



Recovering Energy from Waste

Annual Performance Report

The Coventry and Solihull Waste Disposal Company Waste to Energy Plant Permit No NP3739PD Year 2009

Introduction

The Waste to Energy plant, which is located at Bar Road in Coventry, disposes of Municipal Household waste arising in Coventry and neighbouring Solihull. Small amounts of municipal household waste, arising from other nearby local authorities is also disposed of at the plant.

The plant is operated by The Coventry and Solihull Waste Disposal Company Ltd.

For further information on the report, or for copies of the report the contact the following representatives of the operator;

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Telephone Number	024 7650 7400
M Schilling	Environment, Health and Safety Advisor
Telephone Number	024 7650 7428

Plant Description

The main activity at the installation is to incinerate municipal waste and to recover energy, in the form of steam, heat, and electricity, for export to the local grid and factories.

A limited amount of hazardous waste, containing less than 1% halogenated organic substances (as chlorine), is also burned with the municipal waste.

The installation includes waste receipt and storage, waste heat boilers, abatement of the exhaust gas, on-site storage of residues and all systems for controlling and monitoring incinerator operation.

The plant design is capable of processing approximately 315,000 tonnes of waste per annum/36 tonnes per hour in three combustion streams. The heat produced was used to generate 17.7MW of electricity and until recently 16MWt heat energy to a local industrial site, but this has unfortunately closed. CSWDC are currently seeking an alternative customer for this source of energy.

The material is loaded into each of the furnaces via feed hoppers from a reception hall, where the waste vehicles deposit their loads into the storage bunkers. After entering the combustion chamber via the refuse feed ram the material is allowed to fall onto the grate in a controlled manner. The moving grate mechanisms are used to agitate the waste as it progresses down to the ash discharge.

As the waste moves along, primary air is introduced from beneath the grate enabling the waste to go through a series of drying and burning areas. Re-circulated flue gas is introduced from above the grate for combustion control. Auxiliary gas fired burners are located in the combustion chamber both to heat it up on start up and to maintain the final gas temperature.

The hot gases are maintained at a minimum temperature of 850°C for 2 seconds in the combustion chamber before passing to the boiler, economiser and abatement plant.

Each furnace is equipped with a 3-bank water tube boiler raising steam at 17 bar and 208°C. Economisers are fitted down stream of each boiler unit to pre-heat the incoming feed water.

Each incinerator line is provided with its own gas cleaning and monitoring equipment. Gas cleaning comprises Flue Gas Recirculation (FGR) and Ecotubes followed by activated carbon injection, then dry scrubbing with hydrated lime. The gasses pass through bag filters to remove particulates prior to discharge to atmosphere via a single 92m stack. A project exists to install a SNCR (selective non catalytic reduction) system which used ammonia to further improve combustion, thus reducing the NO_x and CO levels.

Emissions from the stack are continuously monitored for particulates, carbon monoxide (CO), sulphur dioxide (SO₂), hydrogen chloride (HCl), oxygen (O₂), nitrogen oxides (NO_x) and volatile organic compounds (VOC).

There is no discharge of process liquids to controlled waters. Uncontaminated surface and roof waters are discharged to the surface water sewer system. All process waste waters are discharged to foul sewer and these are treated at Finham STW.

Bottom ash from the incinerator grate is quenched with water and then conveyed to a concrete storage bunker prior to removal for reprocessing into aggregates.

The ferrous fraction from the bottom ash is removed by magnetic separation and stored in a bunker prior to removal for recycling for steel making.

Air pollution control residues from the bag filters are collected continuously and stored in an enclosed silo prior to removal for reuse in a waste treatment facility to neutralise acidic wastes.

Summary of plant operation

The plant consists of three separate incinerator lines that incinerate up to 12 tonnes of waste per hour.

There are two electrical generating sets on the plant which utilise the energy released from the waste incineration process. The generating sets are designated as G1 and G2. G1 has a capacity of 12.9MW and G2 a capacity of 4.8 MW. The process energy requirements are taken from the electricity generated and the surplus is exported to the community via the local grid.

The plant also has the capacity to export heat, in the form of high pressure hot water, to a local factory.

During 2009 the plant processed 245187 tonnes of municipal waste.

The following table categorises the types and permitted maximum amounts of wastes incinerated.

