

Permit with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Dŵr Cymru Cyfyngedig

Five Fords WwTW Gas to Grid Facility
Cefn Road
Wrexham
Clwyd
LL13 0PA

Permit number
EPR/AP3139FT

Five Fords WwTW AAD Facility

Permit number EPR/AP3139FT

Introductory note

This introductory note does not form a part of the permit

The main features of the permit are as follows.

The permit is required to authorise the Recovery of non-hazardous waste with a capacity exceeding 100 tonnes per day involving biological treatment, which is an activity covered by the description in Section 5.4 Part A (1)(b)(i) and the resultant biogas is utilised in the gas to grid facility which is covered under Section 1.2 A (1)(a) in Schedule 1 of the Environmental Permitting Regulations.

A Cambi thermal hydrolysis process plant (AAD) prior to the AD operation, increases the yield of gas obtained from the digestion of sludge and also increases the quality of the fertiliser produced from the AD process.

Organic matter is broken down in the AD process by naturally occurring bacteria in the absence of air resulting in the production of biogas and fertiliser. The biogas is then either injected into the local distribution system or burnt in on-site CHP engines to generate electricity.

The feedstock associated with this plant is predominantly sewage sludge from the on-site sewerage treatment works and satellite sites in North Wales.

A liquor treatment plant will reduce the pollutants present in the post digestion dewatering centrate to acceptable levels before pumping back to the main waste water treatment plant.

The resultant biogas is sent from the AD process to the gas to grid facility, here the Biomethane injection plant (BIP) comprises three main packages; Biogas Upgrade plant (BUP); Grid Entry Unit (GEU) and Propane Storage and Transfer Plant (PSTP). The BIP is intended to take biogas produced from the anaerobic digestion part of the plant to allow direct injection of biomethane into the local distribution system.

The BUP has a maximum design capacity to handle 930Nm³/hour of biogas. The BUP cleans the biogas of contaminants deemed harmful to the natural gas grid and reduces the carbon dioxide content, thereby increasing the calorific value (CV) of the gas so it can be designated as biomethane. The pressure of the gas entering the BUP is increased by a gas booster and passed through 2 sets of activated carbon filters (ACFs) configure in series.

The first set of ACFs remove volatile organic compounds (VOCs) and siloxanes, the second set removes Hydrogen Sulphide. The biogas is then compressed, cooled and dried before being passed through a set of membranes which separate the methane from the carbon dioxide. Raw biogas pre gas to grid is 65% methane and is >99% methane post gas to grid.

The biomethane is then passed to the national grid entry unit where a small amount of Propane is added to produce enriched biomethane with a calorific value compatible with that required by the Gas Network Operator. Prior to injection into the gas grid network, the enriched biomethane is monitored, analysed and odourised. The odourisation of the gas is a legal requirement.

Two new boilers capable of operating on either natural gas or biogas have been installed to provide heat for the process. The two CHPs that are present on-site are only used when the gas to grid is offline, for peak lopping or TRIAD avoidance. The CHPs will run on biogas but will produce electricity for on-site use only, excess heat is vented through the heat dump fan, they are expected to run for approximately 1 day per month.

All emissions to air have been screened out as environmentally insignificant using detailed dispersion modelling.

Any liquid waste from the Installation will either be reused in the process or discharged to the sealed drainage system of the adjacent Five Fords WwTW and will undergo treatment through the sewage treatment works prior to discharge to the River Dee.

Dŵr Cymru Cyfyngedig (DCWW) have an Environmental Management System (EMS) that is certified to ISO14001 for waste water operational sites. Five Fords forms part of the scope of the EMS. The management system applies to all DCWW operations and is co-ordinated with the DCWW Quality Management System in relation to the management of the Five Fords Installation.

The status log of the permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	Date	Comments
Application EPR/AP3139FT/A001	Duly made 14/11/11	Application for CHP facility
Additional information received	08/12/11	Aermod data input file for the detailed air dispersion modelling
Additional information received	08/02/12	Related to the operation of siloxane removal plant
Permit determined	10/02/12	Permit issued to Dŵr Cymru Cyfyngedig
Agency variation determined EPR/AP3139FT/V002	26/03/13	Agency initiated variation to implement the changes introduced by IED
Variation Application EPR/AP3139FT/V003	Duly made 17/12/14	Variation Application for adding gas refining activity to enable injection of biogas to national grid
Additional information received	05/02/15	Clarification of throughput and revised risk assessment
Permit determined	23/03/15	Consolidated Permit issued

Status log of the permit		
Description	Date	Comments
Variation Application EPR/AP3139FT/V004	Duly made 29/10/18	Variation Application to add advanced anaerobic digestion process to Permit
Schedule 5 request for more information	09/11/18	Further information sought regarding air quality assessment and the Medium Combustion Plant Directive.
Schedule 5 information received	04/12/18	
Schedule 5 request for more information	15/01/19	Further information sought regarding secondary containment and the site condition report.
Schedule 5 information received	05/03/19	
Schedule 5 request for more information	26/03/19	Further information sought regarding secondary containment and site surfacing.
Schedule 5 information received	11/07/19	Numerous response received between 26/03/19 and 11/07/19. Final response received on the 11/07/19.
Schedule 5 request for more information	19/09/19	Further information sought regarding site plan.
Schedule 5 information received	26/09/19	
Permit determined	01/10/2019	Permit issued to Dŵr Cymru Cyfyngedig

