Emissions Monitoring Plan

Much Fawley Farm, Fawley, Herefordshire HR1 4SP

Prepared by

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Version 3

01-06-2021

Document Ref C4 4A Emissions Monitoring

To comply with the EPRBB3633DS site permit. The CHP1 and CHP2 and incinerator / boiler all need emission checks reported to comply with the permit.

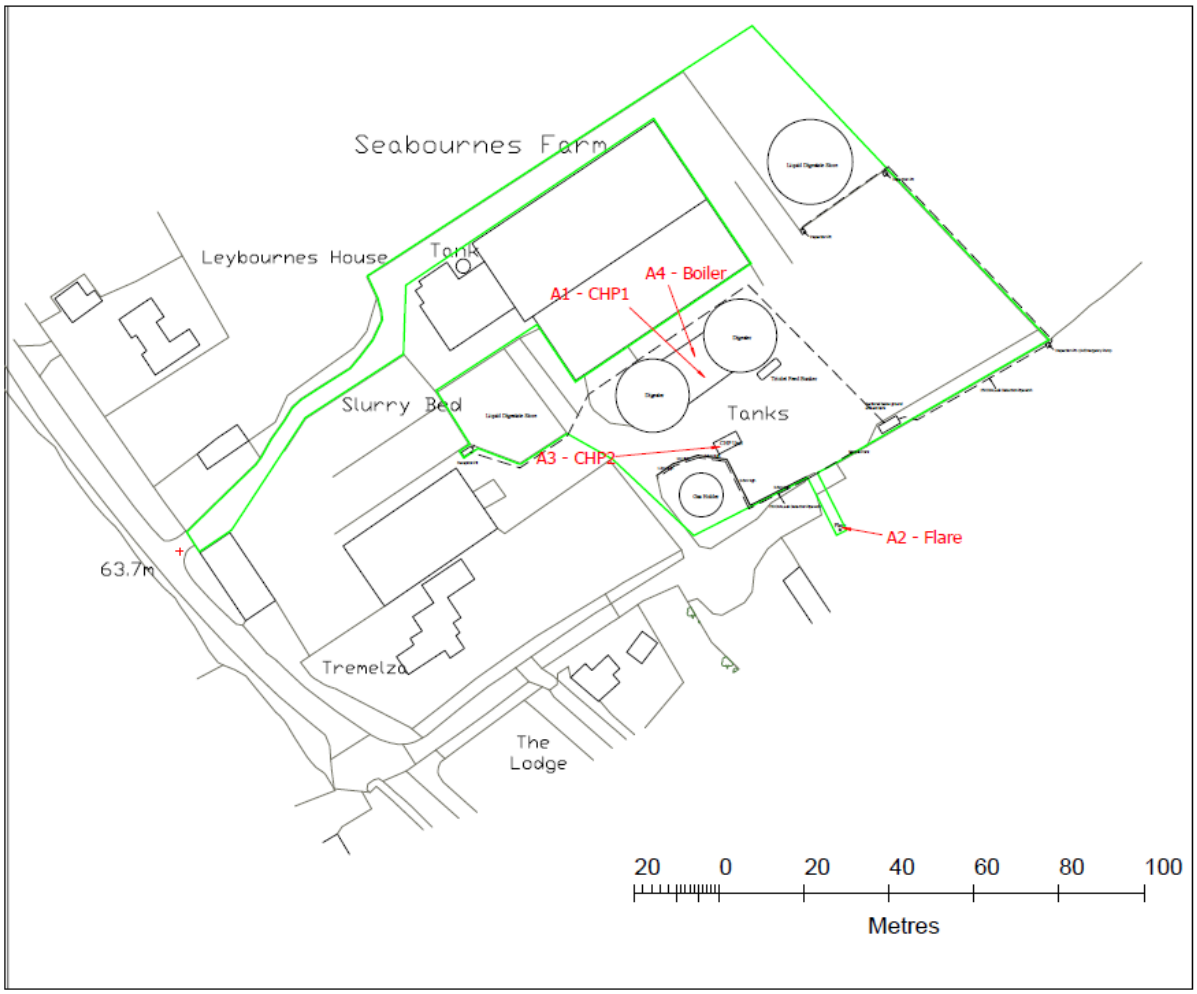
For ease of identification the Emission Points are labelled as below:

A1 = CHP1 Power Systems

A2 = Incinerator

A3 = CHP2 Habo BV

A4 = Boiler CIB Unigas Burners, type P92 Serial No 9711756



Changes

Version 3	1-6-21	Update of Emissions Monitoring Plan for Permit Variation
Version 3	1-6-21	Addition of emissions sampling locations.

