via the stack and are monitored and controlled to prevent any breaches of the emission limits set in the PPC Permit. The monitoring programme frequency for each flue gas species is as follows:

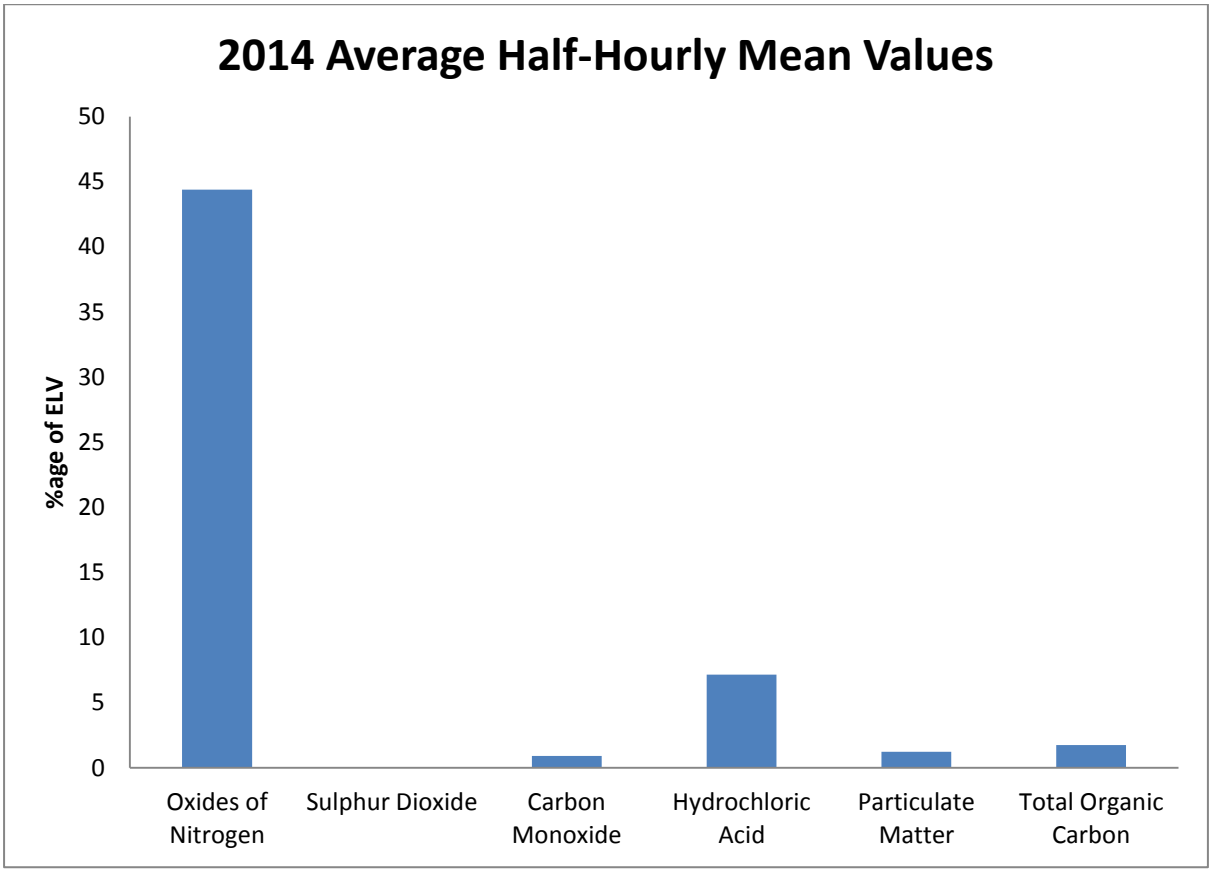
Pollutant	Monitoring Frequency
Particulate matter	Continuous & Bi-annually
Oxides of Nitrogen	Continuous & Bi-annually
Carbon Monoxide	Continuous & Bi-annually
Sulphur dioxide	Continuous & Bi-annually
Hydrochloric acid	Continuous & Bi-annually
Total Organic Carbon (TOC)	Continuous & Bi-annually
Ammonia	Continuous & Bi-annually
Mercury	Quarterly
Cadmium & Thallium	Quarterly
Total Heavy Metals*	Quarterly
Dioxins & Furans	Quarterly
Dioxin-like PCBs	Quarterly
Polycyclic Aromatic Hydrocarbons (PAH's)	Bi-annually
Hydrogen Fluoride	Bi-annually
Nitrous Oxide	Bi-annually

*Total Heavy Metals consists of Antimony, Arsenic, Lead, Cadmium, Chromium, Copper, Cobalt, Manganese, Mercury, Nickel, Thallium and Vanadium.

All monitoring is carried out to BS EN 14181 standard and the continuous emissions monitoring (CEMS) equipment is calibrated regularly with standby equipment always available to ensure that the monitoring programme continues to be in progress

whenever the Plant is in operation. The Quarterly and Bi-annual extractive testing is carried out by a fully accredited third party Testing House.

The 2014 average half-hourly emission values are given in the below table as a percentage of the Emission Limit Value (ELV):



In 2014, there were three half-hourly average emissions level exceedances at the Riverside Resource Recovery facility, for Carbon Monoxide. The cause of these incidents was thought to be volatile waste which caused combustion conditions in the furnace to rapidly change for a short period. Procedures are in place to minimise the possibility of such items entering the waste stream where possible and these procedures have been reviewed and improved as a result. There have been no resultant negative effects associated to this incident and the Environment Agency is fully supportive of the actions taken and the procedures in place at Riverside.

4.2 Fugitive Emissions

To reduce the fugitive emissions (e.g. odours, dust, noise) the following systems are in place:

- Waste is delivered to Riverside in sealed containers.

- All storage and processing are performed within the Plant building.

- The waste bunker is kept at a negative pressure to prevent the release of dust and odours from that area.

- A de-odouriser system is in place to spray an odour neutralising liquid into the bunker.

- A dust suppressant system is fitted in the waste bunker area.

- A dust extraction system is in place with the boiler house area of the Plant.

4.3 Emissions to Water

RRRL is only permitted to release uncontaminated roof and surface water to the two surrounding ditches on the site perimeter and to the River Thames. All drains are fitted with oil and water separators and there is a monthly visual inspection of the discharge points for visible oil or grease.

5. Plant Improvements

Improved Feed Rate Controller (IFRC)

The high variability in the physical properties of waste is a major source of disturbance for the combustion process. The IFRC, installed in 2014, includes additional measurements to evaluate differing waste conditions, which allows the IFRC to then stabilise the volume of waste found on the grate at that time. With the system now fully operational, steam flow has become more stable, requiring fewer CCS (combustion control system) alterations from the Plant Operators.

Pulse Jet Monitoring System (PJMS)

In 2014, there was an improvement made to the monitoring of the cleaning function across the fabric filter baghouse system. With the PJMS monitoring in operation, the Plant Operators are able to recognise failures more readily than before. This reduces the chance of blockages in the flow of gas through the baghouse chambers, caused by the build-up of APCr on the fabric filters, which if not detected, could ultimately lead to fabric filter bag failures and increased particulate emission levels.

End of Report