End of Introductory Note

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number
EPR/AP3139FT

The Natural Resources Body for Wales (“Natural Resources Wales”) authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2016

Dŵr Cymru Cyfyngedig (“the operator”),

whose registered office is

**Pentwyn Road
Nelson
Treharris
Mid Glamorgan
CF46 6LY**

company registration number **02366777**

to operate an installation at

**Five Fords WwTW Gas to Grid Facility
Cefn Road
Abenbury
Wrexham
Clwyd
LL13 0PA**

to the extent authorised by and subject to the conditions of this permit.

Name	Date
Holly Noble	01 October 2019

Authorised on behalf of Natural Resources Wales

Conditions

1 Management

1.1 General management

- 1.1.1 The operator shall manage and operate the activities:
- (a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and
 - (b) using sufficient competent persons and resources.
- 1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.
- 1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.
- 1.1.4 The operator shall comply with the requirements of an approved competence scheme.

1.2 Energy efficiency

- 1.2.1 The operator shall:
- (a) take appropriate measures to ensure that energy is recovered with a high level of energy efficiency and energy is used efficiently in the activities.
 - (b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and
 - (c) take any further appropriate measures identified by a review.

1.3 Efficient use of raw materials

- 1.3.1 The operator shall:
- (a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;
 - (b) maintain records of raw materials and water used in the activities;
 - (c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and
 - (d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

- 1.4.1 The operator shall take appropriate measures to ensure that:
- (a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and
 - (b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and
 - (c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.
- 1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

- 2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the “activities”).
- 2.1.2 For the following activities referenced in schedule 1, table S1.1. Waste authorised by this permit shall be clearly distinguished from any other waste on the site.
- 2.1.3 No MCP shall be operated beyond the site of the grid reference specified for it in table S1.1 of the permit.

2.2 The site

- 2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

- 2.3.1 (a) For the following activities referenced in schedule 1, table S1.1. The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by Natural Resources Wales.
- (b) If notified by Natural Resources Wales that the activities are giving rise to pollution, the operator shall submit to Natural Resources Wales for approval within the period specified, a revision of any plan or other documentation (“plan”) specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.
- 2.3.2 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.

- 2.3.3 Waste shall only be accepted if:
- (a) it is of a type and quantity listed in schedule 2 table S2.2 and
 - (b) it conforms to the description in the documentation supplied by the producer and holder.
- 2.3.4 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:
- (a) the nature of the process producing the waste;
 - (b) the composition of the waste;
 - (c) the handling requirements of the waste;
 - (d) the hazardous property associated with the waste, if applicable; and
 - (e) the waste code of the waste.
- 2.3.5 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.
- 2.3.6 For the following activities referenced in schedule 1, table S1.1 the activities shall be operated using the techniques and, in the manner, described in table S1.2.

2.4 Improvement programme

- 2.4.1 The operator shall complete the improvements specified in Schedule 1 Table S1.3 by the date specified in that table unless otherwise agreed in writing by Natural Resources Wales.
- 2.4.2 Except in the case of an improvement which consists only of a submission to Natural Resources Wales, the operator shall notify Natural Resources Wales within 14 days of completion of each improvement.

3 Emissions and monitoring

3.1 Emissions to water, air or land

- 3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1, S3.2 and S3.3.
- 3.1.2 The limits given in schedule 3 shall not be exceeded.
- 3.1.3 For the following activities referenced in schedule 1, table S1.1. Where a substance is specified in schedule 3 table S3.1 or S3.2 but no limit is set for it, the concentration of such substance in emissions to water from the relevant emission point shall be no greater than the background concentration.
- 3.1.4 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

3.2 Emissions of substances not controlled by emission limits

- 3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

- 3.2.2 The operator shall:
- (a) if notified by Natural Resources Wales that the activities are giving rise to pollution, submit to Natural Resources Wales for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;
 - (b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.
- 3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Odour

- 3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.
- 3.3.2 The operator shall:
- (a) if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to odour, submit to Natural Resources Wales for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;
 - (b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

3.4 Noise and vibration

- 3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.
- 3.4.2 The operator shall:
- (a) if notified Natural Resources Wales that the activities are giving rise to pollution outside the site due to noise and vibration, submit to Natural Resources Wales for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;
 - (b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

3.5 Monitoring

- 3.5.1 The operator shall, unless otherwise agreed in writing by Natural Resources Wales, undertake the monitoring specified in the following tables in schedule 3 to this permit:
- (a) point source emissions specified in tables S3.1 and S3.2
 - (b) process monitoring specified in table S3.3;

- 3.5.2 Monitoring shall not take place during periods of start up or shut down.
- 3.5.3 For the following activities referenced in schedule 1, table S1.1 the first monitoring measurements shall be carried out within four months of the issue date of the permit or the date when the MCP is first put into operation, whichever is later.
- 3.5.4 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.
- 3.5.5 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by Natural Resources Wales.
- 3.5.6 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1, S3.2 and S3.3 unless otherwise agreed in writing by Natural Resources Wales.

