

Proposed changes

1.0 Introduction

This document provides a non-technical summary of the proposed changes Biogen wish to incorporate into environmental permit reference FP3137GF at their existing Westwood Anaerobic Digestion (AD) installation.

The principal changes proposed on site are to incorporate the export of biomethane to the national grid alongside the existing gas to CHP engines for electricity generation, and to increase annual throughput from 65,000 to 105,000 tonnes per annum.

In summary, this proposal includes:

1. Increase the permitted waste annual throughput from 65,000 to 105,000 tonnes.
2. There will be no increase or changes to the current permitted area boundary or expansion in the geographical footprint of the site.
3. The current 1140m³ Raw Waste Buffer Tank (RWBT) will be replaced with a new tank of the same capacity;
4. Total initial design Digester storage capacity of 12,620m³ will remain unchanged, comprised of 4,560m³ (2 x 2280m³ digesters) to continue to serve the CHP engines and 8,060m³ (2 x 2280m³ and 1 x 3500m³ digesters) for gas generation to the national grid.
5. Digesters 1, 3, and 4 will be rebuilt to the current dimensions. The current Digester 2 will remain in use for CHP generation.
6. Digester 5 was never built as part of the original installation except for the concrete base, although the design storage capacity of the tank was included in the original secondary containment maximum design capacity. Digester 5 will be constructed but with a larger tank diameter than the original planned digester but at the same height as the other 4 digesters at 14 metres. A new digester 5 will have a diameter of 17 metres instead of 14 metres.
7. Pasteuriser tanks 1 & 2 will be rebuilt to the same diameter but with an increased height from 7 to 8 metres high which is significantly less than the height of the digesters and the RWBT, which will increase the storage capacity of each tank from 140m³ to 166m³. These will be equipped with a digestate cooling system.
8. The current redundant 140m³ Fats, Oils and Greases (FOG) tank will remain and will be recommissioned as a Dirty Water Tank to store captured rainwater from within the bund for treatment pending discharge to the onsite pond.
9. An additional gas holder will be installed to serve the Gas to Grid operations. The existing gas holder serving the CHP engines will remain.
10. An additional gas flare will be installed to serve the Gas to Grid operations. The existing gas flare serving the CHP engines will remain but will be relocated adjacent to the new Gas to Grid auxiliary flare.
11. Installation of Gas to Grid infrastructure including, but not limited to, a Biogas Upgrade Plant (BUP), Gas Entry Unit (GEU) and propane storage.
12. The current 3 x CHP engines (1 x 0.8 MW, 2 x 1.63MW) will remain in operation. The existing emissions stack will remain unchanged.
13. A new replacement carbon filtration system will be installed to treat extracted channelled air from the waste reception and process building pending emission to air via a stack to aid dispersion. This will include new replacement ventilation and extraction ducting with point source extraction vents/hoods positioned close to all predominant sources of odour within the building.
14. The existing below ground sump in the waste reception building is no longer used for its original intended purpose to store treated feedstock and for digester return. As such, the

odour concentration within the sump is significantly less and therefore the existing cockle biofilter treating the extracted channelled air from the sump has been isolated and decommissioned (as agreed with the Environment Agency) and can be removed from the permit as a specified abatement system.

15. A new sealed separator room will be purpose built to house the Borger screw press separator for digestate screening together with a contaminates skip. Extracted air from the separator building will be channelled through to a new acid scrubber for treatment prior to emission to air via a stack to aid dispersion. This is a new abatement system and emission point to be specified in the permit.
16. Digestate Storage Tank 1 will be subject to a full de-grit, cleaned out and then recommissioned with improvements pending use for PAS110 compliant digestate storage. The headspace of this tank will be extracted through to the same purpose designed acid scrubber serving the screening room. Currently the headspace of Storage Tank 1 is extracted through to a containerised woodchip biofilter. This biofilter is now redundant and will be replaced by the acid scrubber to provide effective odour abatement.
17. Gas boilers will be installed to provide heat for Digesters 3, 4, and 5 for Gas to Grid generation with an emission stack. This is a new point source emission to be specified in the permit.
18. Improvements to the existing clay lined secondary containment bund where required.

Figure 1.0 below shows a site layout plan for the proposed Gas to Grid expansion plans.

In simplistic terms, the new gas to grid expansion plans will utilise the same waste acceptance procedures, front end processing and digestion as currently in place to serve the CHP engines for electricity generation. However, following digestion, gas from digesters 3, 4 and 5 will be directed through a gas scrubber then onto a newly installed gas holder. From here, gas will be directed to a Biogas Upgrade Plant (BUP) where other gases from the gas stream particularly carbon dioxide will be removed. Following upgrade, gas will be directed to the Gas Export Unit (GEU) where propane injection will increase the calorific value to produce biomethane prior to export to the national grid with a typical methane content of >97%. Methane compression can also take place to be exported offsite via road tanker for example.

