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GREATMOOR EMISSIONS REPORT

APPENDIX 18

APPENDIX 18: Greatmoor Emissions Report

Greatmoor
(/)

Emissions Reports

Emissions Monitoring

Operations at Greatmoor EfW, are controlled by the requirements of a permit regulated by the Environment Agency.

Greatmoor EFW incorporates modern, reliable and well understood combustion and pollution abatement technology. The plant has been designed in accordance with the requirements of the Industrial Emissions Directive 2010 (IED) and will employ The BAT (Best Available Techniques) Reference Document (BREF).

Environmental Permits contain conditions which must be complied with including a range of emissions limit values (ELV). They also include requirements for continuous emissions monitoring of a range of substances alongside testing being undertaken by an independent 3rd party organisation certified by the Environment Agency. All emission data and other exchanges of information are submitted to the Environment Agency for assessment.

The table on the right shows the ELV (Emissions Limit Values) in mg/m^3 for daily and half hourly periods

The graphs represent the average half hour and daily emissions calculated at Greatmoor. The bars show the maximum value recorded for the month as a percentage of the emission limit value allowed within the Permit.

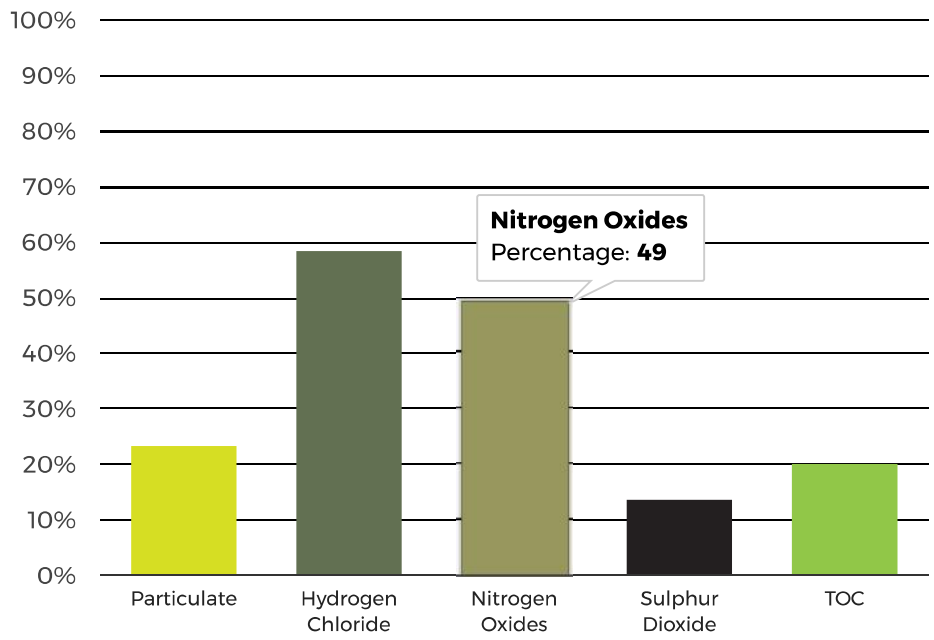
Substance	1/2 hour average	Daily Average
Dust	30	10
HCl	60	10
NOx	400	200
SO2	200	50
TOC	20	10

Substance	10 min average	Daily Average

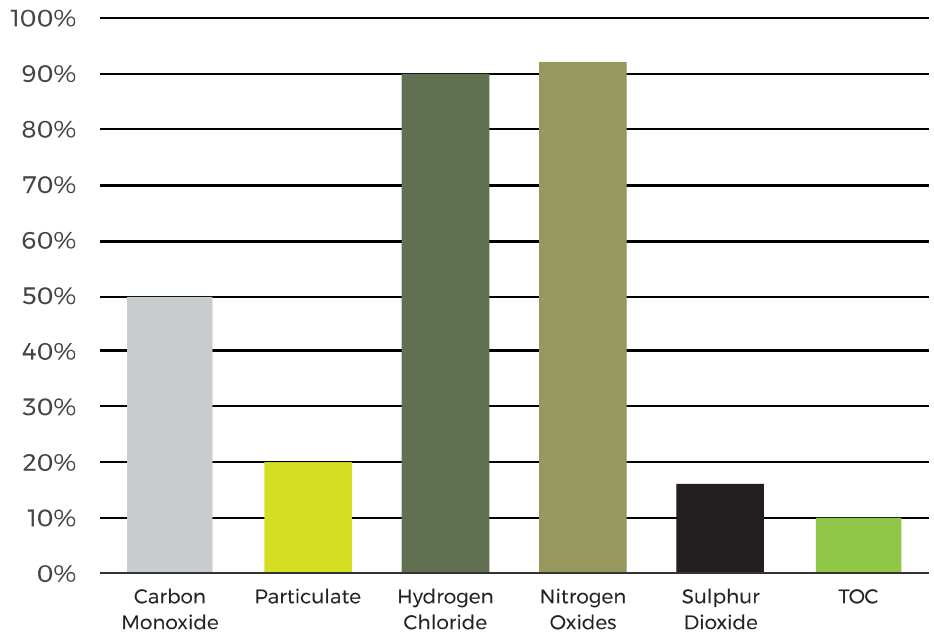
Substance	10 min average	Daily Average
CO	150	50