EWC Code	Description	Amount
19 12 01	paper and cardboard (confidential waste separately collected)	≈ 5%
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11	
20 01 01	paper and cardboard	≈ 5%
20 01 08	biodegradable kitchen waste	≈ 1%
20 02 01	biodegradable waste	≈ 1%
20 03 01	mixed municipal waste	≈ 90%
20 03 02	waste from markets	
20 03 07	bulky waste	
20 03 99	municipal waste not otherwise specified	
13 07 01*	fuel oil and diesel	<1%
13 08 99*	wastes not otherwise specified	
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02	
16 07 08*	waste containing oil	
19 12 10	Combustible waste (refuse derived fuel)	
19 01 99	Wastes not otherwise specified	≈ 0.1%

During 2009 the plant operated for the following hours on each incinerator line.

Incinerator line	Operating hours	Actual availability	Percent	Planned Percent availability
1	6879	78.5%		93
2	8023	91.5%		93
3	7486	85.4%		93

During 2009 there were planned outages for the following reasons.

Water washes on a quarterly basis on all three units.

Planned maintenance took place on units 1,2 and 3. Additionally, G1 condenser, G1 cooling towers, unit 1 HP condenser the LP condenser were all refurbished.

Other periods which were not accounted for by the planned availability to actual availability figures were primarily due to boiler tube failures, ash discharger blockages and crane faults.

The following table describes the type, amount and destination/treatment of residues produced by the process

Residue description	Quantity produced (tonnes)	Destination/treatment
Incinerator Bottom Ash	52565	Recycled in aggregates
Air pollution Control residue	7519	Sorbant treatment with final landfill
Incinerated metal	7925	Recycled

The total energy generated by the plant in 2009 was:

Total electricity generated	117015.2 MWh
Total electricity consumed on site	24759.7 MWh
Total electricity to community	93603.7 MWh
Total heat supply to local factory	0MWh

These results are similar to those seen in 2008.

The electricity exported to the community is equivalent for the average lighting needs of 15000 to 20000 houses.

Summary of plant emissions

The Continuous Emission Monitoring System (CEMS) continuously monitors the emissions to air of the following pollutants on each unit:

- Oxides of Nitrogen
- Carbon Monoxide
- Volatile organic Compounds
- Particulates
- Sulphur Dioxide
- Hydrogen Chloride

The CEMS continuously monitor the Dry and Wet Oxygen content of the gasses for each unit to correct the data to normalised conditions.

It also continuously monitors the gas flow rates for each unit to calculate mass release.

An attached appendix shows monthly average concentrations for each pollutant on each unit.

The emissions to air from the process remained compliant with the PPC Permit Emission Limit Values for half hourly averages for all notifiable pollutants, except as described in the section **Summary of plant compliance** which follows this section.

Graphs of the monthly average concentration for emissions of all notifiable pollutants on the three incinerators are shown at the end of this document in Appendix 3.

The Monthly average for Oxides of Nitrogen for all three units were below the Daily Emission Limit Value set down in the PPC permit of 200 mg/m³ although they are consistently close to the ELV throughout the year. We are installing ammonia injection (SNCR) in order to assist us in reducing the levels of this pollutant.

Levels of Carbon Monoxide produced averaged 25% of the Emission Limit Values for all units and Particulates, Carbon Monoxide, Hydrochlorides, and Sulphur dioxide have also indicated stable levels throughout the year.

Hydrocarbon results again demonstrate very low monthly averages.

A summary table of the mass emissions for 2009 is shown in Appendix 1

The mass emission results for heavy metals, cadmium, mercury, dioxins and hydrocarbons are extrapolated from the periodic monitoring carried out in July 2009. These results remain compliant and do not indicate any significant deviation on previous results.

Periodic sampling has been carried out 4 times during 2009 by an external sampling house. All the results sample were below the Environmental Permit Emission Limit Values. Where applicable the results were comparable with the data generated by the Continuous Emissions Monitoring equipment.

Periodic measurements are taken of the pollutants measured continuously and also the following on each unit.

- Heavy Metals
- Mercury
- Cadmium & thallium
- Hydrogen Fluorides
- Dioxins
- PCB.s

Summary of plant compliance

During 2009 there have were 7 incidents of abnormal operation amounting to a total of 60 hours.

Abnormal operations

Date	Unit	Parameter	Reason
26/06/2009	Unit 1	CEMS	Residual alarm led to CEMS failure 0.5 hrs
26/06/2009	Unit 2	CEMS	Residual alarm led to CEMS failure 0.5 hrs
1/10/2009	Unit 1	CEMS	Loss of CEMS data 2 hrs
1/10/2009	Unit 2	CEMS	Loss of CEMS data 2 hrs
1/10/2009	Unit 3	CEMS	Loss of CEMS data 2 hrs
1/12/2009	Unit 2	CEMS	Loss of CEMS data 33 hrs
11/12/2009	Unit 2	CEMS	Loss of CEMS data 20 hrs

There were five exceedences of the permitted emission limit values reported to the Environment Agency in 2009. All were due to unstable combustions.

