



GP Biotec Annual Report 2019
for
Natural Resources Wales

12th January 2020

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1.0 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 (2019) 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
- ISO14001/Green Dragon
- SMART Circle Project

2.0 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) 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 actively participated in the SMART Circle Research Consortium, which aims to help businesses improve their efficiency and reduce environmental impact. The company has carried out a review of its operations in line with Best Available Techniques and has adopted best practices to ensure its activities have minimal impact on the environment.

3.0 CHP Engine/Emissions Monitoring

The site has two Combined Heat and Power (CHP), the first (an MWM engine) was commissioned in February 2013 and the second (MAN engine) was commissioned in March 2015. Both engines have been monitored and inspected regularly as part of the daily, weekly, monthly, quarterly, 6 monthly and annual checks. 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. Additional monitoring of the engines is provided by external companies. All engine maintenance records are kept in the Site office.

The yearly emissions testing on both engines, MWM and MAN was carried out on 7th January 2019; all parameters were below the limits set out in the permit. All results are presented in the Air1 Form in Annex II.

4.0 Waste

➤ Waste recovery

The total amount of waste received on site between October 2018 and end of September 2019 (the year agreed by GP Biotec and NRW as it was October 2013 when waste first accepted) was 54966.88 tonnes. Additional waste of 321.60 tonnes was received and stored in the permitted storage tank in line with our Standard Operating Procedures.

➤ Waste Storage

The installation of two additional storage tanks in the liquid waste reception has increased the waste storage capacity of the site. The two additional tanks have a total capacity of 210m³ and so the four tanks have a total capacity of 330m³. There is additional storage to be provided by the Storth tanks with a total capacity of 600m³. These tanks are likely to be commissioned in spring 2020. A little over two years ago, they were used for the storage of digestate which is the material remaining from the anaerobic digestion process.

➤ Waste Generation

Site Waste

GP Biotec has a trade waste contract with Thomas Waste for the recycling of paper/cardboard, plastics and general waste. There is a 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 Slicker Recycling – details of these are held in the Site Office.

5.0 Biological Process of the AD plant

The biological process is monitored daily, by means of a round of daily checks including at least two visual checks in the digester tanks which would reveal any significant issues such as foaming. In addition is the constant monitoring of various parameters such as temperature, pressure, gas composition etc. via the supervisory control and data acquisition (SCADA) 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 H₂S concentrations.
- FOS/TAC and pH.
- trace elements.
- ammonia levels.

5.1 Gas production and Gas H₂S Concentrations

The amount of gas produced, and their concentration is monitored through the site's SCADA system. Average methane production for 2019 has been consistently between 60 to 65% for the year, an indicator that the digesters are performing well. Carbon dioxide and Hydrogen sulphide concentration have also been fairly consistent. The percentage of methane to carbon dioxide has been accordant which is an indication of the consistency of the feedstock utilised in the digesters.

5.2 FOS/TAC and PH

The pH and alkalinity of Digesters 1 and 2 are monitored monthly, or more frequently if necessary. The average pH for digester 1 was 8.23 with digester 2 being 8.45. The high alkalinity level show that both digesters have maintained to a large degree a suitable pH which is necessary for a stable digestion process.

The average FOS/TAC for Digester 1 and 2 for the year was 0.47, 0.28 respectively. Also, a good indication of the stability of both digesters. It is reasonable for digester 1 to have a relatively lower PH and higher FOSTAC compared to digester 2. This is consistent with the functionality of these digesters and also correlates with the fact that digester 1 processes more undigested waste at each one time than digester 2.

