GP Biotec Ltd

Great Porthamel, Talgarth

Odour Management Plan

Date: June 2015

Review Date: June 2016

Contents

Odour Management Plan

1 Summary

This document provides an overview of the potential odour impacts from activities associated with the anaerobic digestion process at GP Biotec, and the current odour management systems in place. The purpose of the Odour Management Plan (OMP) is to consider the relevant activities that may contribute to the arising and migration of odours at the GP Biotec site, and to detail the remedial/precautionary actions that may be required. The document also gives the details of the current infrastructure, procedures and general practices involving odour detected at the site.

The OMP has been produced in accordance with Environment Agency H4 Odour *Management How to Comply with your environmental permit* and General Monitoring procedures detailed in Environment Agency guidance document Internal Guidance for *the Regulation of Odour at Waste Management Facilities*.

The OMP forms part of an integrated Environmental Management System. The Working Plan procedures and record keeping methods/locations related to odour management are in Annex II of this document.

This plan will be reviewed annually by the Environmental Systems Manager at GP Biotec from the date of acceptance by Natural Resources Wales (NRW) and amended as required. Amendments may be made more frequently should a method pertaining to odour management change in the interim and this will be considered to supplant the aforementioned annual review.

In line with the Environment Agency's and NRW's general requirements for OMPs as described in their Technical Guidance Note H4 this document addresses the following issues:

- The materials and activities which produce the odour and the point(s) of odour release;
- Identification of local sensitive receptors;
- Process controls and procedures
- Monitoring and auditing of the operational controls and the monitoring of infrastructure;
- Potential corrective actions; and
- Reporting

2 Policy Statement

The GP Biotec OMP policy statement is as follows:

To seek continual improvements in environmental performance;

To prevent the generation of odour where possible;

To contain the odour and use effective treatment techniques, or other means of minimising emissions, where prevention is not possible;

To keep exposure to odour at sensitive receptors below the level at which it would give reasonable cause for annoyance;

To promote the use of good practices for the control of odour, including adequate maintenance and cleaning, storage, containment etc; and

To limit site activities under exceptional circumstances where odour cannot be controlled, i.e. major abatement plant stoppages, equipment failure etc.

3 Background

3.1 Site Setting

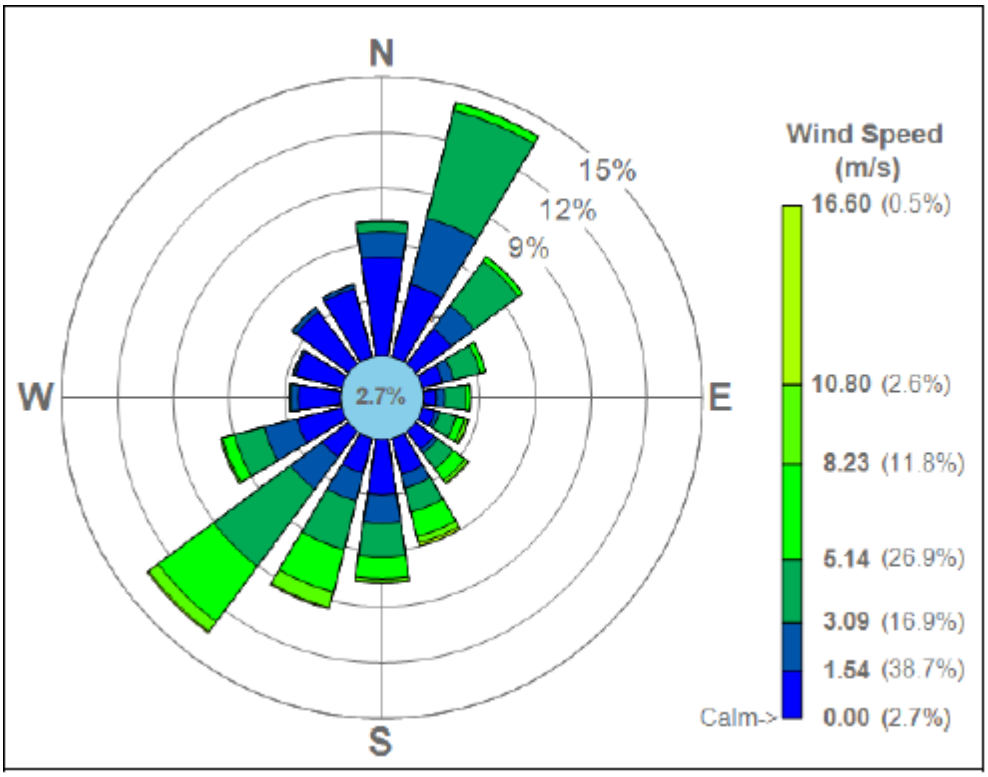
GP Biotec Ltd (GP Biotec) is a permitted Non Hazardous Waste Biological Treatment Facility (using Anaerobic Digestion) at Great Porthamel Farm, Talgarth, Brecon.

The site is centred at approximate National Grid Reference OS X (Eastings) 316023; OS Y (Northings) 235046 Grid reference SO160350. The total site area is approximately 0.78 hectares and comprises an external tank farm (with 2 large digester tanks), a reception building (comprising a purpose built sealed processing plant building) and associated external reception and storage tanks.

The facility is situated to the west of the A4078 road in an area of predominantly agricultural land. The installation site is located on a plot, sloping in a Southerly direction from approximately 140m – 130m above ordnance datum (AOD). The nearest off site residential property to the Installation are the residential properties located in Bryn Derwen, Talgarth at approximately 650m.

A summary of the prevailing wind direction during 2010 is provided below in the form of a wind rose. The wind direction which results in the majority of substantiated complaints is North-Easterly, but historically the dominant wind direction for the site is South Westerly.