4 Information

4.1 Records

- 4.1.1 All records required to be made by this permit shall:
- (a) be legible;
 - (b) be made as soon as reasonably practicable;
 - (c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and
 - (d) be retained, unless otherwise agreed in writing by Natural Resources Wales, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:
 - (i) off-site environmental effects; and
 - (ii) matters which affect the condition of the land and groundwater.
- 4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by Natural Resources Wales.
- 4.1.3 The operator shall maintain a record of the type and quantity of fuel used and the total annual hours of operation for each MCP and/or generator.
- 4.1.4 The operator shall maintain a record of any events of non-compliance and the measures taken to ensure compliance is restored in the shortest possible time

4.2 Reporting

- 4.2.1 The operator shall send all reports and notifications required by the permit to Natural Resources Wales using the contact details supplied in writing by Natural Resources Wales.
- 4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31st March (or other date agreed in writing by Natural Resources Wales) each year. The report(s) shall include as a minimum:

- (a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;
 - (b) the annual production /treatment data set out in schedule 4 table S4.2;
 - (c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule; and
- 4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by Natural Resources Wales, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:
 - (a) in respect of the parameters and emission points specified in schedule 4 table S4.1;
 - (b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.4; and
 - (c) giving the information from such results and assessments as may be required by the forms specified in those tables.
- 4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to Natural Resources Wales, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.
- 4.2.5 The operator shall submit an annual solvent management plan in order to demonstrate compliance with the requirements of the Industrial Emissions Directive, by 31 January each year in respect of the previous year.

4.3 Notifications

- 4.3.1 The Operator shall
 - (a) in the event that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—
 - (i) inform Natural Resources Wales,
 - (ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and
 - (iii) take the measures necessary to prevent further possible incidents or accidents;
 - (b) in the event of a breach of any permit condition, the operator must immediately—
 - (i) inform Natural Resources Wales, and
 - (ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;
 - (c) in the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.
- 4.3.2 Any information provided under condition 4.3.1(a)(i), or 4.3.1 (b)(i) where the information relates to the breach of a limit specified in the permit, shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.
- 4.3.3 Where Natural Resources Wales has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform Natural Resources Wales when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to Natural Resources Wales at least 14 days before the date the monitoring is to be undertaken.

- 4.3.4 Natural Resources Wales shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

- (a) any change in the operator's trading name, registered name or registered office address; and
- (b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

- (a) any change in the operator's name or address; and
- (b) any steps taken with a view to the dissolution of the operator.

In any other case:

- (a) the death of any of the named operators (where the operator consists of more than one named individual);
- (b) any change in the operator's name(s) or address(es); and
- (c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

- 4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

- (a) Natural Resources Wales shall be notified at least 14 days before making the change; and
- (b) the notification shall contain a description of the proposed change in operation.

- 4.3.6 Natural Resources Wales shall be given at least 14 days' notice before implementation of any part of the site closure plan.

4.4 Interpretation

- 4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

- 4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "immediately", in which case it may be provided by telephone.

Schedule 1 - Operations

Table S1.1 activities		
Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
S5.4 A (1)(b)(i) - Recovery of non-hazardous waste with a capacity exceeding 100 tonnes per day involving (i) biological treatment	R3: Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological/transformation processes).	From receipt of waste through to digestion and recovery of by-products (digestate)
	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced).	Advanced anaerobic digestion of waste by a Cambi thermal hydrolysis process (THP) plant, followed by burning of biogas produced from the process or injection of the produced biogas into the local distribution network.
		Heat treatment of waste in the Cambi Thermal Hydrolysis process (THP) prior to anaerobic digestion.
		Waste types suitable for acceptance are limited to those listed in Schedule 2.
		The total annual throughput -up to 104,465 tonnes of liquid organic waste.
		Waste acceptance and pre-treatment will take place within an enclosed building.
		Activities shall be carried out on an impermeable surface with a sealed drainage system.
S1.2A(1)(a) – Refining gas where this is likely to involve the use of 1000 more tonnes of gas in any 12-month period.	Refining of biogas produced from Anaerobic digestion of sewerage sludge prior to the direct injection into the local distribution network.	From receipt of raw biogas to entry to the local distribution network including gas odourisation.
Medium Combustion Plant		
Schedule 25A – MCP (as detailed in Schedule 8)	2 x 1.668 MWth steam raising boilers fuelled by natural gas and biogas. NGR: SJ 364480	From receipt of fuel to emission of combustion products. Operating hours not restricted.
Directly Associated Activities		
Propane storage and transfer plant	Addition of propane to bio-methane to enhance calorific value of gas	Storage and transfer of propane.