Schedule 3 – Emissions

These emission points should be assessed against the following standards the boiler and incinerator should be assessed against the Flare standards as below.

Table S3.1 Point source emissions to air – emission limits and monitoring requirements

Emission point ref. & location	Parameter	Source	Limit (including unit) (1) (2)	Reference period	Monitoring frequency	Monitoring standard or method
CHP engine [Emission Point A1 (identified as J) on 'site plan showing emission points' in Schedule 7]	Oxides of Nitrogen	Exhaust stack of the gas engine	500 mg/m^3	Hourly average	Annual monitoring	BS EN 14792
	Carbon monoxide	Exhaust stack of the gas engine	1400 mg/m^3	Hourly average	Annual monitoring	BS EN 15058
	Sulphur dioxide	Exhaust stack of the gas engine	350 mg/m^3	Hourly average	Annual monitoring	BS EN 14791
	Total volatile organic compounds including methane	Exhaust stack of the gas engine	1000 mg/m^3	Hourly average	Annual monitoring	BS EN 12619 or BS EN 13526 depending on concentration
	Temperature	Exhaust stack of the gas engine	Gas engine exhaust gas temperature where the exhaust leaves the engine shall be no less than 200 degrees C	Instantaneous reading	Annual monitoring	None specified
	Stack exit velocity	Exhaust stack of the gas engine	Minimum stack exit velocity of 15 m/s to ensure effective plume breakaway	None specified	Annual monitoring	None specified
Auxilary flare [Emission Point A2 (identified as H) on 'site plan showing emission points' in Schedule 7]	Oxides of Nitrogen	Exhaust stack from gas flare	150 mg/m^3	Hourly average	Annual monitoring(3)	BS EN 14792
	Carbon monoxide	Exhaust stack from gas flare	50 mg/m^3	Hourly average	Annual monitoring(3)	BS EN 15058
	Total volatile organic compounds including methane	Exhaust stack from gas flare	10 mg/m^3	Hourly average	Annual monitoring(3)	BS EN 12619 or BS EN 13526 depending on concentration
Pressure relief valves	No parameters set	Pressure relief valves	No limit set	None specified	None specified	None specified

(1) Emission limits for the gas engines are based on normal operating conditions and load (temperature: 0^oC (273K); pressure: 101.3 kPa; and oxygen: 5 per cent (dry gas).

(2) Emission limits for the gas flare are based on normal operating conditions and load (temperature: 0^oC (273K); pressure: 101.3 kPa; and oxygen: 3 per cent (dry gas).

(3) Annual monitoring is only required when the gas flare operates for more than 10 per cent of a year (876 hours).

Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme (including the measurement of exhaust gas temperature) shall have either MCERTS certification or MCERTS accreditation (as appropriate), unless otherwise agreed in writing by the Environment Agency.

These CHP's incinerator and boiler will be monitored for the standards set out in the emissions techniques and standards in the following section.

Monitoring Stack Emissions: techniques and standards for periodic monitoring

Please find below extracts form the Environment Agency “Monitoring stack emissions: techniques and standards for periodic monitoring. These are being used as the standards against which emission monitoring are being done:

Nitrous oxide (dinitrogen monoxide)

Here are the relevant monitoring techniques and standards.

Monitoring technique 1

Monitoring technique 1 is extractive sampling and a NDIR analyser.

Monitoring standard

The monitoring standard is EN ISO 21258.

Interference is from carbon dioxide. You may need to measure carbon dioxide, so that it can be compensated for.

You must remove water vapour.