Illustration 3.1 Wind Rose 2011, Sennybridge Weather Station



3.2 Facility and Process Overview

GP Biotec Ltd is a renewable energy business, producing electricity from the anaerobic digestion process. The site receives agricultural wastes from a number of sources and processes them through anaerobic digestion to form biogas and digestate[1].

The site has two digesters and two CHP engines which have the capability to produce a maximum of 1.5 MWof electricity per hour (enough to power around 300 homes). The anaerobic digester process produces methane, which is then turned into electricity via a gas engine, which is fed into the National Grid. The digestate produced is used to fertilise the land at Great Porthamel Farm and other land that the farm business manages.

The company uses abattoir wastes as feedstocks for the digesters, these include:

- Blood
- Gut contents (i.e. partly digested grass)
- Waste water/DAF sludge

[1] Digestate is a nitrogen rich fertiliser produced as a by-product of the anaerobic digestion process.

GP Biotec also uses maize grown on Great Porthamel Farm land where the site is situated as an additional feedstock.

An organogram of the staff employed at GP Biotec can be found in Annex I.

3.3 Nearest Sensitive Receptors

The nearest sensitive receptors within 1 km of the site are listed in Table 3.1 below and illustrated on the map in Illustration 3.2.

Table 3.1 Nearest Sensitive Receptors

Receptor	Receptor Type	OS Grid Co-ordinates		Distance	Direction
		X	Y		
Bryn Derwen, Talgarth	Residential	315750	234340	650m	South
Lower Porthamel Farm	Residential/Campsite	316370	235765	750m	North
Ffostyll Farm	Residential	317020	235210	1km	East
Riverside Caravan Park	Residential/Campsite	314615	234675	1.3km	South West
Great Porthamel Mill	Residential	315937.8	235532.6	450m	North East

Illustration 3.2 Nearest Sensitive Receptors Map

3.4 Off-site Odour Sources

A list of sources of odour off-site, in the surrounding are detailed in Table 3.2 below.

Table 3.2 Sources of Off-site Odour

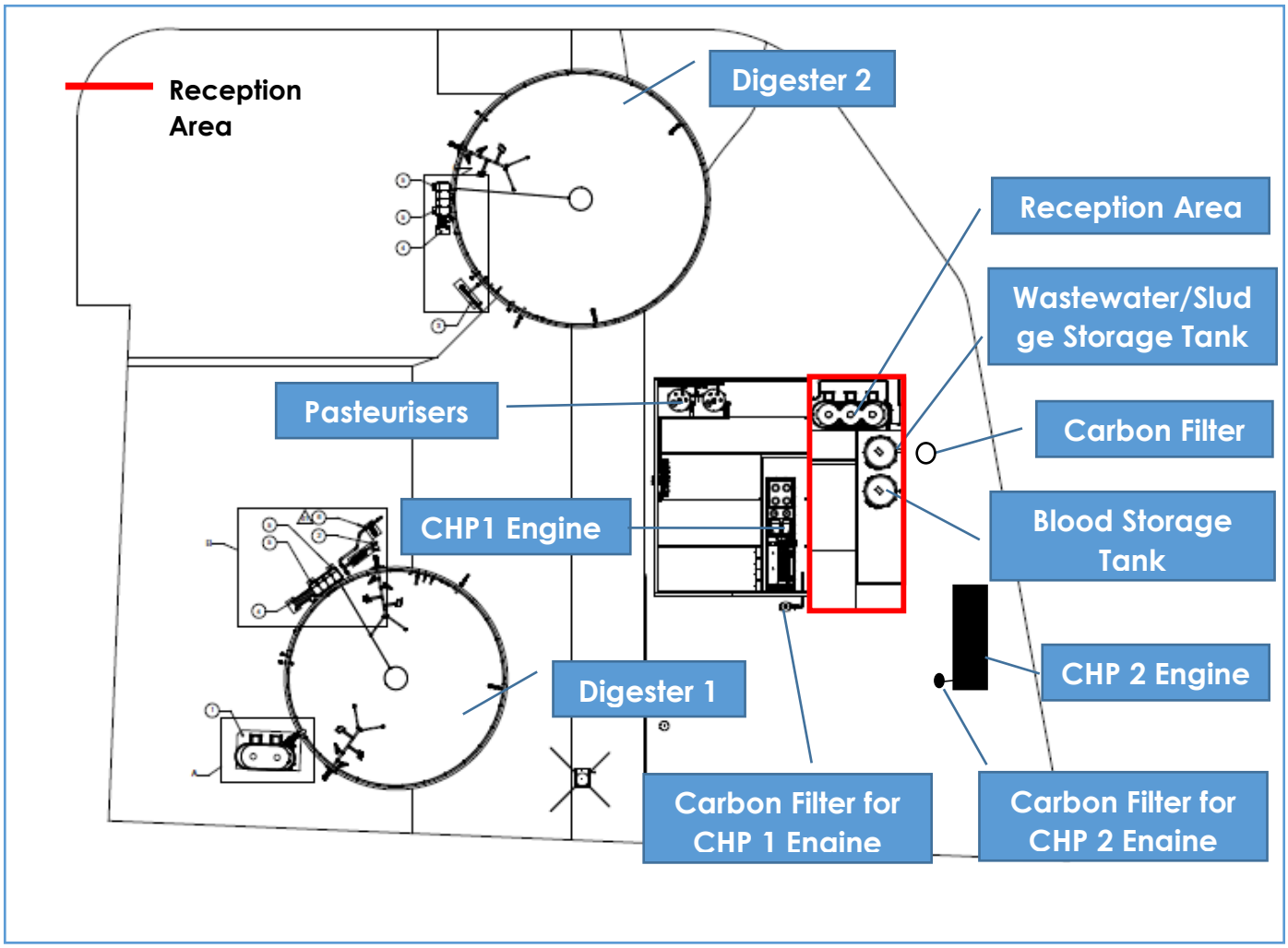
Source	Source Description	Odour Description	Frequency	Distance	Direction
Butchers, Cross House, High Street, Talgarth	Butchers and Abattoir	Blood smell and rotting meat smell from offal bins.	Animals are slaughtered on a Friday	1.5km	South West
Talgarth Livestock Market	Livestock market - intensive housing of cattle and sheep	Cattle and sheep waste	Livestock sales take place on Fridays. Liquid waste tanks are emptied on Thursday evenings.	1km	South West
Talgarth Sewage Treatment Works, Talgarth	Sewage Treatment Works	Human Sewage	Sporadic	850m	South East
Lower Porthamel Farm	Mixed farming (predominantly livestock)	Cattle manure	Seasonal	750m	North
Bradwys Farm	Livestock farming	Sheep dip, cattle manure	Seasonal	600m	North East
Great House Farm - Land	Mixed farming	Sheep dip	Seasonal	600m	South West
Trefiethal Court	Arable and apple farming	Spread poultry/ cattle manure	Seasonal	1.2km	North
Tower Lands, Trefecca Road, Talgarth	Sheep farming	Sheep waste when lambing shed being cleaned out	Seasonal	1.4	South West

