



GP Biotec Annual Report 2018 for Natural Resources Wales

January 16th 2019

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1 Introduction

This report is produced to fulfil the requirements stated in GP Biotec's environmental permit (Permit number EPR/AB3233DW), section 4.2. The report details the performance of the permitted activities carried out by GP Biotec over the previous year (2018) by reviewing the results of the monitoring and assessments carried out in accordance with the permit including an interpretive review of that data.

The report will cover the following areas:

- General Performance
- CHP Engine Monitoring
- Waste Storage
- Biological Process of AD plant
- Waste Return Overview
- Maintenance Overview – Checks
- APHA Monitoring
- Water Usage
- Dust, Noise & Pest Monitoring
- Biofertiliser Certification
- Spreading Activities
- Community Liaison Activities
- Health and Safety
- ISO1400/Green Dragon
- SMART Circle Project

2 General Performance

The AD plant has continued to perform well over the last 12 months. Biogas production has been consistently good (average annual methane content 62%) and all required tests on digestate have passed parameters set by the Biofertiliser Certification Scheme.

GP Biotec continues to work closely with NRW in relation to the plant, but also on agriculture.

In the last 12 months the company has also become part of a SMART Circle Research Consortium, which aims to help businesses improve their efficiency and reduce environmental impact.

3 CHP Engine/Emissions Monitoring

There are two Combined Heat and Power (CHP) engines on site, the first engine (an MWM engine) was commissioned in February 2013 and the second engine (MAN

engine) was commissioned in March 2015. The engine oil from both engines is monitored and changed regularly – the condition of the oil reflects the condition of the engine. Service Reports, Condition Monitoring Reports and Oil Change records are kept in the Site Office.

Engine checks form part of the daily, weekly, monthly, quarterly, 6 monthly and annual checks and then there are additional services carried out (both by GP Biotec and external companies) - all engine maintenance records are kept in the Site office.

The annual emissions testing was carried out on both the MWM engine and MAN engine on 11th January 2019; all parameters were below the limits set out in the permit. All results are presented in the Air1 Form in Annex II.

4 Waste

Waste Recovery

The total amount of waste received on site between October 2017 and end of September 2018 (the year agreed by GP Biotec and NRW as it was October 2013 when waste was first accepted) was 44,863.76 tonnes. Of the waste received on Site 79.7% is generated in Wales.

Waste Storage

Waste storage on Site is developing as a result of a new location for digestate storage having been made available. This has freed up a storh storage tank to be used as a pre-mixing tank for waste to be held. It is hoped that this will be commissioned in 2018.

Waste Generation

Site Waste

GP Biotec continues to have a trade waste contract with Powys County Council for the recycling of paper/cardboard, plastics and general waste – there is a two-weekly collection of 360 litre bin for cardboard/paper, 240 litre bin plastic/can recycling bin and 360 litre bin for general/mixed waste. This covers waste produced by the office and staff room. The contract is kept in the site office. For larger amounts of plastics wrappings on new equipment etc generated by the Site are taken to Wye Valley Recycling, for which waste transfer notes are retained in the Site Office. Waste oil from the engines is collected by an Environment Agency registered company Oil Monster – details of which are held in the Site Office.

5 Biological Process of the AD plant

The biological process is monitored daily, by means of a round of daily checks including a visual check in the digester tanks which would reveal any significant issues e.g. foaming, as well as constant monitoring of various parameters via the plants computer system. The substrate in the digesters is checked monthly for FOS/TAC analysis and biannually a full analysis of the substrate is carried out.