Continuous emissions data June 2017

Maximum Emission as a % of ½ hour ELV June 2017



Maximum Emission as a % of Daily ELV June 2017



CONTINUOUS EMISSIONS DATA ARCHIVE (/ALL-EMISSIONS)

Other Emissions

Other emissions including Dioxins, Furans and Heavy Metals are monitored on a quarterly basis.

The table on the right shows the monitoring results since Greatmoor opened, expressed as percentages of the limits as set in the permit.

Date	Dioxins & Furans	Cadmium & Thallium	Heavy Metals	Mercury	Hydrogen Fluoride
August 2016	2%	2%	45%	2%	2%
November 2016	19%	1%	2%	8%	1%
January 2017	8%	1%	4%	3%	2%
April 2017	2%	1%	4%	2%	1%

Dust (Particulates)

What is it?

Particulates is the term used to describe tiny particles in the air, made up of a complex mixture of soot, organic and inorganic materials with a particle size less than or equal to 10 microns diameter (10 microns is equal to one hundredth part of a mm).

How is it released?

There are many man-made sources of Particulates, including road transport and industry. There are also natural sources such as sand and dust storms and volcanoes.

How we control it

At Greatmoor EFW the exhaust gases are filtered through a bag filter, which traps fine particulate matter (dust). At Greatmoor EFW we have installed more than 2,000 filter bags distributed in 12 chambers.

Total Organic Carbon (TOC)

What is it?

Total Organic Carbon is a measurement of Volatile Organic Compounds (VOC)

VOC is a term used to classify a large group of liquids and gases (containing carbon) and are gaseous or easily vaporize at room temperature.

They can react with other gases, i.e. NO, to form ozone at low atmospheric levels which can be harmful to human health

How is it released?

Paints, natural gas, petrol, road transport and industrial processes are the major sources of these compounds; however some are also produced by natural biological processes.
Organic chemicals are widely used as ingredients in household products. Paints, varnishes and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them, and, to some degree, when they are stored.

How we control it

At Greatmoor we have an optimized combustion control system (CCS) in place to ensure the complete combustion of the volatile gases at the required 850˚C for 2 seconds.

Carbon Monoxide (CO)

What is it?

Carbon monoxide is both a common naturally occuring chemical and is also manufactured by man. It is a colourless, odourless poisonous gas.

How is it released?

Small amounts are also released from the burning of fossil fuels in power stations and waste incinerators.
It is produced by the incomplete burning of various fuels, including coal, wood, charcoal, oil, kerosene, propane, and natural gas

How we control it

At Greatmoor we have an optimized combustion control system (CCS) in place to ensure the complete combustion of the volatile gases at the required 850˚C for 2 seconds.

The design of the furnace optimises combustion conditions, the right oxygen and temperature reduces carbon monoxide concentrations and improves the burn-out.

Hydrogen Chloride (HCl)

What is it?

Hydrogen chloride is both a naturally occuring chemical and through manufacturing processes. It is a colourless, chemically reactive gas with a strong, pungent odour. In solution with water it forms a strong acid – hydrochloric acid. The gas is acidic and corrosive.

How is it released?

Hydrogen chloride is formed by combustion-related activities such as large coal burning power stations and incinerators. It is also formed in large quantities when materials such as plastics or polyvinyl chloride (PVC) are burnt.

How we control it

Flue gas cleaning with a Semy Dry Reactor, this abatement system uses hydrated lime and activated carbon to eliminate HCl, SO2 and other substances.

At Greatmoor EfW the parameters that control the reactor have been optimised during the commissioning process so the emissions can be controlled without overdosing reagent.

Sulphur Dioxide (SO2)

What is it?

Sulphur dioxide is man-made and naturally occurring colourless gas with a penetrating odour. It dissolves in water to form an acidic solution. Sulphur dioxide gas is one of the main chemicals that causes acid rain, can damage crops and forests and acidify sensitive soils and water bodies.

How is it released?

Sulphur dioxide is produced by burning coal and oil. Power stations and oil refineries release most of the sulphur dioxide in the air, but releases from domestic open fires can also affect local concentrations. Releases from its industrial uses are relatively small. Sulphur dioxide is also found naturally in the air at low concentrations from natural releases such as volcanoes and forest fires.

How we control it

Limitation on the fuel oil use on the process, the limit for sulphur in oil is 0.1%.

Flue gas cleaning with a Semy Dry Reactor, this abatement system uses hydrated lime and activated carbon to eliminate HCl, SO2 and other substances.