Illustration 3.3 Sources of Off-site Odour map

4 Potential On-Site Odour Activities

Key operations with the potential to produce and release odour have been identified and are described below. Specific points where odour can be created are detailed, with the pathway and key control measures in tables for each process carried out on site. The Site Plan below denotes the key points on the site where potentially odorous activities are carried out. For more details of the procedures used on site see Annex II.

Illustration 4.1 Site Plan



4.1 Waste Reception

Waste (see Table 4.1 for classification) is delivered to the Reception Area on site. Liquid waste is transported to the site in sealed tankers and solid waste is transported to the site in covered bulkers. Table 4.1 below gives a comprehensive classification of the waste that is received by the site.

Table 4.1 Classification of Waste Odours

Description	Odour Description	Hedonic Scale[2]	Approx Quantity received annually (Tonnes)	Pattern of release	Potential Problems
Blood	Sulphurous, rotten cabbage, putrid	-4	3650 tonnes	Expected to peak during unloading. Material is transferred to storage as soon as it arrives on site.	Carbon filter failure. Increased volumes of blood stored over Bank Holiday weekends. Extremely hot weather.
Gut content	Sweet, gassy, pungent, rotting grass	-3	12,500 tonnes	Expected to peak during unloading. Material is processed as soon as it arrives on site.	Failure of negative air pressure in Reception Building
Waste water/ DAF sludge	Slurry, fat	-2	9000 tonnes	Expected to peak during unloading. Material is transferred to storage as soon as it arrives on site.	Carbon filter failure.

[2] The hedonic tone of an odour is the subjective judgement made by a person of the relative pleasantness or unpleasantness of its smell. The determination of this this odour characteristic is therefore open to variation between perceiving individuals and is strongly influenced by previous experience of the odour and emotions at the time of perception. Determination of hedonic tone is usually undertaken in a laboratory setting. Positive scores are the more pleasant odours (a score of +4, e.g. a bakery smell) and negative scores (a score of -4 e.g. sewer odour) are for unpleasant odours. "Source: HPA odour FAQ. Please note the hedonic tones attributed above are not derived from odour experienced in laboratory settings.

Liquid Waste

- Only trained staff are allowed to unload waste[3]
- Sealed tankers containing liquid waste are unloaded in the Reception Area and pumped into the pre-storage tanks
- The tankers are connected to the pre-storage tanks via a Bauer coupling.
- It takes approximately 15-20 minutes to unload a tanker

Solid Waste

- Only trained staff are allowed to unload waste[4].
- The solid waste is unloaded into a hopper in the Reception Area.
- It takes approximately 20-25 minutes to unload a bulker.
- The building containing the hopper is 6x11x10 metres, the door (which is roughly 3 metres wide x 4.5 metres high) is opened for around 5-10 minutes per load, once or twice a day Monday to Friday.
- Once the solid waste is emptied into the hopper it is shredded, before passing into the digester.

Table 4.2 Sources of odour and associated mitigation

Potential Source of Odour	Pathway	Control Measures
➢ Arrival of new waste on-site ➢ Off-loading waste on-site ➢ Odorous waste (due to quality of material, age, degradation, temperature) ➢ Spillage whilst unloading liquid waste	Emitted to air directly from the bulkers/tankers during unloading	➢ Inspection of all incoming wastes, to ensure it is not too odorous ➢ Delivery of liquid waste in sealed tankers ➢ Cooling of stored blood to a level where odour is minimised (below 20°C) ➢ Immediate transfer to storage tanks or sealed hopper ➢ Communication with customers to ensure materials are available before becoming malodorous ➢ Immediate clean-up of any spillages ➢ Negative pressure within the Reception Building ➢ Good housekeeping

[3] *Staff are trained in procedures GP-E02, GP-E03, GP-E04 and GP-E05 by the Site Manager – See Training Records file in Site Office*

[4] *Staff are trained in procedures GP-E02, GP-E03, GP-E04 and GP-E05 by the Site Manager – See Training Records file in Site Office*

4.2 Waste Storage

There are two 60m^3 pre-storage tanks, both sitting within a concrete bunded area in the Reception Area. One of the storage tanks is for the storage of blood and the other for the storage of waste water/DAF sludge.

The waste storage tanks are fitted with an ACTUS Carbon Adsorber filter system, a fan sucks air from both tanks and then the air passes through an activated carbon media to remove odours, releasing clean/odourless air into the atmosphere. The filter is designed to cope with the displacement of air during the unloading of the blood from tanker to storage tank.

The Reception Building that houses the hopper is held under negative pressure. The air is changed four times per hour and extracted air passes through ACTUS Carbon Adsorber filter system in order to remove any odours before being released to atmosphere.