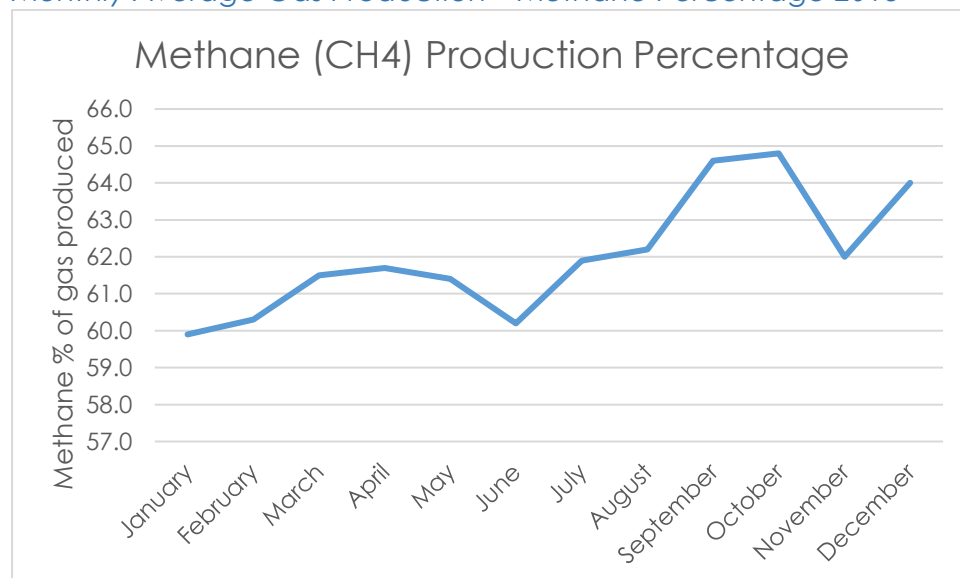
The digesters have performed consistently well over the past 12 months. The gas production is continually high and the digestate produced is of a consistently good quality. The information below gives more details of how we measure and monitor the performance of the digesters, including:

- gas production and H_2S concentrations;
- FOS/TAC and pH;
- trace elements;
- ammonia levels;

5.1 Gas production and Gas H_2S concentrations

Average methane production for 2018 has been consistently between 60 – 65% (see chart below) for the year, an indicator that the digesters are performing well.

