GP Biotec Annual Report 2020

for

Natural Resources Wales

Contents

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 (2020) by reviewing the results of the monitoring and assessments carried out in accordance with the permit including an interpretive review of that data. This also includes the annual production data as set out in the permit and the applicable performance parameters as described on the forms specified in the permit.

This 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 performed well with the average methane levels staying consistent. All tests carried out on both liquor and fibre digestates passed as per the parameters set by the Biofertiliser Certification Scheme.

As part of the company's commitment to its environmental policies, it has adopted ISO14001 standard in the management of its environmental systems.

The company has continued to fulfil its duties under the SMART expertise program and has fully participated in its meeting though being virtual due to the pandemic.

The company has reviewed its operations and continues to adopt 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 has been scheduled for later in the month and all results will be presented on the Air1 Form to be attached to this report. Results for the different parameters have always remained below the limits set out in the permit.

4.0 Waste

- Waste recovery

The total amount of waste received on site from January 2020 to December 2020 is 59,231.16 Tonnes. Waste returns have been submitted every quarter to confirm amount of waste processed in the 3-month period in each quarter and provides a further breakdown of all waste received onto site.

- Waste Storage

There have been no changes to waste storage since the last report. The total waste storage capacity is 930$M^{3.}$

- 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. Plastic wrappings of significant amount taken from new equipment etc are taken to Wye Valley Recycling. The waste transfer notes are retained in the Site Office. Slicker Recycling which is registered with the Environment Agency collects the waste oil produced from the site's activities. 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. Monitoring of the temperature, pressure, gas composition etc. is possible via the supervisory control and data acquisition (SCADA) system. On a monthly basis, the fermentation process is checked in house through measurement of the buffer capacity of the substrate as a ratio of the volatile fatty acids content. This is called FOSTAC Analysis. In addition, an extensive analysis of the digester substrate is carried out to monitor the trace element content. This is done biannually.

Performance is monitored generally by monitoring;

- Gas production and H2S Concentration
- FOS/TAC and PH
- Trace element
- 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. The average methane concentration per biogas has been approximately 60 to 65%. This is an indication 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 also been consistent.

5.2 FOS/TAC and PH

The pH of the Digesters are monitored monthly, or a bit more frequently when necessary. Over the last 12 months, the average pH readings in the tanks were in the range of 8.34 and 8.40, which means the pH levels have remained alkaline and that is an indication of the stability of the digesters. FOSTAC levels in the secondary digesters have remained relatively lower than in the primary digester (see Fig 5.1a and 5.1b). Again, another good indication of the stability of the digesters.