Table 4.3 Potential sources of odour from plant failure and associated mitigation

Potential Source of Odour	Pathway	Control Measures
➢ Failure of carbon filter system ➢ Failure of Reception building to be maintained under negative pressure ➢ Failure of the cutters on the solid waste hopper	Emitted to air directly through carbon filter system	➢ Carbon medium to be replaced regularly or when H_2S emissions reach 3 ppm (schedule of replacement in Maintenance Schedule, procedure in Working Plan) ➢ Daily monitoring of the carbon filter system ➢ Daily monitoring of the solid waste hopper ➢ Regular maintenance of the solid waste hopper/cutters (schedule of replacement in Maintenance Schedule, procedure in Working Plan)

4.3 Digestion and Pasteurisation

Following initial storage, waste is then pumped into the Primary Digester tank at an hourly rate. The waste is retained in the Primary Digester tank for approximately 36

days[5] and the temperature is maintained at a mesophillic range (35-40°C). A range of micro-organisms digest the feedstock, which releases a methane-rich gas (biogas) and produces a nutrient rich material (digestate).

Once the material in the Primary Digester tank has achieved the time/temperature parameters and/or the biogas yield required it is pumped to the Secondary Digester tank, where it remains for the secondary digestion phase for approx. 43 days[6].

All digestate is then pumped via enclosed and sealed pipework into two sealed pasteurisation tanks. All digestate is processed and pasteurised in accordance with the ABP Regulations (Animal By-Products Regulations (ABPR) requirements (EU Implementing Legislation 142/2011)i.e. pasteurised for a minimum of 60 minutes at 70°C).

H_2S levels in the digesters are monitored by the computer programme (Proleit) which is controlled and monitored by the Site Manager via Teamviewer.

Table 4.4 Potential sources of odour from waste transfer and associated mitigation

Potential Source of Odour	Pathway	Control Measures
➢ Transfer of waste from Reception Building to Primary Digester Tank ➢ Production of malodorous Hydrogen sulphide (H_2S)	Emitted to air directly	➢ Direct pumping of waste from Reception Building/Storage tanks ➢ High retention time to enable thorough digestion of malodorous waste ➢ Daily monitoring of biogas levels ➢ Daily monitoring of oxygen and H_2S levels in the digester tanks ➢ Injection of oxygen and Ferric sulphate to alleviate levels of H_2S

NB – all daily monitoring records are carried out in line with the Daily Checks Procedure carried out by the Site Manager and Environmental Systems Manager, the records are paper forms filled out daily and kept in the Site Office.)

[5] The retention time varies depending upon the volume and type of feedstock, the calculation used is Hydraulic Retention Time (d) = capacity digester (m^3)/ fresh substrate added daily (m^3/d)

[6] The retention time varies depending upon the volume and type of feedstock, the calculation used is Hydraulic Retention Time (d) = capacity digester (m^3)/ fresh substrate added daily (m^3/d)

4.4 Storage of Digestate

Once pasteurised, the digestate is stored in 'Storth' storage tanks for up to four weeks, before it is released to a covered lagoon, where it is stored until it is required for spreading to land. At the end of each retention cycle a sample of pasteurised digestate is taken from the pasteurisers (in accordance with the sampling protocol specified in Annex C of the Biofertiliser Certification Scheme Rules see Annex X) to test for PAS 110:2010 compliance; the sample is tested for each parameter in Table 1 of PAS 110 by a Biofertiliser Certification Scheme approved laboratory NRM Ltd.

Table 4.5 Potential sources of odour from lagoon to tanker and associated mitigation

Potential Source of Odour	Pathway	Control Measures
➢ Transfer of digestate from pasteurisers to 'Storth' storage tanks ➢ Transfer from 'Storth' storage tanks to lagoon ➢ Spreading of digestate to land	Emitted to air directly	➢ REA Biofertiliser Certification /Compliance with PAS 110:2010 and the ADQP[7] ➢ High quality pipes, built and welded to BS ISO 8085 ➢ See Odour Management Plans for Deployment of Digestate and Odour Management Plan for Lagoon Site (Annex XI)

4.5 Treatment of Biogas

The biogas produced from the anaerobic digester process is saturated with water. Prior to combustion of the gas within the Combined Heat Powered (CHP) engines, the biogas is dewatered by cooling in an underground gas pipe. The condensate produced as a result of this process is then collected in condensation wells and pumped back into the both Digester tanks.

The biogas is passed through a carbon filter to remove any H_2S, before it is passed through the engine.

[7] REA Biofertiliser Certificate (Annex XII)

Table 4.6 Potential sources of odour from biogas and associated mitigation

Potential Source of Odour	Pathway	Control Measures
➢ Presence of odorous H_2S (a level of more than would be 200 ppm the trigger point	Fugitive emission	➢ Dewatering of biogas and re-feeding of condensate into the digester ➢ Carbon medium to be replaced regularly (see Maintenance Schedule Annex IV) ➢ Daily monitoring of the carbon filter system

NB - all daily monitoring records are carried out in line with the Daily Checks Procedure carried out by the Site Manager and Environmental Systems Manager, the records are paper forms filled out daily and kept in the Site Office. H_2S is monitored daily as part of these daily checks.

5 Control Measures

The following section details management techniques, procedures and odour control measures to minimise the potential for odour generation at the points identified in Section 4.

The facility has been designed with a hierarchy of odour control measures based around the operational requirements of the site and has been aligned with sector best practice.

The control measures detailed below follow a hierarchical strategy:

1. Prevention of the release occurring
2. Containment of the release
3. Minimisation/reduction of the release

5.1 Waste reception

The Waste reception procedures are detailed in GP-E01 (Waste Pre-Acceptance), GP-E02 (Waste Acceptance), GP-E03 (Waste Rejection) and GP-E04 (Off Site Waste Transfers and GP-E05Waste Reception of the Site Environmental management Plan & Quality Management System. These procedures are from Annex II to the Odour Management Plan.