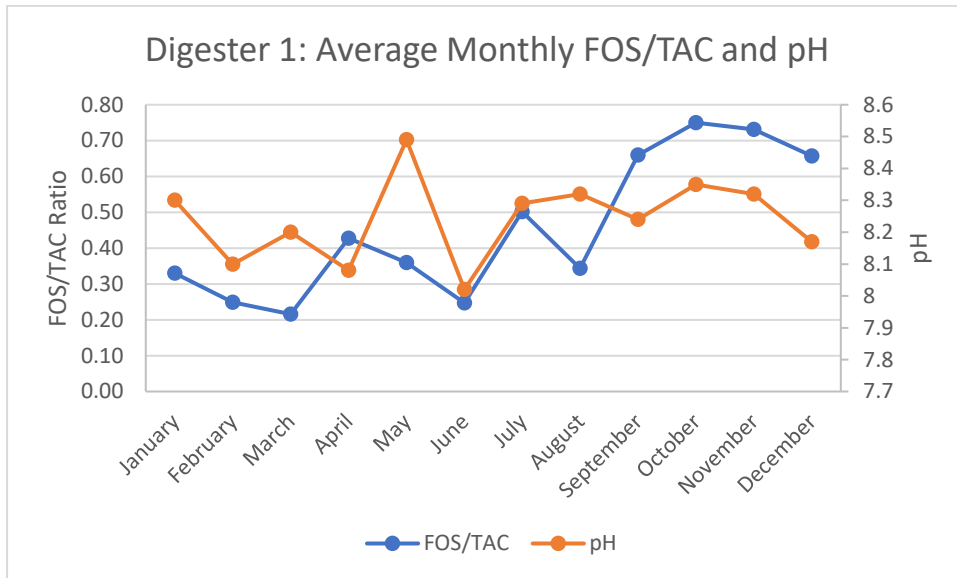


Fig 5.2.1

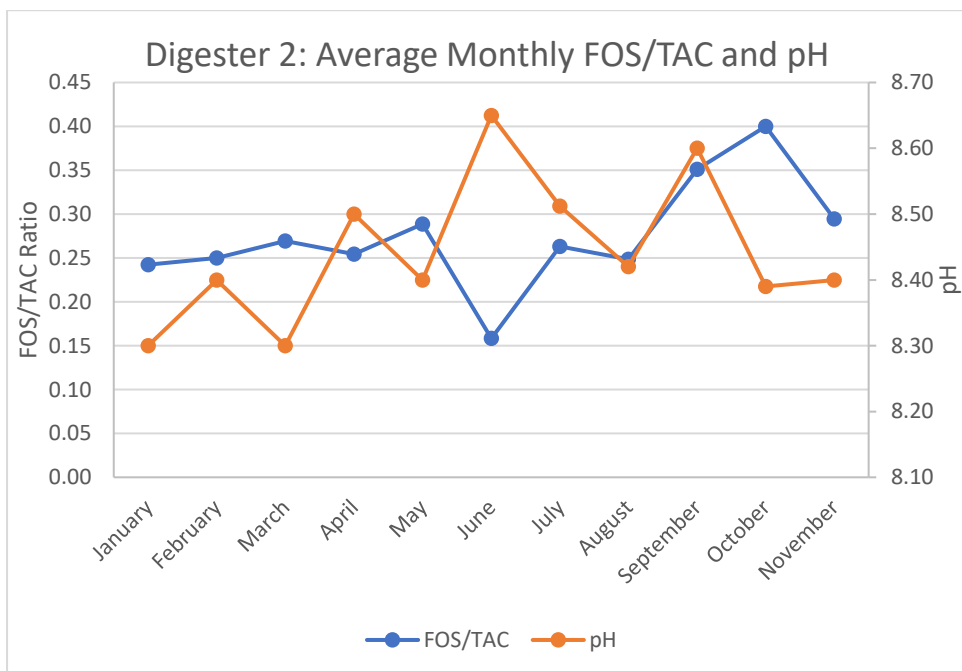


Fig 5.2.2

5.3 Trace Elements, Acids & Ammonia

Analysis of the digester substrate was done three times in the year. In the first half of the year, trace elements were within the appropriate range, so the bacteria were well supported and had good conditions in which to thrive. Towards the end of the year, the results from tests done showed certain essential trace elements i.e. molybdenum, selenium and nickel were considerably low. The dry matter was within a good range and so was the iron-sulphur ratio, meaning the H₂S levels were low.

All three tests revealed ammonia levels below the recommended level of 6000mg/l. The highest amount recorded was 4980 with the lowest being 3546mg/l.⁷

VFAs (Volatile Fatty Acids) levels have stayed within normal ranges. Analysis show acetic acid level relatively high with a result of 0.11 when the other fatty acids had results of less than 0.02mg/l. The stability of the process increases when trace elements is optimum.

6.0 Water Usage

Since the installation of the new water meter in 2017, the average daily water usage is 0.3m³. The AD plant uses water from the farm's private water supply.