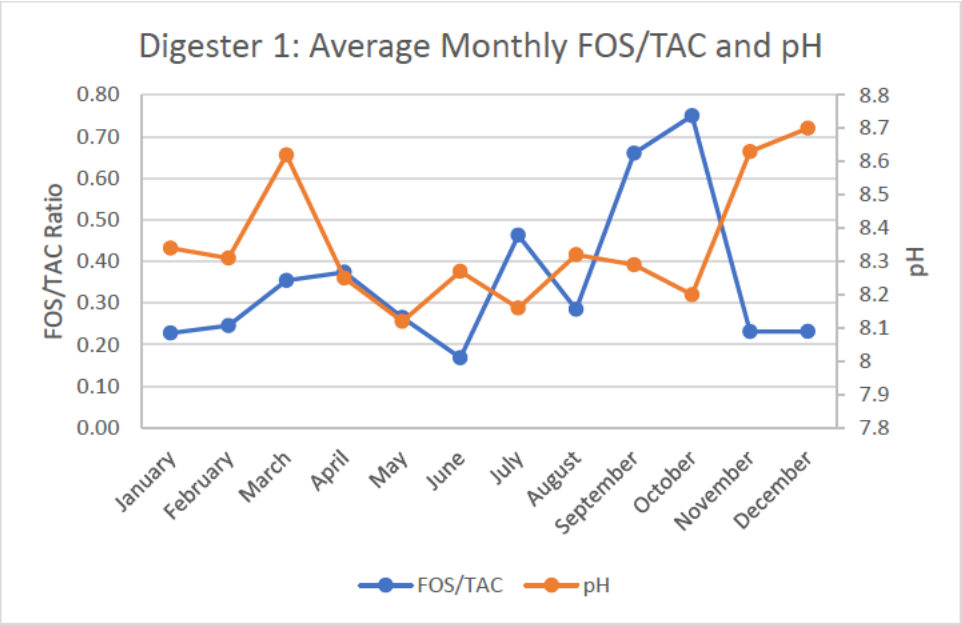

Fig 5.1a

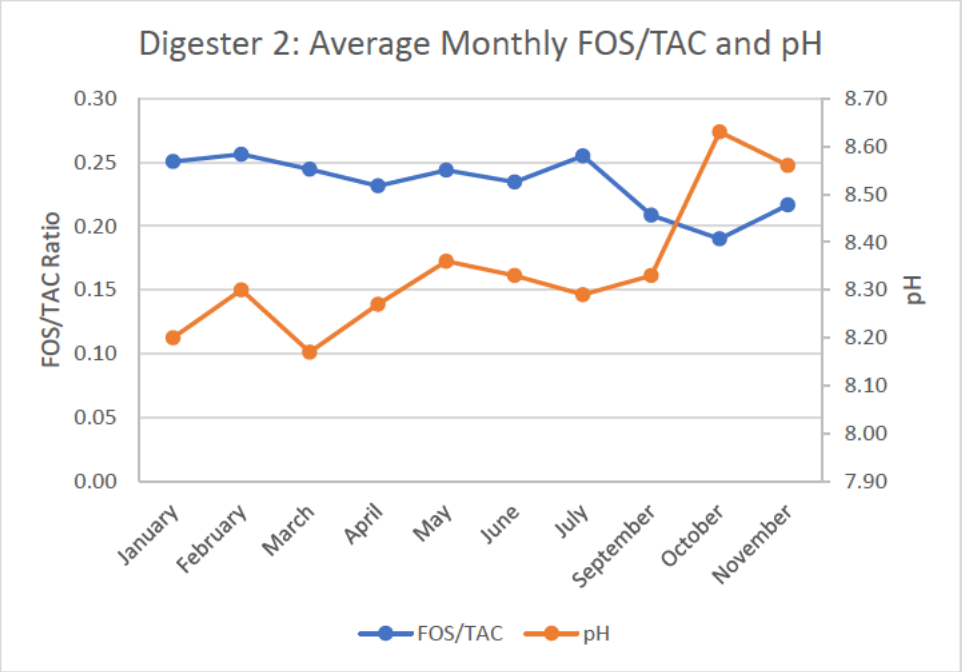

Fig 5.2b

5.3 Trace Elements, Acids & Ammonia

Micronutrient have been reported to be important in the metabolic and enzymatic activities of methanogenic microbes. Digester substrate analysis results for the year under review revealed most of the essential trace element were within reasonable concentrations.

Nutrients that were considered low were augmented with a bespoke trace element additives. Dry matter concentrations were also within a good range and so was the iron-sulphur ratio. The. Residual biogas potential also remained stable over the last 12 months.

Other parameters such as VFAs (Volatile Fatty Acids) levels have stayed within normal ranges. The stability of the process increases when trace elements is optimum. Trace element supplementation is potentially useful for stability of system from changes in feedstock, temperatures etc.

6.0 Water Usage

A record of water meter reading is kept from which the average daily water usage is estimated. Average daily water use is 0.18m3. The AD plant uses water from the farm's private water supply.

7.0 Dust, Noise & Pest Monitoring

7.1 Dust

Dust does not pose any major issues within the site or outside the site. Dust controls include dampening with water when necessary which tends to be in the summer months. Since completion of the new digesters, much of the bare ground has been concreted which has reduced overall dust experienced on site.