Date	Unit	Parameter	Reason
13/02/2009	2	CO	Unstable combustion
11/06/2009	3	CO	Unstable combustion
11/06/2009	3	CO	Unstable combustion
24/06/2009	2	CO	Unstable combustion
26/06/2009	2	CO	Unstable combustion

One instance of fugitive emission was reported to the EA during October, in the form of an APC residue spillage that was contained on site, but could have reached neighbouring residents . hence its reporting to the Agency. There were two fugitive emissions of flakes of rust which were due to corrosion inside the temporary stack which was erected when the main stack was refurbished.

There have been 12 complaints relating to Environmental performance of the plant.

Complaint Type	Frequency in year
Odour	4
Noise	3
Dust	4
Miscellaneous	1

There were 3 noise complaints which related to contractor activity over short durations during the stack refurbishment. Explanations were given to the complainants who were satisfied with our responses.

There were 4 complaints of odour from the process. All were difficult to substantiate given the subjective nature of an individual's sense of smell. Controls have been tightened regarding the closure of the tipping hall doors and the checking of the de-odourising sprays has been added to the contract cleaners' periodic checks to ensure they are operating correctly. A new odour control system is expected to be installed during the first half of 2010.

Summary of plant improvements

During 2009 as part of our PPC Permit improvement programme we completed the following improvements:

- Refurbishment of the chimney stack liner
- Refurbishment of the cooling towers on G1
- Refurbishment of the LP condenser and one HP condenser
- Removal of the demineralisation plant which used hazardous chemicals
- Installation of a reverse-osmosis demineralisation plant

Summary of information made available

The Company has a Website (<http://www.cswdc.co.uk>) where the public can access information about the Company and its processes, including monthly updated emissions data.

An information brochure, which includes a process flow diagram, can be obtained upon request to the Company's office.

Information on emission releases to air may be obtained from the public registers which are held at the following addresses:

- Coventry City Council
- Environmental Services dept
- Broadgate House
- Broadgate
- Coventry

Environment Agency
Sentinel House,
9 Wellington Crescent,
Fradley Park,
Lichfield,
Staffordshire,
WS13 8RR

Visits to the plant may be arranged by contacting the Company's office

CSWDC Ltd
Bar Road
Coventry
CV3 4 AN
T 024 7650 7400
F 024 7650 7404

M Schilling

Environment, Health and Safety Advisor
January 2010

APPENDIX 1

MASS RESULTS SUMMARY

Year	SO2	HCl	NOx	CO	HC	Part	HF	Metals	Cd	Hg	Dioxin	CO2
2009	23.79	3.68	255.2	29.67	0.51	2.04	0.05	0.03	0.0006	0.0027	0.0305	140564
2008	12.11	4.31	248.3	30.39	1.004	4.07	0.08	0.09	0.0026	0.00015	0.0036	143902
2007	9.6	7.07	247.3	30.28	0.51	2.6	0	0.053	0.009	0	0.0087	146230

In Tonnes except Dioxins (grams)