Monthly Average Gas Production – Methane Percentage 2018

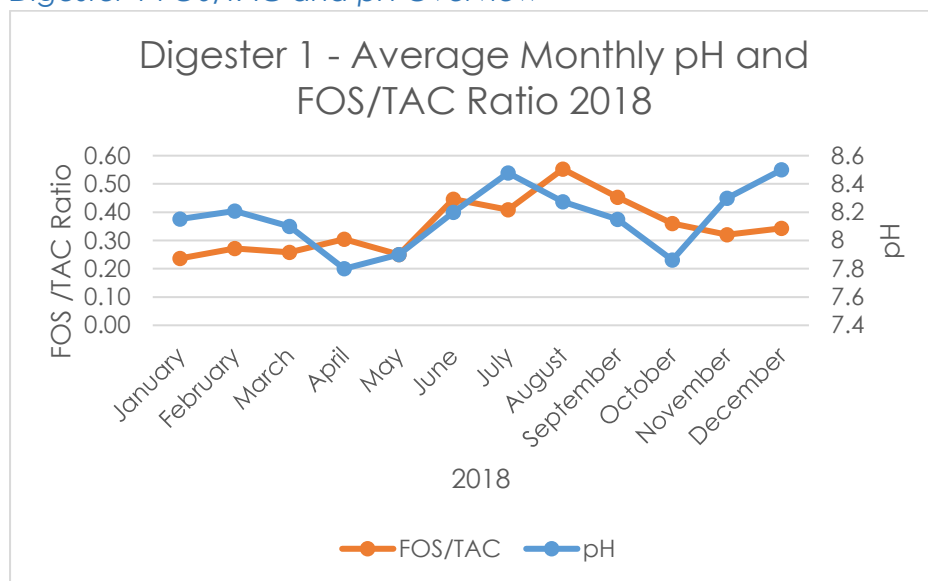


5.2 FOS/TAC and pH

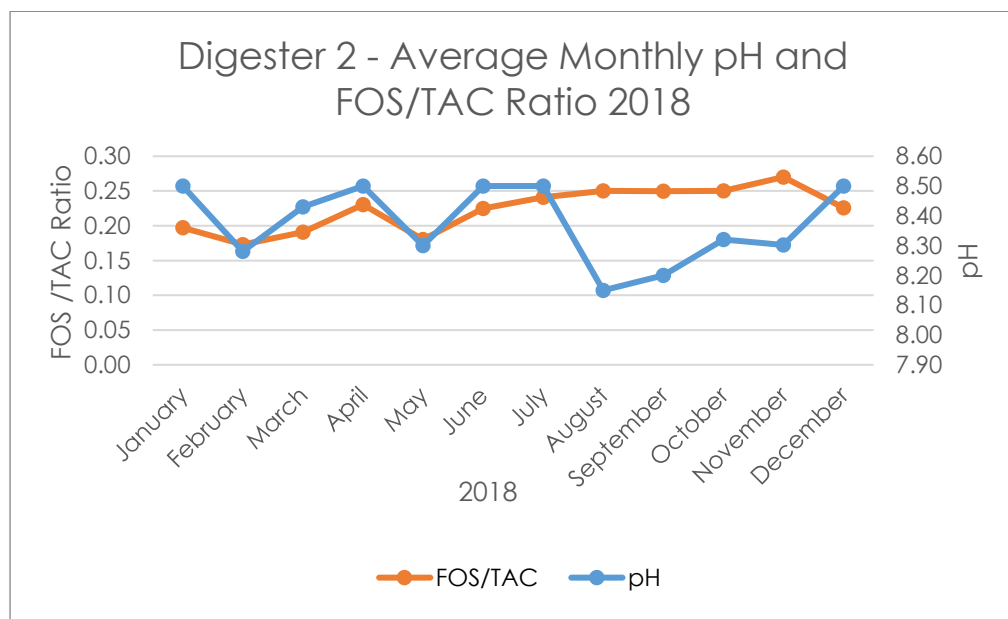
The pH and alkalinity of Digesters 1 and 2 are monitored monthly, or more frequently if necessary. The pH for both digesters has been consistent at around pH 7.8 – pH 8.4 which is within the optimal range for the type of AD system at GP Biotec.

The average FOS/TAC for Digester 1 over the course of the year was 0.35, which indicates a stable process.

Digester 1 FOS/TAC and pH Overview



The FOS/TAC in Digester 2 is more consistent and over the course of the year the average was 0.22, which is indicative of a very stable process.



5.3 Trace Elements, Acids & Ammonia

The digester substrate has been analysed three times this year. Trace elements are all within the appropriate range so the bacteria are well supported and have good conditions in which to thrive. The dry matter is in a very good range, as is the iron-sulphur ratio, meaning the H₂S levels are low.

The levels of ammonia within the digesters remain below the recommended 6000mg/l, however, levels were slightly higher than usual towards the end of 2018 because of a slight increase in blood feedstock in the run up to the Christmas period, our advisors from HOST were not too concerned as the amount of blood has reduced and so ammonia levels will in turn reduce.

VFAs (Volatile Fatty Acids) levels have reduced overall, particularly iso-butyric acid, which is highly likely to be due to the slightly increased temperature in digester 1, thanks to the addition of a heat exchanger which was installed in November 2017.

6 Water Usage

GP Biotec is a farm-based AD plant and uses water from the farm's private water supply. A water meter was put in place towards the end of 2015, however the meter was discovered to be faulty in August so a replacement meter was installed and so far the average daily water usage is 0.3m³.

7 Dust, Noise & Pest Monitoring

7.1 Dust

The area surrounding the site has been in a state of flux for the as there is much building and groundworks going on, this often results in a slight increase in the levels of dust but it does not cause any major issues within the site or outside of the site. Once the new solid feeder system is in place the yard surrounding the Waste Reception Area will be tarmacked and this will further improve the situation.

The construction of the third and fourth digesters is underway, once complete all roadways will be tarmacked and so will reduce dust to a minimal level.

7.2 Noise

Noise from the activities on site does not cause any issues in terms of pollution off site. Records for readings of noise levels can be found in the site office.

7.3 Pest Control

GP Biotec has an agreement in place with a pest control contractor who visits the site at six weekly intervals in line with Animal and Plant Health Agency (APHA) requirements. Full records of visits and details of control measures can be found in the site office. These records are checked quarterly by the APHA as part of their routine site inspection.

8 Maintenance Overview

GP Biotec carries out a variety of regular site checks and has a comprehensive maintenance schedule. Records of these checks and maintenance can be found in the Site Office.