7.2 Noise

The company's Noise Policy identifies the noisiest place on site as the engine room. Noise from the activities on site does not cause any issues in terms of pollution off site. The site has a noise management policy which has been forwarded to NRW.

One issue had been raised during the year about a slight droning noise thought to originate from our site. Investigations were undertaken but no source of such noise was identified.

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 and all inspections undertaken by APHA have been satisfactory.

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 in February 2021.

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.
- Digestate Dispatch Record (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.

Through the SMART Circle initiatives, work on dewatering digestate is ongoing. This study focuses on separating and removing phosphates and nitrates from the digestate. The recovery of nutrients means a more manageable product can be applied more accurately to land as well as increasing the possibilities of transporting the product to places where more nutrients are required.

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).

12.0 Community Liaison Activities

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

These meetings have been useful and informative as it has fostered a symbiotic relationship between GP Biotec and the community.

Due to Covid-19 restrictions, meetings for the year had to be cancelled. GP Biotec still maintained contact with the group through emails.

As per the terms of Reference for the group, there is the possibility of calling for extraordinary meetings if there were issues that four or more members deemed necessary to discuss.

13.0 Odour Complaints

The total number of Complaints made against GP Biotec with respect to odour were 10 (See Table 13.1). No official complaints were received for the first quarter of the year.

As per the site odour management procedure, each complaint was investigated and responded to within 24 hours of receiving them. All these records have been saved.

Month (2020)	Number of complaints
April	1
May	1
June	1
July	1
September	2
October	2
December	1

The odour management plan is reviewed annually to check its efficiency and GP Biotec is committed to adopting best practices to mitigate its odour emissions.

Plans are underway to install a biofilter with the ability to capture biologically degradable pollutant (ammonia) and investigations into the best media to use for the biofilter for optimal results is being carried out by the University of South Wales. In addition to these, a misting fan is currently in use on site.

14.0 Site Management

In August 2020, GP Biotec achieved certification to ISO14001 after satisfactorily fulfilling all requirements of the international standard. Our significant aspects have been clearly defined and adequate steps will be taken to achieve applicable available best techniques. The Odour and Accident Management plans have been reviewed and integrated within our Environmental Management System which is governed by the ISO14001 requirements.

15.0 Health and Safety

GP Biotec continues to work closely with their Health and safety consultant to implement health and safety policies. In light of the Covid-19 pandemic, GP Biotec implemented measures to make the site Covid Secure and provided adequate training to its staff. All policies are up to date and site security has continued to improve since installing a CCTV. The focus of 2020 was hazard perception and emergency preparedness. With Covid-19 still in sight, the focus will stay on emergency preparedness with a look into specific health and safety topics such as working in confined spaces, driving and wellbeing.

16.0 Site Development

Work on the additional digester tanks were completed in November 2020. A supplementary feeding system has also been built to take pressure off the current system and to provide back up during breakdown or maintenance.

The heat generated by the plant continues to be used to heat the Site Office, canteen and workshop for the affiliated haulage business, GP Services.

There are currently three carbon filters, one at the liquid waste tanks and one each used by the CHP engines. There are plans to install more carbon filters, one on the waste reception building and other on the new liquid waste storage tanks. There are also plans to explore the benefits of a wood chip biofilter.

A sump (W1) has been built to collect all surface rainwater from the installation. The drainage outlet is released for discharge into the Afon Lynfi once satisfactory checks have been carried out, ensuring only clean/ uncontaminated water is released.

17.0 SMART Circle Project

The SMART expertise program seeks to explore innovative bioprocesses to improve the overall efficiency of a range of industrial operations.

GP Biotec has continued to fulfil its commitment in this project and is looking to collaborate with South Wales University who is the main researcher in this project on a number of research ideas. The other partners are Dŵr Cymru Welsh Water and Cogent Power, which is part of the

TATA Steel Group, Bryn Power, FRE-Energy, BPE Design and Support, Heatcatcher and, from Spain, the Severo Ochoa Foundation.

Due to COVID-19 limitations, all meetings were held virtually and the focus was on 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.