Table S1.1 activities

Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
Steam and electrical power supply	R1: Use principally as a fuel to generate electricity.	From the receipt of biogas produced at the on-site anaerobic digestion process to combustion with the release of combustion gases. Combustion of biogas in 2 x 1.668MWth boilers and 2.82MWth CHP plant.
Emergency flare operation	D10: Incineration on land	From the receipt of biogas produced at the on-site anaerobic digestion process to incineration with the release of combustion gases. Use of 1 x auxiliary flare required only during periods of breakdown or maintenance of the plant.
Gas Storage	Storage of biogas arising from the anaerobic digestion process.	Storage of biogas prior to injection to the local distribution network, or burnt in the boilers, CHP or flare.
Siloxane Removal Plant	A granular activated carbon filter, which removes siloxane from the biogas.	The generation of gas from the anaerobic digestion plant prior to injection to the local distribution system or burnt in the CHP or boilers.
Discharge of condensate	Condensate from the gas pipelines, gas storage bag and from the siloxane removal media regeneration process.	From collection to the point of discharge at the adjacent WwTW.
Digestate storage	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced).	From the receipt of processed uncertified digestate produced from the on-site anaerobic digestion process to dispatch for use off-site.

Table S1.2 Operating techniques

Description	Parts	Date Received
Application EPR/AP3139FT/A001	Environmental permit supporting information document and Site Condition report	31/08/11
Additional information	Revised Air Quality Assessment and H1 Risk Assessment	08/11/11
Additional information	Email dated 08/02/12 providing further information relating to the operation of the siloxane removal plant	08/02/12
Application EPR/AP3139FT/V003	Environmental permit variation application, supporting information and Site Condition report	17/12/14
Additional information	Clarification regarding risk assessment and throughput at site	05/12/15
Application EPR/AP3139FT/V003	Five Fords AAD – noise assessment	01/06/16
Application EPR/AP3139FT/V003	Five Fords WwTW AAD – Odour Impact Assessment of Upgrade Works	26/07/16

Table S1.2 Operating techniques

Description	Parts	Date Received
Application EPR/AP3139FT/V003	Environmental risk assessment document	26/07/18
Application EPR/AP3139FT/V004	Air Quality Assessment – Five Fords AAD	23/11/18
Application EPR/AP3139FT/V004	Section 2 and 3 of Permit application supporting document	28/11/18

Additional operating techniques for Medium Combustion Plant (as detailed in Schedule 6), and Specified Generators

- (a) Each MCP must be operated in accordance with the manufacturer's instructions and records must be made and retained to demonstrate this.
- (b) The operator must keep periods of start-up and shut-down of each MCP and generator as short as possible.
- (c) There must be no persistent emission of 'dark smoke' as defined in section 3(1) of the Clean Air Act 1993.

Table S1.3 Improvement programme requirements

Ref.	Requirement	Date
IC5	The Operator shall incorporate the Biomethane Injection Plant Accident Management arrangements into the existing Accident Management Plan.	Complete
IC6	The Operator shall update its existing Environmental Management System to incorporate the new activities carried out by the Biomethane Injection Plant.	Complete
	The Operator shall submit the updated EMS to Natural Resources Wales for approval	
IC7	The operator shall submit a report detailing how they will construct impermeable bunding and surface work around storage and process tanks on site. The report should include a site plan showing the extent of the work, information on the anticipated capacity of the "bunded/kerbed" area, justification for the height of any kerb/bund. Justification is required in the report for any areas the operator believe bunding and surface work is not required.	31/10/2019
	The Operator shall submit the report to Natural Resources Wales for approval	
IC8	Once the proposal IC7 is agreed with NRW, complete required bunding and surface work around required storage and process tanks no later than 6 months.	Within 6 months of agreement of IC7
IC9	The Operator shall update its existing Environmental Management System to incorporate all activities now covered by the permit.	Within 3 months of permit variation issued.
	The Operator shall submit the updated EMS to Natural Resources Wales for approval	

Schedule 2 - Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels

Raw materials and fuel description	Specification
Natural Gas	-
Biogas	-
Corrosion Inhibitor	-
Lubricating Oil	-
Carbon Filters	-

Table S2.2 Permitted waste types for AD plant

Maximum quantity	104,465 tonnes per annum
Waste code	Description
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
19.08	wastes from waste water treatment plants not otherwise specified
19.08.01	screenings
19.08.02	waste from de-sanding
19.08.05	sludges from treatment of urban waste water
19.08.99	centrate liquor only
19.09	wastes from the preparation of water intended for human consumption or water for industrial use
19.09.02	sludges from water clarification
19.09.03	sludges from decarbonation
19.09.06	solutions and sludges from regeneration of ion exchangers
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS
20.03	other municipal wastes
20.03.04	septic tank sludge
20.03.06	waste from sewage-cleaning
20.03.99	cesspool waste and other sewage sludge only