7.0 Dust, Noise & Pest Monitoring

7.1 Dust

In the summer and the other dry months, the site experiences a slight increase in the levels of dust, mostly because some roads are yet to be tarmacked. This does not cause any major issues within the site or outside the site.

The construction of the third and fourth digesters is ongoing with its associated pipe work. There are plans to tarmac all roads in the near future once work on the additional tanks are completed. This will hopefully 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 APHA as part of their routine site inspection.

8.0 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.

9.0 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.

10.0 Biofertiliser Certification Scheme

The separated fractions (liquor and fibre) continue to be certified under the Biofertiliser Certification Scheme by the Organic Farmers and Growers. The annual recertification audit/inspection will take place on 4th February 2020.

11.0 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 Biotec's affiliated company, GP Services carries out the spreading of the digestate and has continued to increase its 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 is working with The University of South Wales' AD Centre of Excellence on preliminary studies to separate and remove phosphates and nitrates from the digestate.

12.0 Community Liaison Activities

The Community Liaison Group (CLG) has been running for almost five 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.

As per recent revisions, meetings are held twice a year. The two meetings were held in May and October 2019. Both meetings were very successful with members seeing the need to continue to engage with the community on new projects and to provide updates on existing ones.

There is the possibility of calling for extraordinary meetings if there were issues that four or more members deemed necessary to discuss. This is captured in the Terms of Reference for the group.

13.0 Odour Complaints

GP Biotec received a number of odour related complaints which compared to the year prior, was relatively lower (See Table 13.1). No official complaints were received for the last quarter of the year. A possible indication that odour mitigation measures have improved and have been considerably efficient.

Most of the complaints were received from neighbouring buildings particularly the new primary school as a result of moving and spreading digestate from the solid digestate building.

In line with the Site's odour Management plan, each complaint was investigated and responded to within 24 hours of receiving it. Details of all complaints received i.e. time, complainant, source of odour, response etc have been recorded.

Month (2019)	Number of complaints
February	3
March	1
April	1
May	2
June	1
August	2

Table 13.1

GP Biotec continues to adopt best practices to mitigate its odour emissions. The long-term plan is to install a biofilter in the solid digestate building. Biofilter is a pollution control technique with the ability to capture biologically degradable pollutants in this case ammonia. Investigation into the best media to use for the biofilter for optimal results is being carried out by the University of South Wales. In the meantime, the building is enclosed with sliding doors and the air will be passed through the existing carbon filter.

14.0 Site Management

GP Biotec has reviewed its odour and accident management plans, along with the HACCP for the site. The company with its vision to be as environmentally responsible as possible is adopting the requirements of ISO14001. In preparation for a formal application onto the standard, a gap analysis of the sites management system against requirements of the ISO standard has been carried out. It is hoped that full certification will be achieved by autumn 2020.

15.0 Health and Safety

GP Biotec continues to work closely with their Health and safety consultant to implement health and safety policies. All policies are up to date and Site security has continued to improve with the installation of CCTV. The focus in 2019 year was particularly on fire safety as well as first aid training. Early in the year all staff received first aid training with the issuance of certificate. There is also a dedicated First aider. The focus for 2020 is increased awareness of hazard perception and emergency response preparedness.

16.0 Site Development

Construction of the third and fourth digesters is in the final phase with the hope that they will be completed by spring 2020. This will enable vital maintenance work to be carried out on the Primary digester. 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.

There is also consultation with Green Valleys and SMART Circle partners to explore ways to utilise the excess heat.

Three new carbon filters will be installed this year, one on the waste reception building and another on the new liquid waste storage tanks.

A supplementary solid feeding system was also planned for 2019, to take the pressure off the current system and to provide back up during breakdowns or planned maintenance; delayed but to get around to it the next twelve months.

17.0 SMART Circle Project

Amongst other things this project which is funded by a £1m grant from the Welsh Government's SMART Expertise Programs seeks to explore innovative bioprocesses to improve the overall efficiency of a range of industrial operations.

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 project was the first to be funded under the SMART Expertise scheme, with the team highly commended for its innovative approach.

One area of focus has been 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 is looking to develop technologies 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 project is also undertaking preliminary studies into the removal of phosphates and nitrate from digestate and to develop more efficient bio-technology systems that could provide viable solutions to be more resource efficient.