AR2

Storage of waste pending recovery or disposal.

As above, the permitted annual throughout will increase from 65,000 tonnes to 105,000 tonnes per annum. This will increase the daily waste acceptance rate from approximately 178 tonnes to 288 tonnes per day (should feedstocks be accepted Monday to Sunday for 365 days).

No new waste types are proposed as part of this application.

AR3

Physical treatment for the purpose of recycling.

All pre-treatment of waste activities will remain unchanged and will continue to take place within a fully enclosed building equipped with new ventilation, extraction and odour abatement. All feedstocks will continue to be deposited on an impermeable surface with a sealed drainage system contained within designated bays.

Pre-treatment activities will continue to involve shredding, sorting, screening, compaction, baling, mixing and maceration as listed in the current permit. This will include maceration down to 12mm at the front end.

Post-treatment of digestate will take place in a new purpose built sealed and enclosed building and on an impermeable surface with sealed drainage system in the form of screening to remove any remaining contraries down to 2mm prior to storage as fully recovered PAS 110 QP digestate (non-waste).

Heat treatment will continue to in the form of pasteurisation in 2 new tanks for the purpose of recovery. Pasteuriser tanks 1 & 2 will be rebuilt to the same diameter but with an increased height of 7 to 8 metres high, which will increase the storage capacity of each tank from 140m³ to 160m³.

Gas cleaning in the form of chemical scrubbing is to take place. Biogas will be subject to chemical scrubbing prior to storage in the gas holder prior being treated and upgraded pending transfer to the grid via a pipeline.

A Gas Upgrade Plant (GUP) will be utilised as a gas cleaning operation predominantly in the form of membrane filtration and propane injection to increase the calorific value prior to injection to the national grid. The gas to grid process will incorporate methane compression and a Gas Entry Unit (GEU).

AR4

Steam and electrical power supply.

Gas produced in digesters 1 and 2 at a capacity of 2280m³ each together with the Pasteurisers and the Pasteuriser Dump Tank will be stored in a purpose designed gas holder. From here, gas will then continue to be transferred to the 3 Jenbacher CHP engines for combustion to generate electricity. Emissions for the consumer engines will continue to be subject to annual MCerts emissions testing by an independent third party. The CHP engines with an aggregated thermal input will have sufficient surplus capacity to consume additional gas for electricity generation.

Gas produced following digestion from tanks 3, 4 and 5 at 2280m³ and 3500m³ each respectively will be subject to chemical scrubbing prior to temporary storage in a new separate gas holder prior to upgrade pending export to the National Grid.

From a digestion and biogas production perspective, the Westwood facility will effectively operate as a two tier process (gas to engines for electricity generation and gas to National Grid) following pre-treatment. The gas to grid process will be served by a pre-gas scrubber, a gas holder and have its own auxiliary flare and will be independent.

AR5

Emergency flare operation.

Two auxiliary gas flares will be utilised, one for the gas to engine production and the other for gas to grid. Each flare will be appropriately designed to have a maximum flow rate of equivalent to or exceeding the total maximum gas flow rate which could be produced on site in the unlikely event the CHP engines were non-operational and gas to grid production temporarily ceased.

The existing flare will be repositioned on site to continue to serve the CHP engines but will be relocated and a new additional flare will be installed to serve the Gas to Grid operations.

Following commissioning, in the unlikely event either auxiliary gas flare was operational for more than 10% of total operating hours (876 hours), emissions monitoring would be completed. A record of operating hours for each individual gas flare will be recorded on SCADA and submitted annually to the Environment Agency.

The use of either auxiliary flare will only be required during periods of breakdown or maintenance of the CHP engines or in the event of disruption to gas to grid generation.

It is not Biogen's intention to increase the rate of flaring. It isn't financially viable or environmentally beneficial to increase the rate of flaring. The rate of feeding (OLR) into the digesters will be continuously monitored and can be controlled remotely through SCADA. This includes continuous monitoring of the gas holder levels. Both gas holders will have sufficient surplus capacity to store additional gas. In the event of elevated gas holder pressures and either holder reaching a pre-determined volume, the auxiliary flare/s would auto ignite prior to the PRVs activating. The flares would continue to operate until either gas holder levels are reduced to a pre-set limit. Both auxiliary flares are to be ignited by propane which will be stored on site in sufficient quantities at all times and equipped with an auto changer.