9 Animal and Plant Health Agency Monitoring (APHA)

GP Biotec carries out monthly monitoring of *E.coli* and *Salmonella* in samples from the two pasteurisers on site, the results have always been negative and can be found in Annex IV. APHA carry out quarterly site visits – during which they check various critical control points, including the maintenance of the 12mm cutting screen, vehicle cleaning records, pest control records, pasteurisation records and a spot check on waste transfer notes and weight tickets. All *E.coli* and *Salmonella* samples continue to be negative.

10 Biofertiliser Certification Scheme

The separated fractions (liquor and fibre) continue to be certified under the Biofertiliser Certification Scheme by the Organic Farmers and Growers (See Annex V for a copy of the current certificate). The annual recertification audit/inspection will take place in February 2019.

11 Spreading Activities

GP Biotec/GP Services continues to increase its available land bank as a priority moving forward to be able to manage the amount of digestate produced. The following information is recorded and stored in the Site Office:

- Signed land management agreements;
- Field numbers and maps;
- Acreage;
- Spreading rate;

- Signed dispatch Digestate (including batch number, in accordance with the Biofertiliser Scheme);

GP Biotecs affiliated company GP Services which carries out the spreading of the digestate continues to increase on-site and off-site storage capacity, so that digestate is stored closer to the land where it will be spread.

There is currently a drive in the agriculture industry to dewater and recover nutrients from slurries to reduce agricultures' impact on the environment by reducing the risk of pollution. New technologies are in the early stages, but some companies have developed on-farm systems to remove water and recover nutrients which results in a product that's less voluminous and easier to store, therefore lessen risks of spills and reduces transport costs (both financial and to the environment). The recovery of nutrients means a more manageable product can be applied more accurately to land and increases the possibilities of transporting the product to places where more nutrients are required.

As part of the SMART Circle project GP Biotec are working with The University of South Wales' AD Centre of Excellence on preliminary studies to separate and remove phosphates and nitrates from the digestate.

12 Community Liaison Activities

The Community Liaison Group (CLG) has been running for almost four years now. The purpose of the group is to facilitate communication, share information and engage in balanced discussions about any environmental issues arising from GP Biotec's permitted waste recycling and disposal activities regarding GP Biotec's activities at Great Porthamel Farm, Talgarth.

Both GP Biotec and the Group members have found the meetings useful and informative and the general feeling is that a good and open relationship has developed.

The group discussed whether meetings were required to be so frequent, as attendance hadn't been as good as previously, combined with a lack of response from members when organising the meetings. A discussion at the meeting held in April 2018, decided that meetings would be twice yearly, with the possibility of extraordinary meetings being called if there were issues that four or more members deemed necessary to discuss. The Terms of Reference for the group have been amended to reflect this.

Two new members have joined the group, including a local business owner and a local Talgarth resident who is also part of the Talgarth Community Woodland Group, with whom GP Biotec are offering a place to store wood coppiced from the woodland above the Site.

13 Odour Complaints

Unfortunately, there were fifteen complaints related to the Site in 2018. In February 2018 the new primary school in Talgarth (Ysgol Myndd Ddu) opened, the school is located approximately 0.85km to the SSW of the Site. All the complaints received were related to the school and in two of those instances another complainant whose property is in similar direction also got in touch with the Site.

The table below summarises the timings of the complaints:

Month (2018)	Number of complaints
June	1
July	8
September	2
November	3
December	1

GP Biotec responded to the complaints in accordance with the Site's Odour Management Plan; odour monitoring is carried out and a complaint response form is completed. Every effort is made to inform the complainant of actions being taken and in the case of Ysgol Myndd Ddu, close contact has been kept between GP Biotec and the Head teacher of the school.

In June/July after a thorough investigation GP Biotec identified the issue to be coming from the separator building, however it was difficult to identify whether it was emanating from the separator (the equipment used to separate the whole digestate into liquor and fibre fractions) or the storage area for the digestate fibre. GP Biotec arranged for the digestate fibre to be removed more quickly from the Site so that a build-up of fibre was avoided. A carbon filter was also fitted to the separator building, but before this was completed GP Biotec agreed to turn the separator off during school hours, which temporarily reduced odour issues. Throughout this process close contact was kept with Ysgol Myndd Ddu to keep them informed of measures to abate the odour, as well as odour monitoring in the form of visiting the school's car park to detect any odour.