Monitoring technique 2

Monitoring technique 2 is extractive sampling and a FTIR analyser.

Monitoring standard

The monitoring standard is CEN TS 17337.

EN ISO 21258 is a reference method. You may use an alternative method provided you meet the requirements specified in the MCERTS performance standard for stack emissions monitoring organisations.

Carbon monoxide

Here are the relevant monitoring techniques and standards.

Monitoring technique 1

Monitoring technique 1 is extractive sampling and a NDIR analyser.

Monitoring standard

The relevant monitoring standard is EN 15058.

Monitoring technique 2

Monitoring technique 2 is extractive sampling and FTIR analyser.

EN 15058 is the standard reference method. You may use an alternative method, provided you meet the requirements specified in the MCERTS performance standard for stack emissions monitoring organisations.

Monitoring standard

The relevant monitoring standards are:

CEN TS 17337

alternative method for EN 15058

Sulphur dioxide

Here are the relevant techniques and standards.

Monitoring technique 1

Monitoring technique 1 is non isokinetic or isokinetic extraction and impingement into hydrogen peroxide solution. Analysis is by ion chromatography or Thorin method.

Monitoring standard

The monitoring standard is EN 14791.

Monitoring technique 2

Monitoring technique 2 is extractive sampling and measurement with an analyser.

Monitoring standard

The monitoring standard is CEN TS 17021.

It is based on the generic analyser technique. It specifies performance criteria, rather than a specific analyser technique.

You can use a performance criterion of 5% of the measured value for the losses and leakage in both the:

sample gas line

sample gas conditioning system performance characteristic

This performance criterion has an impact on measurement uncertainty. It is your responsibility to make sure that your measurement uncertainty meets the relevant requirements.

EN 14791 is the standard reference method. CEN TS 17021 may be used as an alternative method, provided you meet the requirements specified in the MCERTS performance standard for stack emissions monitoring organisations.

Some NDIR analysers may suffer from interference from methane. This may be an issue when measuring emissions from landfill gas engines and biowaste plants. You should make appropriate provisions to quantify the interference.

Instrument type testing specifies that the collective interference value must not be more than 4% of the certification range at either the zero or span point. You should refer to the MCERTS certificate to find the interference effects of methane.

If the methane interference effect is more than 4%, you must use another technique.

VOCs (total)

VOCs (total) are also referred to as total organic carbon (TOC).

Here are the relevant monitoring techniques and standards.

Monitoring technique 1

Monitoring technique 1 is extractive sampling and FID analyser.

Monitoring standard

The monitoring standard is EN 12619.

Interference from oxygen is reduced by using a mixed hydrogen and helium fuel.

You need to check interference from oxygen at 10% and 20%. This applies to combustion processes, especially when calibrating a CEMS for EN 14181 purposes.

If the FID does not meet the performance criteria at these concentrations, gases with an oxygen concentration similar to stack gas should be used for the zero and span checks at combustion processes, with emissions typically around 10% oxygen (for example, waste incineration plants).

Monitoring technique 2

Monitoring technique 2 is extractive sampling and a NDIR analyser equipped with a catalytic converter for the oxidation of VOCs to carbon dioxide.

Unlike FID techniques this approach does not have a flame or hydrogen fuel, so you can use it in applications where you must use intrinsically safe equipment.

The VOCs have the same response factors because they are oxidised to carbon dioxide. The technique does not have cross interference from oxygen.

Monitoring standard

The monitoring standard is EN ISO 13199.

It cannot be used to measure emissions from combustion processes. It may be used on painting and printing processes.

Gas velocity

Here are the relevant monitoring techniques and standards.

21.1 Monitoring technique

Several different techniques are specified for different applications.

velocity measurement at point – differential pressure devices and vane anemometer

determination of swirl – differential pressure devices able to determine flow direction (S-type, 2D or 3D Pitot tube)

periodic measurement of average velocity in a duct – grid of point velocity measurements, tracer dilution technique, tracer transit time technique and calculation approach based on energy consumption

calibration of continuous emissions monitoring systems (CEMS) for average velocity or volume - grid of point velocity measurements, tracer dilution technique, tracer transit time technique.