Prevention

- Good communication with customers to ensure materials are available before becoming malodorous
- Site Management will work with waste suppliers to ensure that waste volumes are consistent during peak seasons
- Waste shall be inspected on arrival at the site and any non-conforming loads shall be rejected and removed from site.
- All liquid wastes shall be transported to site within sealed tankers
- All solid wastes shall be transported to site within cover bulkers
- The cleanliness of the Reception Area will be maintained with regular scrapping and washing down (all cleaning water is drained into the digester)
- Waste is not accepted onto the site on Bank Holidays or weekends

Containment

- Liquid waste will be unloaded on arrival at the site, via a Bauer coupling connection with the storage tanks
- Solid waste loads will be tipped on arrival at the site in the dedicated hopper in the Reception Building, which is kept under negative pressure, the air is circulated 4 times every hour (which goes further than BAT – see 3.3.12. Indicative BAT requirements for Waste reception and storage of How to comply with your environmental permit. Additional guidance for: Anaerobic Digestion Reference LIT 8737 Report version 1.0 and November 2013)

- The electric roller door on the Reception Building will only be opened when the load of solid waste is ready to be tipped, it will be closed immediately once unloading is completed (approximately 5-10 minutes)

Minimisation/Reduction

- Any spillages arising from the transfer of liquid waste will be immediately cleaned up see Accident Management Plan for Spill Response Plan in Annex VI

5.2 Waste Storage

Prevention

- The two storage tanks for the liquid waste are fitted with a carbon filter system
- The carbon filter system will be maintained via daily checks in accordance with the Daily Checks Procedure carried out by the Site Manager/Site Operative and Environmental Systems Manager, the record is a paper form filled out daily and kept in the Site Office.
- The carbon filter system has a performance guarantee for the removal of the specified annual average of H_2S at an output of 0.1ppm H_2S (See Maintenance Schedule (Annex VII) & Pure Air Solutions Proposal for Odour Control System Process Storage - AD Plant for GP Biotec Limited Annex IV)
- If H_2S levels rise above 3 ppm the carbon medium will be refreshed or replaced in accordance with instructions in Annex IV and in line with the requirements of the 5 ppm limit stated in the EH40/2005 Workplace Exposure Limits (Annex VIII)
- Stock level control checks
- Staff trained to handle delivery. Staff are trained in procedures GP-E02, GP-E03, GP-E04 and GP-E05 by the Site Manager, training records are kept on file in the Site Office.

Containment

- The pre-storage tanks are situated within a concrete bunded area, overflow pipes flow into concreted bunded area so that if any leaks occur from the tanks, the leaked waste is contained. The bunded area can then be washed down and the waste water is drained into the Primary Digester tank
- Daily inspections of the tanks and bunded area are carried out in accordance with the Daily Checks Procedure carried out by the Site Manager and Environmental Systems Manager, the records are paper forms filled out daily and kept in the Site Office.

Minimisation/Reduction

- Any leakages from the storage tanks would be identified as part of the Daily Checks Procedure and/or when trained staff are unloading. As soon as a leak

is identified it would be dealt with immediately, and washings drained back into the digesters, see Accident Management Plan for details of the Spill Response Plan in Annex VI)

5.3 Digestion and Pasteurisation

Prevention

- The 'feeding' of the Primary Digester Tank is regulated by a computer programme (Proleit) which is controlled and monitored by the Site Manager via Teamviewer. The Site Manager has a permanent connection to the Team Viewer computer system via his mobile phone. The Daily Checks Procedure carried out by the Site Manager and Environmental Systems Manager, also provides the mechanism to monitor the feeding of the Primary Digester Tank, the records are paper forms filled out daily and kept in the Site Office.
- All feedstock is pumped from the storage tanks through enclosed pipework built to BS ISO 8085 standards to the Primary Digester Tank, the pump is checked daily as part of the Daily Checks Procedure.
- All material pumped from the Primary Digester Tank to the Secondary Digester Tank is via sealed and enclosed pipework built to BS ISO 8085 standards, the pump is checked daily.
- Both Digester Tanks are fitted with a sealed double membrane roof.
- Feeding of digestate from the Secondary Digester Tank to the pasteuriser tanks is via sealed and enclosed pipework.
- High level gauges and alarms in the Digester Tanks and pasteurisers, connected to computer software (TeamViewer) prevent overfilling via interlocks
- Staff training
- The Digester Tanks have leak detection chambers which are checked daily as part of the Daily Checks Procedure.

Containment

- H_2S levels within the Digester Tanks are measured and recorded by the computer programme (Proleit), this is monitored by the Site Manager and Environmental Systems Manager as part of the Daily Checks Procedure.
- The H_2S level after both engines carbon filters may maximally rise to 200 ppm (See TAB 3 (Annex V) for CHP1 and Annex IX for CHP2). At higher levels the CHP installations must be turned off and the CHP suppliers must be consulted on how best to handle the situation[8].
- If H_2S levels are particularly high and oxygen addition is not sufficient, then Ferric sulphate will be injected into the Digester Tanks.

[8] TAB 3 Inspection, maintenance and monitoring Biogas Installation – HOST and 01-SAFETY PRECAUTIONS CHP GENSET ENGINE: E-3262 LE 202 and 05-MAINTENANCE CHP GENSET ENGINE: E-3262 LE 202 (Annex V)

- The Primary and Secondary Digester Tanks are contained within an impervious bund (plastic liner) to contain leakages.
- The pasteuriser tanks are contained in a bunded room with 110% capacity of the pasteurisers
- There is a valve on the pump - with manual tap to prevent leaks

Minimisation/Reduction

- Leakage from the Digester Tanks would be contained within the bunded area
- Leakage from the pasteurisers would be contained in the bunded room with 110% capacity of the pasteurisers

5.4 Storage of Digestate

Prevention

- The retention time in the Digester Tanks is approximately 86 days[9] which means there is more time for the feedstock to be broken down, this means that once the digestate is stored there is little material left that can be digested anaerobically whilst in storage, this results in low odour emissions
- The feedstock is constantly monitored and regulated so that a low odour digestate is produced, consultation with Biogas Analytix (see Maintenance Schedule in Annex VII)
- Samples of pasteurised digestate are tested regularly by an UKAS accredited laboratory to make sure the digestate is PAS 110:2010 compliant

Containment

- Digestate is transferred from the pasteurisers to the Storth storage tanks via pipework built/welded to BS ISO 8085 standard.
- Digestate is stored in Storth storage tanks
- Digestate is transferred from Storth storage tank to lagoon storage via lay flat pipework, which is inspected daily in accordance with the Daily Checks Procedure carried out by the Site Manager and Environmental Systems Manager, the records are paper forms filled out daily and kept in the Site Office.