Schedule 3 – Emissions and monitoring

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

Emission point ref. & location	Source	Parameter	Limit (including unit) ¹	Reference Period	Monitoring frequency	Monitoring standard or method ²
A1 CHP Stack (1) (Point A1 on the Site installation boundary plan in Schedule 7).	1.41MW CHP engine exhaust stack	Oxides of Nitrogen (expressed as NO ₂)	500 mg/m ³	Hourly Average	Annual	BS EN 14792
		Carbon Monoxide	1400 mg/m ³			BS EN 15058
		Sulphur Dioxide	No Limit Set			BS EN 14791
A2 CHP Stack (2) (Point A2 on the Site installation boundary plan in Schedule 7).	1.41MW CHP engine exhaust stack	Oxides of Nitrogen (expressed as NO ₂)	500 mg/m ³	Hourly Average	Annual	BS EN 14792
		Carbon Monoxide	1400 mg/m ³			BS EN 15058
		Sulphur Dioxide	No Limit Set			BS EN 14791
A4 (Point A4 on the Site installation boundary plan in Schedule 7).	Siloxane removal unit	Siloxane	No Limit Set		No monitoring required	
A5 (Point A5 on the Site installation boundary plan in Schedule 7).	Waste gas burner (flare stack)	-	-		No monitoring required	
A6 (Point A6 on the Site installation boundary plan in Schedule 7).	Biomethane plant stack	Nitrogen	No Limit Set		No monitoring required	
		Oxygen				
		Carbon monoxide				
		Methane				
		Hydrogen sulphide				
		Odour				
A7 (Point A7 on the Site installation boundary plan in Schedule 7).	Digester 1 gas relief valve	-	-		No monitoring required	

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

Emission point ref. & location	Source	Parameter	Limit (including unit) ¹	Reference Period	Monitoring frequency	Monitoring standard or method ²
A8 (Point A8 on the Site installation boundary plan in Schedule 7).	Digester 2 gas relief valve	-	-		No monitoring required	
A9 (Point A9 on the Site installation boundary plan in Schedule 7).	Existing gas holder pressure relief valve	-	-		No monitoring required	
A10 (Point A10 on the Site installation boundary plan in Schedule 7).	New gas holder pressure relief valve	-	-		No monitoring required	
A11 (Point A11 on the Site installation boundary plan in Schedule 7).	New Medium Combustion Plant - Steam boiler 1 – operating on Natural Gas	Oxides of Nitrogen (expressed as NO ₂)	100 mg/m ³	Hourly Average	Annual	BS EN 14792
		Carbon Monoxide	12.5 mg/m ³			BS EN 15058
		Sulphur Dioxide	No Limit Set			BS EN 14791
	New Medium Combustion Plant - Steam boiler 1 – operating on Biogas	Oxides of Nitrogen (expressed as NO ₂)	100 mg/m ³			BS EN 14792
		Carbon Monoxide	12.5 mg/m ³			BS EN 15058
		Sulphur Dioxide	100 mg/m ³			BS EN 14791
A12 (Point A12 on the Site installation boundary plan in Schedule 7).	New Medium Combustion Plant - Steam boiler 2 – operating on Natural Gas	Oxides of Nitrogen (expressed as NO ₂)	100 mg/m ³	Hourly Average	Annual	BS EN 14792
		Carbon Monoxide	12.5 mg/m ³			BS EN 15058
		Sulphur Dioxide	No Limit Set			BS EN 14791
	New Medium Combustion Plant - Steam boiler 2 – operating on Biogas	Oxides of Nitrogen (expressed as NO ₂)	100 mg/m ³			BS EN 14792
		Carbon Monoxide	12.5 mg/m ³			BS EN 15058
		Sulphur Dioxide	100 mg/m ³			BS EN 14791

Emission points A1-A2, monitoring is only required if CHP plant operates >10% of the time

(1) Reference conditions for SI engines are dry air, 272K at a pressure of 101.3kPa with an oxygen content of 5%.

(2) Certification to the MCERTS performance standards indicates compliance with BS EN 15267-3

Table S3.2 Point Source emissions to sewer, effluent treatment plant or other transfer offsite – emission limits and monitoring requirements

Emission point ref. & location	Source	Parameter	Limit (incl. unit)	Conc. Limit (incl. unit)	Reference Period	Monitoring frequency	Monitoring standard or method
W1 (Point W1 on site installation boundary plan in Schedule 7 – discharged to Five Fords WwTW)	Condensate from the gas pipelines and gas storage bag	No Parameters set				No monitoring required	
W2 (Point W2 on site installation boundary plan in Schedule 7 - discharged to Five Fords WwTW)	Condensate from the Siloxane removal media regeneration process	No Parameters set				No monitoring required	