Monitoring standard

The monitoring standard is EN 16911-1 and MID for EN 16911-1.

The MID for EN 16911-1 provides information on the application of EN 16911-1 to flow measurements used for isokinetic sampling, and for calculating mass emissions from periodic monitoring.

CEN/TR 17078 – Guidance on the application of EN 16911-1 is a technical report that provides guidance on applying the standard to a range of applications with different uncertainty requirements (that is calibration of CEMS and emissions trading).

Results

Results to be recorded and kept within the Management System. Emissions Monitoring results section 28.

Reporting

Reporting will be carried out as per Schedule 4 and laid out in the reporting Form Appendix 1.

Schedule 4 - Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Emissions to air Parameters as required by condition 3.5.1.	CHP engine [Emission Point A1 (identified as J) on 'site plan showing emission points' in Schedule 7]	Every 12 months	16/01/12
	Auxiliary flare(1) [Emission Point A2 (identified as H) on 'site plan showing emission points' in Schedule 7]	Every 12 months	16/01/12

(1) Annual monitoring is only required when the gas flare operates for more than 10 per cent of a year (876 hours).

Table S4.2 Reporting forms

Media/parameter	Reporting format	Date of form
Air	Form air1 or other form as agreed in writing by the Environment Agency	16/01/12

Additional Emission Points

Additional equipment with emissions potential are being added to the permit as part of the March 2021 permit variation application. Once accepted these points will be included within the amended emissions Management Plan.

Permit Number: EPR/BB3633DS Operator: Mr Nigel Green and Mrs Sally Green

Facility: Much Fawley Farm Form Number: Air1/16/01/12

Reporting of emissions to air for the period from / / to / /

Emission Point	Substance / Parameter	Emission Limit Value [a] [b]	Reference Period	Result [1]	Test Method [2]	Sample Date and Times [3]	Uncertainty [4]
CHP engine [Emission Point A1 (identified as J) on 'site plan showing emission points' in Schedule 7]	Oxides of Nitrogen	500 mg/m^3	Hourly average		BS EN 14792		
	Carbon monoxide	1400 mg/m^3	Hourly average		BS EN 15058		
	Sulphur dioxide	350 mg/m^3	Hourly average		BS EN 14791		
	Total volatile organic compounds including methane	1000 mg/m^3	Hourly average		BS EN 12619 or BS EN 13526 depending on concentration		
	Temperature	Gas engine exhaust gas temperature where the exhaust leaves the engine shall be no less than 200 degrees C	Instantaneous reading		None specified		
	Stack exit velocity	Minimum stack exit velocity of 15 m/s to ensure effective plume breakaway	None specified		None specified		
Auxilary flare [c] [Emission Point A2 (identified as H) on 'site plan showing emission points' in Schedule 7]	Oxides of Nitrogen	150 mg/m^3	Hourly average		BS EN 14792		
	Carbon monoxide	50 mg/m^3	Hourly average		BS EN 15058		
	Total volatile organic compounds including methane	10 mg/m^3	Hourly average		BS EN 12619 or BS EN 13526 depending on concentration		

(a) Emission limits for the gas engines are based on normal operating conditions and load (temperature: 0°C (273K); pressure: 101.3 kPa; and oxygen: 5 per cent (dry gas).
(b) Emission limits for the gas flare are based on normal operating conditions and load (temperature: 0°C (273K); pressure: 101.3 kPa; and oxygen: 3 per cent (dry gas).
(c) Annual monitoring is only required when the gas flare operates for more than 10 per cent of a year (876 hours).

28/4/21

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Where the emission limit value is expressed as a range, the result is given as the 'minimum – maximum' measured values.

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with the Environment Agency is used, then the appropriate identifier is given. In other cases the principal technique is stated, for example gas chromatography.

[3] For non-continuous measurements the date and time of the sample that produced the result is given. For continuous measurements the percentage of the process operating time covered by the result is given.

[4] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated.

Signed ..... Date.....

(Authorised to sign as representative of Operator)