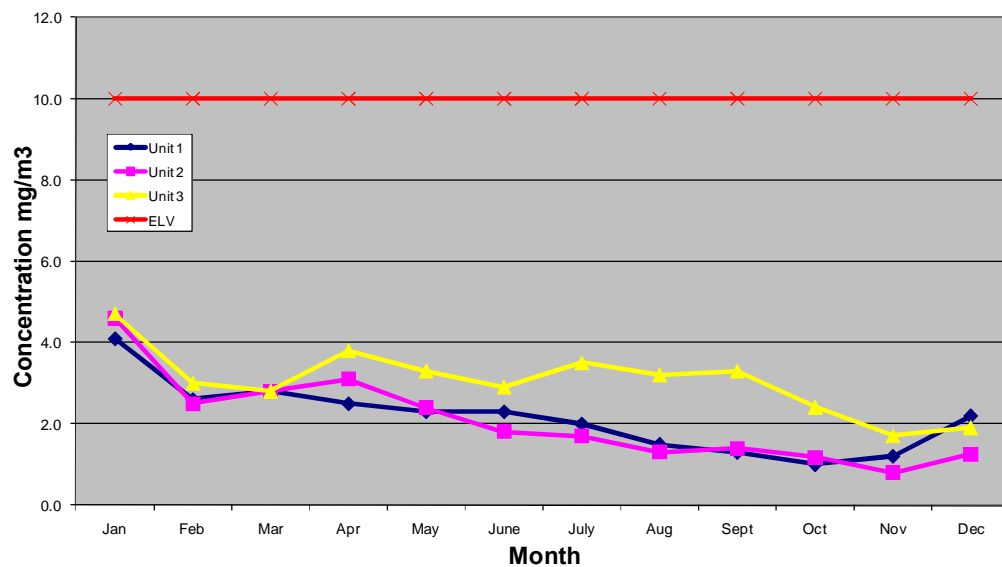
APPENDIX 2

TOTAL EMISSIONS (T) PER UNIT

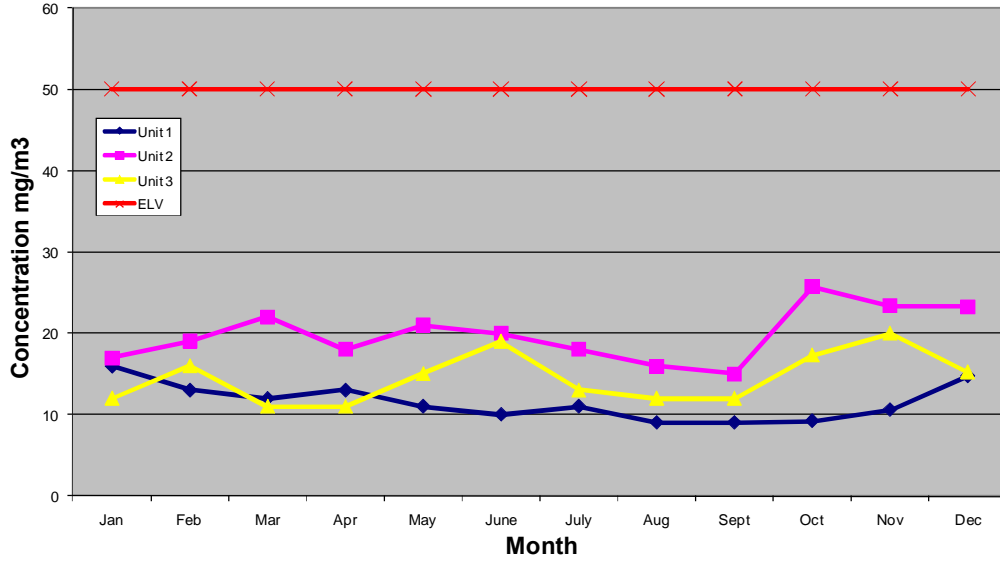
	HCL	SO2	NOx	CO	HC	Dust
UNIT 1	0.96	4.95	74.61	7.02	0.11	0.65
UNIT 2	1.29	12.12	98.85	12.30	0.20	0.69
UNIT 3	1.43	6.73	81.81	10.34	0.20	0.71