Table S3.3 Process monitoring requirements

Emission point reference or source or description of point of measurement	Parameter ^{Note 1}	Monitoring frequency	Monitoring standard or method	Other specification
Biogas as supplied to the engines	Hydrogen sulphide	Continuous	Continuous in-line monitor	Monitoring point in biogas feed line within the Installation boundary
	Methane			
	Carbon dioxide			
Gas Holder leak detection	Methane	Continuous	Continuous in-line monitor	Monitor detects between the two membranes of the holder
Biogas from digesters	Flow	Continuous	In accordance with EQ weights and measures regulations	-
Amount of biogas used by the CHP/boilers per day	t/day	Daily	As agreed in writing with Natural Resources Wales	-

Note 1: There is no requirement to report process monitoring data. The information shall be made available at the Installation for inspection

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	A1, A2, A11, A12	Annually	1 January
Hydrogen sulphide concentrations in biogas feed above 1500 ppm	Monitoring point in biogas feed line within the Installation boundary	Every 3 months	1 January

Table S4.2: Annual production/treatment

Parameter	Units
Electrical energy generated	MWh
Thermal energy generated	MWh
Biomethane fed into National Grid	Tonnes
Biogas produced by AD facility	m ³
Total amount of waste treated	Tonnes

Table S4.3 Performance parameters

Parameter	Frequency of assessment	Units
Fuel input to Installation (biogas)	Annually	m ³
Fuel input to Installation (natural gas)	Annually	Tonnes
CHP engine efficiency	Annually	%
Hours of operation for both CHP engines	Annually	Hours
Amount of biogas combusted in the CHP per day	Annually	m ³ /day
Hours run on biogas (steam raising boilers)	Annually	Hours
Hours run on natural gas (steam raising boilers)	Annually	Hours
Amount of biogas combusted in the steam raising boilers per day	Annually	m ³ /day
Operational hours of waste gas burner (flare)	Annually	Hours
Biogas burnt by waste gas burner (flare)	Annually	m ³
Operational hours of Biomethane Injection Plant	Annually	Hours
Water Usage	Annually	m ³
Electrical energy exported to the grid	Annually	MWh
Electrical energy drawn from the grid	Annually	MWh

Table S4.4 Reporting forms		
Media/parameter	Reporting format	Date of form
Air	Form Air 1 or other form as agreed in writing by Natural Resources Wales	01/10/2019
Performance Indicators	Form P1 or other form as agreed in writing by Natural Resources Wales	01/10/2019

Schedule 5 - Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	EPR/AP3139FT
Name of operator	Dŵr Cymru Cyfyngedig
Location of Facility	Five Fords WwTW, Cefn Road, Wrexham, Clwyd, LL13 0PA
Time and date of the detection	

(a) Notification requirements for any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution

To be notified within 24 hours of detection	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit

To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	Notification period

(c) Notification requirements for the detection of any significant adverse environmental effect	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B - to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 - Interpretation

“accident” means an accident that may result in pollution.

“application” means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

“authorised officer” means any person authorised by Natural Resources Wales under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

“*background concentration*” means such concentration of that substance as is present in:

- for emissions to surface water, the surface water quality up-gradient of the site; or
- for emissions to sewer, the surface water quality up-gradient of the sewage treatment works discharge.

“*calendar monthly mean*” means the value across a calendar month of all validated hourly means.

“CEN” means Comité Européen de Normalisation.

“Combined Heat & Power” (CHP) or Cogeneration means the simultaneous generation in one process of thermal energy and electrical or mechanical energy.

“Commissioning” means testing of the installation that involves any operation of a Large Combustion Plant referenced in schedule 1, table S1.1.

“*emissions to land*” includes emissions to groundwater.

“*emissions of substances not controlled by emission limits*” means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit.

“*energy efficiency*” the ISO base load net plant efficiency means the performance value established by acceptance testing following improvements made to the plant that could affect the efficiency.

“EP Regulations” means The Environmental Permitting (England and Wales) Regulations SI 2016 No.1154 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

“First put into operation” means when fuel is first combusted in the MCP.

“*groundwater*” means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

“*Industrial Emissions Directive*” means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions

“*hazardous substance*” means a substance classified as hazardous as a consequence of fulfilling the criteria laid down in parts 2 to 5 of Annex I to Regulation (EC) No 1272/2008

“*MCERTS*” means the Environment Agency’s Monitoring Certification Scheme.

“Medium Combustion Plant” or “MCP” means a combustion plant with a rated thermal input equal to or greater than 1 MW but less than 50 MW.

“Medium Combustion Plant Directive” or “MCPD” means Directive 2015/2193/EU of the European Parliament and of the Council on the limitation of emissions of certain pollutants into the air from medium combustion plants.

“*Natural gas*” means naturally occurring methane with no more than 20% by volume of inert or other constituents.

“NRW” means Natural Resources Wales.

“Operating hours” means the time, expressed in hours, during which a combustion plant is operating and discharging emissions into the air, excluding start-up and shut-down periods.

“quarter” means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

“RFI” means Request for Further Information

“SI” means site inspector.