Minimisation/Reduction

- In order to minimise potential odour emissions from the digestate storage lagoon can hold 4000 m3, it is a covered lagoon and is secured with protected drainage and an impervious bund.

[9] The retention time varies depending upon the volume and type of feedstock, the calculation used is Hydraulic Retention Time (d) = capacity digester (m^3)/ fresh substrate added daily (m^3/d)

- In order to minimise potential odour, digestate is stored in the lagoon for no longer than 6 months. This is less than the limit of 12 months stated in the Standard rules SR2010No4 Mobile plant for land spreading Waste permit that GP Biotec holds. GP Biotec has sufficient storage capacity during times when the land-bank may be unavailable for prolonged periods, where the land is waterlogged or frozen and to span the winter no spread periods, this is considered BAT (see How to comply with your environmental permit. Additional guidance for: Anaerobic Digestion Reference LIT 8737 Report version 1.0 and November 2013)

5.5 Treatment of Biogas

Prevention

- H_2S is primarily removed from the biogas by desulphurisation bacteria. The bacteria convert the H_2S in the biogas to elemental sulphur. The elemental sulphur is removed through the digestate.
- The desulphurisation bacteria have to be fed with maximal 4% air compared to the biogas production. At a higher air dosage, sulphuric acid is formed, that causes damage to the concrete and parts of the roof.
- The desired amount of air is added to the digester through an air pump. The capacity of the air pump is limited in capacity, so that an explosive mixture will not occur. The amount of air to be dosed depends on the biogas production (see Desulphurization Table Annex V and Section 3 Host Manufacturers Document TAB 1 Anaerobic Digestion Annex V).
- Dewatering of biogas and re-feeding of condensate into the digester (for details see Section 4 Host Manufacturers Document TAB 1 Anaerobic Digestion Annex V)
- Carbon medium in engine carbon filters to be replaced before H_2S level reach 200 ppm as stated in TAB 3 Inspection, maintenance and monitoring (Annex V) and by CooperOstlund (I'm waiting for them to show me where this is stated in the instruction manual.
- Daily monitoring of the carbon filter systems in accordance with the Daily Checks Procedure (see Annex VII) carried out by the Site Manager and Environmental Systems Manager, the records are paper forms filled out daily and kept in the Site Office.

Containment

- Double membrane gas roof on digesters
- Biogas transported in high quality pipes, built to BS ISO 4437-3:2014

Minimisation/Reduction

- A gas detection system in the engine room means that an alarm goes off if there is a biogas leak in the engine room and the engine shuts down.

- The gas alarm is triggered at 10% of the low explosion threshold (see Operating Manual ETW Energietecknik GMbH Annex IX)

5.6 Liaison with Neighbours and Complaint Handling

Public Relations

Liaison meetings to be held every two months between GP Biotec, Natural Resources Wales (NRW) and Talgarth Local Council to discuss past, present and future operations and provide an open forum for discussions, to ensure that the local community is kept up to date with improvements and activities on site.

If an action is being considered that may cause temporary odour, outside of the normal operational procedures, then before such action is taken NRW will be informed on **0800 807060** and by informing the NRW officer for the site. Neighbours who may be affected will be contacted to advise them of the operation being undertaken and that any increase in odour will be of a temporary nature.

Complaints Handling

Odour complaints are received by the site in two ways, either through NRW or direct contact to the site. It is recommended that complainants use the NRW Hotline **0800 807 060**, the site contact number is **07974 087405** (Site Manager).

In the event that a complaint is received from the public (either direct to GP Biotec or via NRW or Environmental Health) a thorough investigation will be undertaken, principally in the form of Complaint Monitoring (detailed in Section 8.3). Feedback would be provided to the complainant via the same route that the complaint was initially made, i.e. if the complaint was made via NRW the feedback would be sent back via NRW immediately.

6 Trigger Points and Contingency Planning

The following trigger values have been identified, and if exceeded the Site Manager/Operations Manager will be required to take appropriate contingency measures.

Trigger Point	Contingency Actions
Blood Table 6.1 Trigger Points in storage tank exceeds 20 ^{o}C[10]	Addition of cold water to the tank to cool the blood.
H_2S level from odour abatement carbon filter exceeds 3ppm[11]	Carbon media to be refreshed or replaced immediately[12]
Level of H_2S in Digester tanks rises above 200 ppm	Addition of O_2/ferric sulphate injection Immediate renewal of carbon media in carbon filter
Odour Intensity 3 Recorded at Sensitive Receptor	Two hourly monitoring
Receipt of Complaint	Complaint monitoring
Plant Failure	See Accident/Incident Management Plan (Annex VI)

Exceedance of the control levels in Table 6.1 will result in further investigation into the causes of any odour and will instigate additional monitoring. Actions will be taken to abate any odour being produced on site.