During this time a separate odour issue was identified; the tipping of the food waste loads which contain fruit and vegetable peelings (including garlic peelings) from a local food processing company, was also causing the school some odour issues. GP Biotec agreed to tip the loads earlier in the morning so that this was done before teachers and pupils arrive for school, this resolved the issue in the main, although there was the odd occasion where GP Biotec were at the mercy of the supplier, but where possible these earlier collections are made.

There were two other issues in November related to the blood storage tank, the first occurred because the carbon needed replacing in the carbon filter attached to the blood storage tank; the carbon was replaced and this resolved the issue, however GP Biotec accept that this situation should be pre-empted and acted upon sooner.

The second issue arose when the blood storage tank had overflowed due to the knock-on effect of a maintenance issue the previous day. The driver responsible claimed not to have noticed the spill. The spill was contained in the bund and cleaned up in line with the spill procedure in the AMP.

Long term the plan is to install a biofilter, but the University of South Wales are currently investigating what the best medium for the filter would be; in the meantime, the building will be enclosed with sliding doors and the air will be passed through the existing carbon filter.

14 Site Management

GP Biotec has reviewed its Odour and Accident Management Plans, along with the HACCP for the Site. It has been decided that the company will aim for the ISO 144001 Standard with regard to its EMS rather than the Green Dragon certification, so work on this continues and it is hoped that this will be achieved in 2019.

15 Health and Safety

GP Biotec continue to work closely with their Health and Safety consultant to implement their health and safety policy. Site Safety, particularly fire safety was the focus in 2018. Site security has also been improved with the installation of CCTV. Aims for 2019 are first aid training.

16 Site Development

The bases for the third and fourth digester tanks have been installed and it is hoped that the third digester will be 'online' in late Spring 2019. This will enable vital maintenance work to be carried out on the Primary digester, after which the three digesters will be working (Two Primary and one Secondary – ultimately there will be three Primary digesters).

It was hoped that GP Biotec would install three new carbon filters on site in 2018, only one of these is installed, the one on the separator building/post-pasteurisation holding tank. There was an issue with the fans that were purchased to work in conjunction with the filters, so this has delayed the extra one on the waste reception building. The third filter was to be fitted on the new liquid waste storage tanks, however, these have been purchased and placed in the liquid waste pit, but they are not functioning yet.

A supplementary solid feeding system was also planned for 2018, to take the pressure off the current system and to provide back up during breakdowns or planned maintenance; however, this was delayed because the design development has taken longer than expected and with it being such a substantial investment time needs to be taken to get it right.

The heat generated by the plant continues to be used to heat the Site Office, canteen and new workshop for the affiliated haulage business, GP Services; however, GP Biotec are working with various collaborators (Green Valleys and SMART Circle partners) to explore ways to utilise this excess heat.

17 SMART Circle Project

Consortium partners include Dŵr Cymru Welsh Water and Cogent Power, which is part of the TATA Steel Group. Other partners include GP Biotec, Bryn Power, FRE-Energy, BPE Design and Support, Heatcatcher and, from Spain, the Severo Ochoa Foundation.

The three-year project is funded by a £1m grant from the Welsh Government's SMART Expertise Programme, which utilises EU structural funds to support innovation in industry, and a £1m match contribution from the industry partners. The project was the first to be funded under the SMART Expertise scheme, with the team highly commended for its innovative approach.

The consortium will work together to explore how innovative bioprocesses can be used to improve the overall efficiency of a range of industrial operations. For example, one area of focus will be the industrial demonstration of a biological process that will convert waste gases, including carbon dioxide, into a useful fuel and allow the recovery of any wasted heat energy, therefore improving the overall economic and environmental performance of the end user.

The project also aims to develop technology that can recover unused, high-value molecules including nutrients and enzymes from low-value materials such as sewage sludge, commercial and municipal solid wastes. These high-value materials are then available for use in other industrial processes, and the disposal cost of any remaining waste is greatly reduced.

The ultimate aim of the project is to develop more efficient bio-technology systems that could provide viable solutions to help businesses become more resource efficient and adopt 'Circular Economy' approaches.