“Waste Framework Directive” or “WFD” means Waste Framework Directive 2008/98/EC of the European Parliament and of the Council on waste

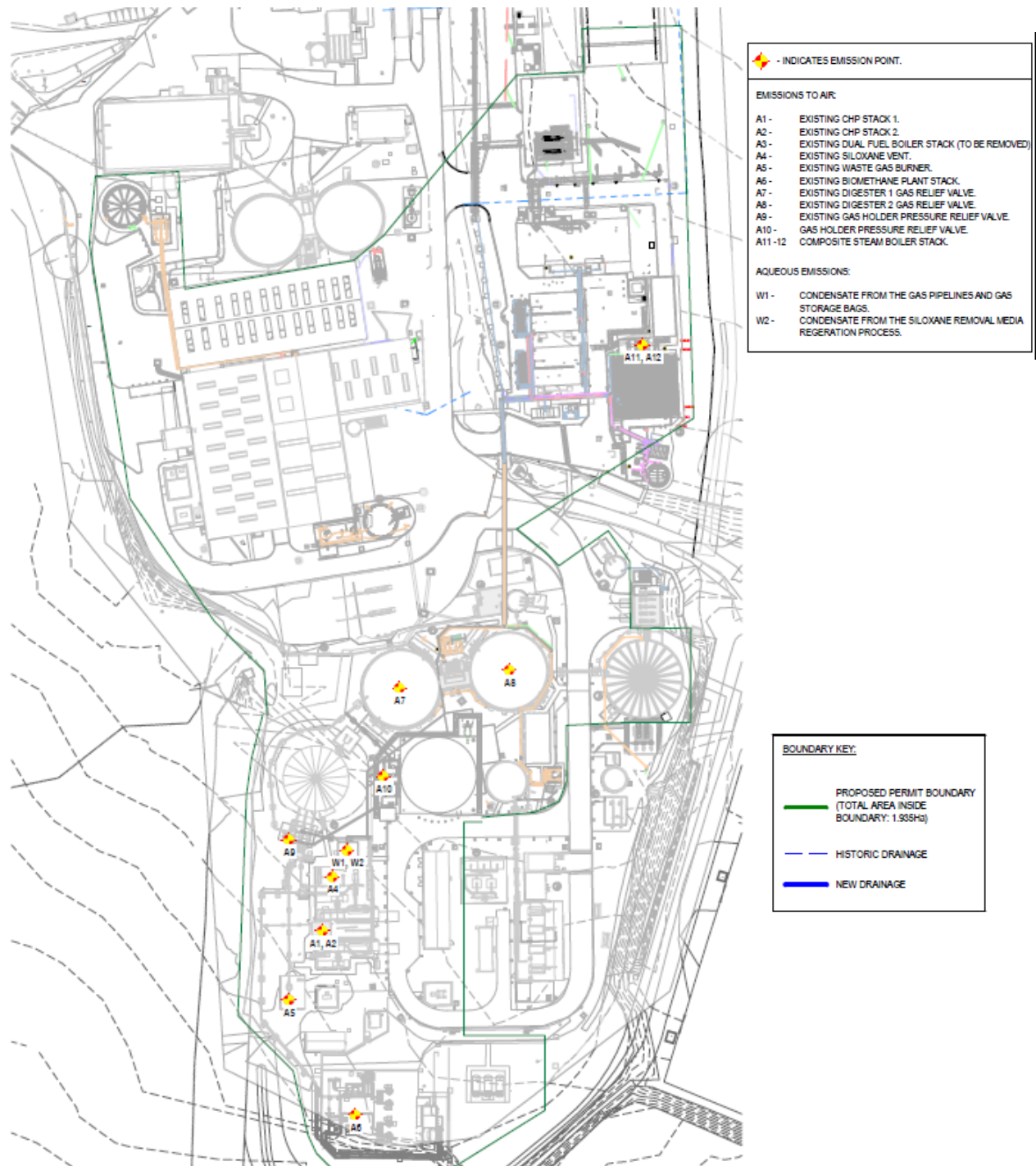
Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

- in relation to emissions from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid and gaseous fuels, 6% dry for solid fuels; and/or
- in relation to emissions from gas turbine or compression ignition engine combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3kPa and with an oxygen content of 15% dry for liquid and gaseous fuels; and/or
- in relation to emissions from combustion processes comprising a gas turbine with a waste heat boiler, the concentration in dry air at a temperature of 273K, at a pressure of 101.3kPa and with an oxygen content of 15% dry, unless the waste heat boiler is operating alone, in which case, with an oxygen content of 3% dry for liquid and gaseous fuels; and/or
- in relation to emissions from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content.

“year” means calendar year ending 31 December.