APPENDIX 3

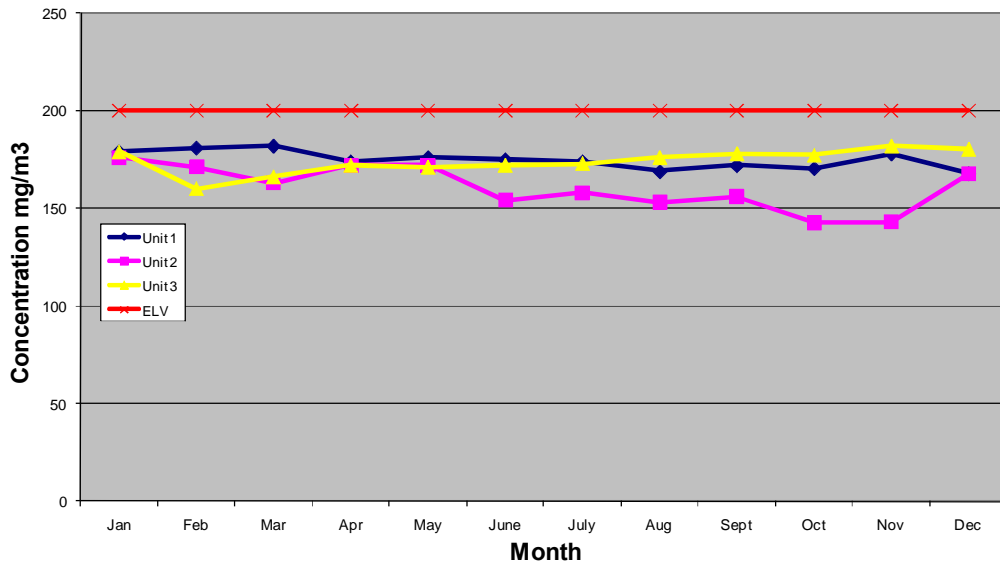
Monthly Averages - Hydrochlorides



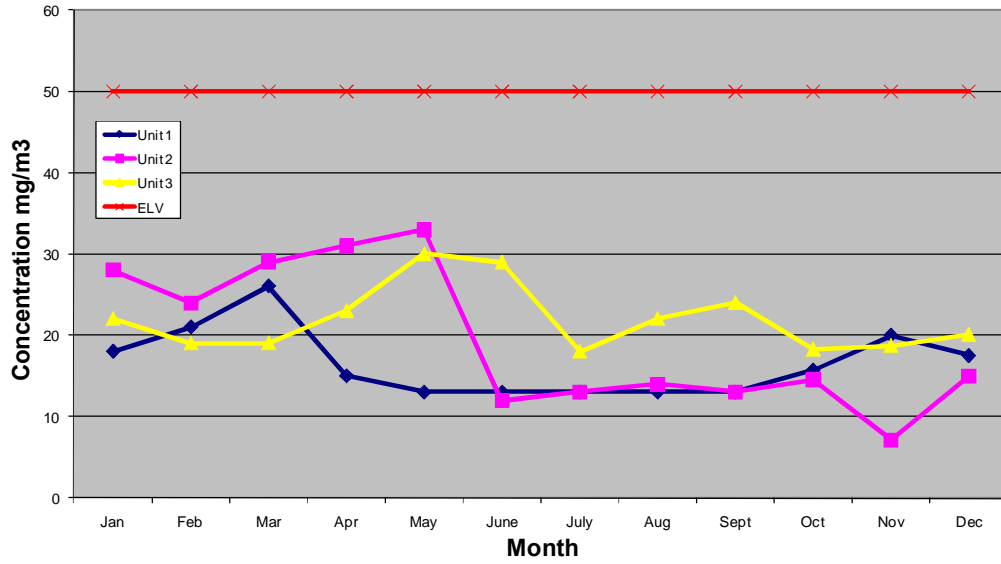
Monthly Averages Sulphur Dioxide



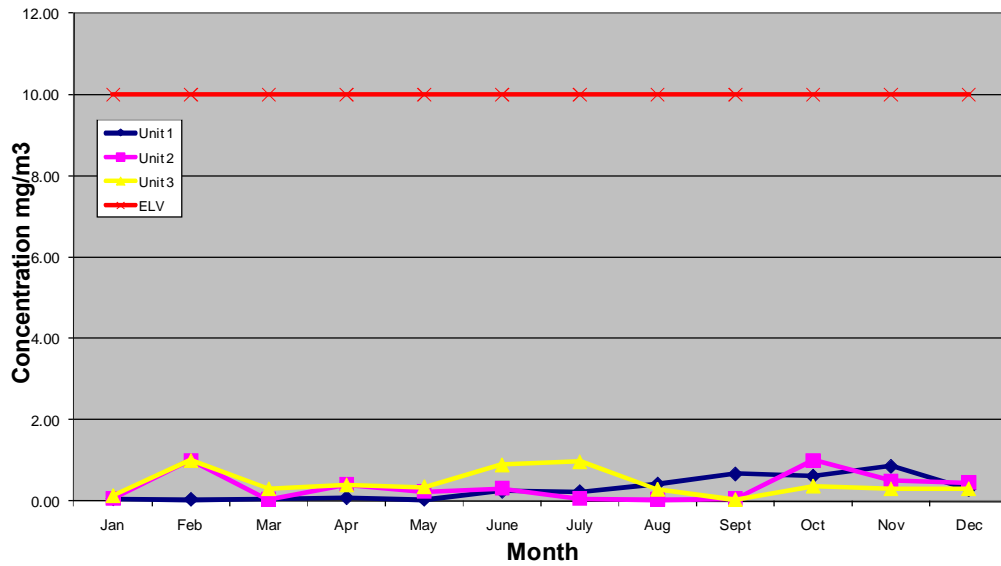
Monthly Averages - Oxides of Nitrogen



Monthly Averages - Carbon Monoxide



Monthly Averages Hydrocarbons



Monthly Averages - Particulates