AR6

Raw material storage.

From receipt of raw materials to despatch for use within the facility, the majority of raw material use will predominantly remain unchanged from current operations, however, the quantity used is likely to increase. This includes for example, but not limited to, lubrication oil, antifreeze, ferrous chloride and propane.

The newly installed carbon filter treating extracted channelled air from the waste reception and processing building will contain activated carbon. The frequency of replenishing the carbon media will be dictated by six monthly emissions test results. The results of the emission testing provide an indication of the remaining lifespan of the media. This enables Biogen to proactively evaluate when the media is likely to require changing.

The site utilises ferrous chloride for H₂S dosing.

AR7

Gas storage

An additional larger gas holder will be installed to contain and provide biogas for the gas to grid upgrade. The site will have two standalone gas holders, one for gas to grid and the existing holder to continue to serve the CHP engines for electricity generation.

The rate of feeding (OLR) into the digesters will be continuously monitored and can be controlled remotely through SCADA. This includes continuous monitoring of the gas holder levels. Both gas holders will have sufficient surplus capacity to store additional gas derived from their respective digesters. In the event of elevated gas holder pressures and/or either holder reaching a pre-determined capacity, the auxiliary flare/s would auto ignite to burn the surplus gas.

Both gas holders will consist of an inner membrane which contains the gas and an outer membrane which is inflated by forced ventilation. If the inner membrane was to leak, the void between the inner and outer membranes could become an explosive environment. Therefore, the void area between the two membranes is continually subject to forced ventilation.

The gas holders will be specially designed and installed to the highest specification. The site is and will continue to be subject to periodic DSEAR conformance assessments. DSEAR plans are and will be updated and made available on site and electronically which will be revised in advance of infrastructure changes made on site and in accordance with COMAH.

AR8

Digestate storage

All digester material will be subject to post-pasteurisation to 70.7°C for 65 minutes in the two 160m³ pasteuriser tanks prior to discharge (independently). Digestate will then be screened down to <2mm in a new purpose built enclosed separator building prior to storage in the onsite Digestate Storage Tanks.

Following screening, the storage of fully recovered PAS110 QP digestate on site will take place in all three Digestate Storage Tanks at 9700m³ each pending removal off site by tanker or tractor/trailer for land spreading or transferred to the Bedfordia Farm main via an onsite irrigation pump system. All Digestate Storage Tanks are equipped with either hydraulic or mechanical mixing.

Arrangements are in place should digestate cease to meet the end of waste criteria and remain a waste, or access to land for spreading of materials or waste is either restricted or prohibited.

AR9

Surface water collection and storage.

Uncontaminated rainwater derived from rooftops and surface runoff from non-operational areas will continue to enter the onsite attenuation pond. Rainwater captured within processing areas including the secondary containment area will either be reused within the facility or discharged to the onsite attenuation pond (subject to ammonia testing) and released offsite to a field drainage ditch via soakaway reed bed by opening the sluice. All rainwater captured within the secondary containment area returned back into the process will continue to form part of our PAS 110 QP final product.

AR10

Air treatment

The waste reception and processing building will continue to operate under a negative air extraction system providing a minimum of three air changes per hour. This will maintain a healthy working environment for staff and visitors and ensures odorous air is retained within the building to prevent fugitive emissions. The ventilation and extraction system will be replaced, with extraction fans engineered to provide sufficient extraction in accordance with the design capacity of the building based on 52,000m³/air per hour and the contact residence time within the abatement system.

Extracted air from the waste reception and processing building will be directed to a new purpose designed carbon filtration system for treatment consisting of a bank of carbon trays. Treated air will be exhausted through a new emissions stack to aid with dispersion. Odorous air from the 200m³ below ground sump in the reception building is no longer required and has been isolated and decommissioned as previously agreed with the local Environment Agency Brampton Waste Team (**document reference WWCB1**). As such, air is no longer extracted and channelled through to a cockle bed biofilter for treatment. This biofilter has been isolated and decommissioned. Odorous air from the headspace of Digestate Storage Tank One will be extracted and channelled through to the acid scrubber also installed to treated extracted air from the new enclosed separator building. This is a new point source emission.

Air extracted from the sealed separator screening room is to be channelled through to an acid scrubber for treatment based on a minimum of 10 air changes per hour. As above, this is a new point source emission.

Gas boilers are to be installed to provide heat for Digester 3, 4 and 5 positioned with the pump room. The gas boilers will share an emission stack to air. This is a new point source emission.