Schedule 7 - Site plan



Schedule 8 – Annex 1 of MCP

1. Rated thermal input (MW) of the medium combustion plant.	MCP 1 - 1.668 MWth	
2. Type of the medium combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	Other medium combustion plant	
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	Natural Gas – 98% Biogas – 2%	
4. Date of the start of the operation of the medium combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	01/04/2019	
5. Sector of activity of the medium combustion plant or the facility in which it is applied (NACE code).	E3700	
6. Expected number of annual operating hours of the medium combustion plant and average load in use.	8760 (1 boiler 100%, 1 boiler on standby)	
7. Where the option of exemption under Article 6(3) or Article 6(8) is used, a declaration signed by the operator that the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs.	N/A	
8. Name and registered office of the operator and, in the case of stationary medium combustion plants, the address where the plant is located.	Registered office - Pentwyn Road, Nelson, Treharris, Mid Glamorgan, CF46 6LY	Site address - Five Fords WwTW Gas to Grid Facility, Cefn Road, Abenbury, Wrexham, Clwyd, LL13 0PA

1. Rated thermal input (MW) of the medium combustion plant.	MCP 2 - 1.668 MWth	
2. Type of the medium combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	Other medium combustion plant	
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	Natural Gas – 98% Biogas – 2%	
4. Date of the start of the operation of the medium combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	01/04/2019	
5. Sector of activity of the medium combustion plant or the facility in which it is applied (NACE code).	E3700	
6. Expected number of annual operating hours of the medium combustion plant and average load in use.	8760 (1 boiler 100%, 1 boiler on standby)	
7. Where the option of exemption under Article 6(3) or Article 6(8) is used, a declaration signed by the operator that the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs.	N/A	
8. Name and registered office of the operator and, in the case of stationary medium combustion plants, the address where the plant is located.	Registered office - Pentwyn Road, Nelson, Treharris, Mid Glamorgan, CF46 6LY	Site address - Five Fords WwTW Gas to Grid Facility, Cefn Road, Abenbury, Wrexham, Clwyd, LL13 0PA

END OF PERMIT

Permit Number: AP3139FT

Operator:

Dwr Cymru Cyfyngedig

Facility: Five Fords Gas to grid facility

Form Number:

Air1 / 01/10/2019

Reporting of emissions to air for the period from DD/MM/YYYY to DD/MM/YYYY

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Uncertainty ^[4]
A1	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	500 mg/m ³	Hourly Average		BS EN 14792		
A1	Carbon monoxide	1400 mg/m ³	Hourly Average		BS EN 15058		
A1	Sulphur dioxide	No limit	Hourly Average		BS EN 14791		
A2	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	500 mg/m ³	Hourly Average		BS EN 14792		
A2	Carbon monoxide	1400 mg/m ³	Hourly Average		BS EN 15058		
A2	Sulphur dioxide	No limit	Hourly Average		BS EN 14791		
A11 (Operating on Natural Gas)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	100 mg/m ³	Hourly Average		BS EN 14792		
A11	Carbon monoxide	12.5 mg/m ³	Hourly Average		BS EN 15058		

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Uncertainty ^[4]
(Operating on Natural Gas)							
A11 (Operating on Natural Gas)	Sulphur dioxide	No limit	Hourly Average		BS EN 14791		
A12 (Operating on Natural Gas)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	100 mg/m ³	Hourly Average		BS EN 14792		
A12 (Operating on Natural Gas)	Carbon monoxide	12.5 mg/m ³	Hourly Average		BS EN 15058		
A12 (Operating on Natural Gas)	Sulphur dioxide	No limit	Hourly Average		BS EN 14791		
A11 (Operating on Biogas)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	100 mg/m ³	Hourly Average		BS EN 14792		

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Uncertainty ^[4]
A11 (Operating on Biogas)	Carbon monoxide	12.5 mg/m ³	Hourly Average		BS EN 15058		
A11 (Operating on Biogas)	Sulphur dioxide	No limit	Hourly Average		BS EN 14791		
A12 (Operating on Biogas)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	100 mg/m ³	Hourly Average		BS EN 14792		
A12 (Operating on Biogas)	Carbon monoxide	12.5 mg/m ³	Hourly Average		BS EN 15058		
A12 (Operating on Biogas)	Sulphur dioxide	No limit	Hourly Average		BS EN 14791		

[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 Natural Resources Wales 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
(Authorised to sign as representative of Operator)

Date.....

Permit Number: AP3139FT

Operator:

Dwr Cymru Cyfyngedig

Facility: Five Fords Gas to Grid Facility

Form Number:

Performance1/ 01/10/2019

Reporting of other performance indicators for the period DD/MM/YYYY to DD/MM/YYYY

Parameter	Units
Fuel input to installation (biogas)	m ³
Fuel input to installation (Natural Gas)	Tonnes
CHP engine efficiency	%
Hours of operation for both engines and hours that engines operated in CHP mode	Hours
Amount of biogas combusted in the CHP per day	Hours
Hours run on biogas (steam raising boiler)	Hours
Hours run on Natural gas (steam raising boiler)	Hours
Amount of biogas combusted in the steam raising boilers per day	m ³ /day
Operational hours of waste gas burner	Hours
Biogas burnt by waste gas burner	m ³
Operational hours of biomethane Injection Plant	Hours
Water Usage	m ³
Electrical energy exported to the grid	MWh
Electrical energy drawn from the grid	MWh

Operator's comments :

Signed
(Authorised to sign as representative of Operator)

Date.....