[10] Is considered BAT The Red Meat Processing (Cattle, Sheep and Pigs) Sector (EPR 6.12)
[11] See EH40/2005 Workplace Exposure Limits (Annex VIII)
[12] See instructions for refreshment of carbon media and replacement of media (Annex IV)

7 Incident and Emergency Planning

Consideration has been given to the types of failure or abnormal events that have the potential to result in an odour impact. Abnormal events include the following:

- Adverse weather conditions
- Fire
- Flooding
- Power cut
- Road Closure
- Bank Holidays/Weekends
- Plant Failure
- Staff Absence
- Odour detected Off-Site
- Vandalism/Site security

7.1 Adverse Weather Conditions

In extremely high temperatures, combined with still conditions the waste being delivered to the site could potentially become odorous. It is therefore imperative that if such conditions arise the waste is transferred to the storage tanks and hopper immediately. If it is at all possible the waste will be delivered earlier on in the working day so that it is unloaded during the coolest part of the day.

7.2 Fire

In the event of a fire (on site) dependent of the size and location of the fire, site infrastructure may be compromised, a full Fire Risk assessment has been carried out (see Annex VI). Once everyone on site has been alerted to the fire and the Fire Brigade and NRW have been informed, the site will be under the control of the Fire Brigade and as such, any actions taken must be at their direction. The main priority would be to prevent fire spreading to the Digester Tanks where there is a high concentration of potential explosive biogas. If it is safe and practicable to do so, efforts will be made to safeguard current infrastructure and control odours arising from the site. Odour impact is likely to be from burning infrastructure and gas.

In the event of a fire off-site in the local area, everyone on site would be alerted to be aware of the situation and to be extra vigilant due to the potential explosive nature of the gases created and stored on site. If it became concerning that the site was potentially compromised by the fire, the Fire Brigade and NRW would be informed immediately.

7.3 Flooding

The ingress of watercourse floodwater, blocked drains, burst water main and the use of fire water, have the potential to cause an on-site flood. However, surface water is managed on site with a series of drains which feed into the Digester Tanks, so no increase in odour from the site in this eventuality is likely. All drains are checked for blockages as part of the daily site checks.

Flooding in the local area (i.e. off-site) is likely to have a low-moderate impact on site activities including odour control at the site, because of the location/position of the site.

7.4 Power cut

The site produces/uses its own electricity and therefore can continue to operate should there be a power cut. In the unlikely event that a system failure causes the production of the site's own electricity to be halted AND there is a power cut, then the site can cope with being 'on stop' for a maximum of 12 hours (see Accident Management Plan for details in Annex VI). There may be minimal short-term odour related to the waste being held in storage. If power was down for more than 6 hours we would hire a generator to provide electricity until mains power was restored (this would take less than 6 hours to sort out). The second CHP engine has been installed and can run in 'Island Mode' (this facility will be made available week commencing 15/6/15).

7.5 Road Closure

The site is accessible from two directions via the A4078, although waste may only be delivered to the site from the North (i.e. by not going through the town of Talgarth). Closure of the A4078 from the North would limit access to the site for waste deliveries, this would have little impact on the odour management at the site and deliveries could be temporarily halted. If the entire A4078 was closed it would limit access to the site contractors and site staff (although the Site Manager resides on the farm where the site is situated, so the impact would be minimal). Also the site can be controlled remotely via the computer software (TeamViewer) in place.

7.6 Bank Holidays/Weekends

The site receives no deliveries of waste on weekends or Bank Holidays. The site regulates waste deliveries and the feeding of the Digesters, so that sufficient feedstock is stored on site and is available during these periods where deliveries cease.

7.7 Plant Failure

The plant is monitored so closely on a daily basis that at the first signal that any part of the process is failing due to a fault with equipment/imbalance in the microbes, a response is immediate (See Accident Management Plan Annex VI). GP Biotec has a running agreement with Biogas Analytix, who advise on the running of the plant based on samples from the digesters and provide advice as appropriate. However, in the event of the failure of the anaerobic digestion plant this may result in a delay in processing waste received. The magnitude of the impacts will depend on the length of the breakdown and the type and volume of waste held in the storage tanks yet to be processed. This waste could have the potential to result in the release of odour if the facility was 'on stop' for longer than 24 hours; in this eventuality the site has the capacity to store the waste for a considerable period.

The farm also holds a Standard Rules SR2010No4 Mobile plant for landspreading which means that if required the waste received by the site could be spread to land in an emergency, in compliance with the permit. There could be odour associated with this process but it would be short-term.

Table 7.1 Plant Failure

Plant Failure Type	**Action**	**Time limit on Back up plan being instigated**	**Back up Plan**
Due to failure of electricity supply	CHP2 Engine 'island mode' will be utilised	24 hours	Generator to be hired
Failure of grid to export power	Gas flared and pressure relief valves on digester tanks activated; waste received onto site stored. Western Power contacted to solve the problem.	As soon as on site waste storage is at capacity (dependant on waste deliveries) 24 hours	Waste stored under Standard Rules SR2010No4 Mobile plant for landspreading Blood waste would be halted within Request our suppliers to minimise amount of waste if possible. Spread waste directly to land as a last resort under Standard Rules SR2010No4 Mobile plant for landspreading
Failure of Anaerobic Digestion process e.g. foaming, waste feedstock could contain impurities that impede/prevent the anaerobic digestion process	Stop feeding. Contact Biogas Analytic for advice Circulate contents of Tank 2 into Tank 1 to dilute contents of tank 1 to increase bacteria in Tank 1. Additives to prevent foaming e.g. oil seed rape oil Hire a boiler to maintain temperature. Pasteurise contents of digester and then transfer to storage in our Standard Rules	As soon as on site waste storage is at capacity (dependant on waste deliveries) 24 hours	Waste stored under Standard Rules SR2010No4 Mobile plant for landspreading Blood waste would be halted Request our suppliers to minimise amount of waste if possible. Spread waste directly to land as a last resort under Standard Rules SR2010No4 Mobile plant for landspreading

	Permitted Site (EPR/GB3631AP)		

7.8 Staff Absence

Short-term staff shortages (such as a few days illness) will not affect the ability of the site to operate effectively as other staff members can be reassigned to critical operations. In the event of prolonged absence of staff members, GP Biotec would recruit temporary staff and provide training. These measures will also be employed if widespread absence occurs amongst staff members (such as food poisoning). The table below shows the appointed deputy should absence occur and the task associated with that position.