At Greatmoor EFw the parameters that control the reactor have been optimised during the commissioning process so the emissions can be controlled without overdosing reagent.

Nitrogen Oxides (NOx)

What is it?

The term 'nitrogen oxides' (NOx) is usually used to includes two gases – nitric oxide (NO), which is a colourless, odourless gas and nitrogen dioxide (NO2), which is a reddish-brown gas with a pungent odour. These contribute to acid rain, depletion of the ozone layer and have detrimental effects on health. They are also greenhouse gases.

How is it released?

Major man-made releases of nitrogen oxides are primarily from fuel combustion including vehicles, biomass burning and some production processes. There are also minor natural sources such as lightning, natural fires and biological processes in soils and waters.

How we control it

In order to control and reduce the emissions at Greatmoor we have an optimised Combustion Control system and a NOx reduction system which doses ammonia (NH3) as a control reagent. During the commissioning process both systems have been optimised to achieve the requirements under the Incineration Emissions Directive and Environmental Permit.

The production of NOx, N2O and Ammonia are interrelated. At Greatmoor EFW Plant has been optimised through combustion settings and suppliers vast experience of injection rates of Ammonia. This enables a steady & well controlled emissions for NOx, NH3 & N2O showing good levels of optimisation.

It is also a requirement under the Environment Permit to minimise the use of raw materials, therefore at Greatmoor we achieve an efficient use of ammonia by controlling NOx emissions and avoiding overdose of ammonia which will contribute to N2O emissions

Dioxins and Furans

What are they?

Dioxins (polychlorinated dibenzodioxin, PCDD) and furans(polychlorinated dibenzofuran, PCDF)

are families of complex chemicals containing chlorine. There are several hundred dioxin substances. They are crystalline solids which dissolve in organic (carbon-containing) solvents, fats and oils – but not in water.

How are they released?

Dioxins and furans are released as by-products from waste incineration, the burning of fuels (industrial, domestic and transport) the processing of metals and paper manufacture. Cigarette smoke also contains trace amounts. They are released naturally from forest fires and volcanoes.

How we control them

The plant it is designed to achieve the minimum temperature of 850˚C for a minimum of two seconds in the combustion chamber to minimise dioxins and furans formation.

The flue gases formed during combustion may contain very small quantities of dioxins and furans. These are adsorbed in the surface area of the activated carbon which is added into the Semi Dry Reactor where the flue gas is cleaned. The reaction products are a dry solid material called Air Pollution Control Residue (APCr) which is then separated by means of the fabric filter from the gas stream and disposed of off-site at a suitably permitted treatment facility.

Heavy Metals

What are they?

A metal of relatively high density, or of high relative atomic weight and includes

Arsenic, Antimony, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Thallium, Vanadium.

How are they released?

Heavy metals are natural constituents of the Earth's crust. They are stable and cannot be degraded or destroyed, and therefore they tend to accumulate in soils and sediments.

The principal man-made sources of heavy metals are industrial point sources, e.g. mines, foundries and smelters, and diffuse sources such as combustion by-products, traffic, etc.

How we control them

The flue gases may contain very small quantities of heavy metals where there is metal content within the waste. The first control is on the wastes that are accepted to limit their input. Heavy metals which are generared from the combustion process are adsorbed in the surface area of the activated carbon which is added into the Semi Dry Reactor where the flue gas is cleaned. The reaction products are a dry solid material called Air Pollution Control Residue (APCr) which is then separated by means of the fabric filter from the gas stream and disposed of off-site at a suitably permitted treatment facility.

Hydrogen Fluoride

What is it?

Under normal conditions, Hydrogen fluoride will be a colourless gas, which has a sharp, pungent smell. It is highly toxic and irritating, but non-flammable. Hydrogen fluoride is however usually found as a strong solution in water, whereby it is Hydrofluoric acid. Hydrofluoric acid is an extremely strong acid. It will severely corrode metals, glass, minerals and many organic (carbon-containing) substances – and will release highly flammable hydrogen in the process.

How is it released?

The main releases of Hydrogen fluoride occur from high temperature industrial processes. In the UK, the most significant releases will occur from coal-fired power stations. Hydrogen fluoride may also be released when products containing fluorine compounds (such as plastics and rubbers, fire extinguishing agents, aerosol propellants and other chemicals) are burned. Hydrogen fluoride is also released naturally from volcanic eruptions, but the amounts emitted are small in comparison to man-made sources.

How we control it

The first step in the control of Hydrogen fluoride is on the controls of the waste entering site to prevent large concentrations of Fluorine containing wastes. Hydrogen Fluoride which is generated is treated within the Flue gas cleaning system. Lime is added into the gas cleaning process with the reaction products being a dry solid material called Air Pollution Control Residue (APCr) which is then separated by means of the fabric filters from the gas stream and disposed of off-site at a suitably permitted treatment facility.

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