Table 7.1 Staff Absences Contingency Plan (Reference to Annex I)

Position	Odour Specific Task	Appointed Deputy
Site Manager	Overseeing complaints handling, assess malodorous loads, authorisation for waste acceptance/rejection, odour controls operational checks, odour monitoring checks, pre-acceptance waste checks	Operations Manager/Environmental Systems Manager
Operations Manager	Complaints handling, assess malodorous loads, authorisation for waste acceptance/rejection, odour controls operational checks, odour monitoring checks, pre-acceptance waste checks	Site Manager
Environmental Systems Manager	Complaints handling, controls operational checks, odour monitoring checks	Site Manager
Driver(s)	Un-loading waste, cleaning Reception Area	Driver/Site Manager/Operations Manager monitored/ supervised by Site Manager

7.9 Odour detected Off-Site

If odour is detected off-site GP Biotec will review operations, however it is difficult to temporarily stop waste being delivered to the site because the nature of the anaerobic digestion process is a continuous one, the balance of which can be upset hugely by a change in volume or type of waste. In fact by altering things significantly, odour impact could very well increase, therefore improvement by closure of the site is not workable in this instance. NRW will be informed and the odour management plan reviewed.

8.0 Vandalism/Site Security

Unauthorised entry and tampering/malicious damage to property, plant and equipment is minimised by a secure gate and perimeter fence and all Site buildings have coded locks on them. The Site gate is locked out of hours and tanks and valves locked when not in use or out of hours. Plant and equipment are locked in secure storage out of hours.

8 Monitoring and Auditing

A comprehensive approach is taken towards odour monitoring, both proactive (i.e. routine monitoring of performance in order to benchmark and improve environmental performance) and reactive (i.e. change in regulatory requirements or to qualify and quantify complaints). The monitoring strategy applies to both approaches.

8.1 Odour Monitoring

Monitoring points have been identified to provide an overall assessment of odour at the site boundary and at the nearest sensitive receptors; any off-site odour sources not near a monitoring point are also included, all of these points are listed and illustrated in the table and map below respectively:

Table 8.1 Odour Monitoring Points

Monitoring Point Number	Monitoring Point Description	Monitoring Point Location
1	Site Entrance	East
2	Second bend in the private lane	North
3	Junction A4078 and Hay Road	South West
4	Talgarth Medical Centre	South West
5	Brian George Butchers/Abattoir, Cross House, High Street, Talgarth	South West
6	Talgarth Livestock Market	South West
7	Talgarth Sewage Treatment Works, Talgarth	South East
8	Riverside Caravan Park	West
9	Honey Cafe	North West
10	Pontithel	North
11	Junction of A4078 and A438	North East
12	Junction of Velindre Road and A4078	North East

Sniff tests[13] at these monitoring points will be carried out twice daily and may be used to provide information on odour levels where the purpose of the monitoring is to:

- Demonstrate if actions taken to reduce odours have been effective;
- Demonstrate compliance with permit conditions; and
- Carry out continuous checks on effectiveness of the control measures in place.

[13] Sniff test monitoring shall be carried out in accordance with the monitoring protocol contained within the Environment Agency's Technical Guidance Note H4 Appendix 1, see Annex VIII.

All results of sniff tests will be recorded in the Odour Monitoring Form (see Annex III) and all results will form an electronic Odour Diary which will be recorded/compiled by the Environmental Systems

Illustration 8.1 Monitoring Points Map

8.2 Meteorological Monitoring

Part of the monitoring strategy will be to record weather conditions via the on-site weather station. The station automatically records the conditions on the site continuously, including temperature, wind speed and direction, and conditions (i.e. dry, precipitous). This electronic data is transferred to the site diary by the Environmental Systems Manager.

8.3 Complaint and Corrective Action Monitoring

Details of complaints shall be recorded and will include, date and time, nature of complaint, name of complainant (if given), a summary of the

investigation/monitoring instigated as a result of the complaint, their results and feedback given to the complainant.

In the event of a complaint a trained member of staff will aim to investigate the odour as soon as the complaint has been received. The investigation will include the following:

- A sniff test at the location of the complaint
- Sniff tests at all the monitoring points identified in Table 8.1(See Annex III for Site Odour Monitoring Form)
- A consultation with Team Viewer to check the plant is running normally
- Checks that the carbon filters on site are both working normally
- Checks that the Reception Building is being maintained under negative pressure and that the air flow is normal.
- Meteorological conditions at the time of the complaint will be recorded.

All of the information above will be recorded in a Complaints Response Form (see Annex III) feedback relating to the report will then be given to the complainant direct or via NRW

9 Record Keeping

Records of the following will be kept on site:

- Results of daily odour monitoring
- Meteorological data to be downloaded regularly from the on-site weather station
- Operational problems including date, time, duration, prevailing weather conditions and cause of problem
- Details of corrective action taken and any subsequent changes to operational procedures and evaluation of the effectiveness of control and abatement techniques used
- A complaints log will be maintained
- Notification to NRW of abnormal/odorous activities on site

10 Future Improvements

This plan will be reviewed annually from the date of acceptance by Natural Resources Wales and amended as required. Amendments may be made more frequently should a method pertaining to odour management change in the interim and this will be considered to supplant the aforementioned annual review.

Future odour related objectives for GP Biotec include:

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Future Objective	Timescale
Enclosing the storage tanks once tanks 3 and 4 are installed	June 2015
Refrigeration of the blood storage tank	First quarter 2015 June
Development of an Accident Management Plan which integrates with the OMP	March 2015
Development of a website with meteorological information and information of activities on site	Third Quarter 2015
New engine Island Mode facility	June 2015