` Biowaste Appropriate Measures Review

Westwood AD facility

This review addresses the Appropriate Measures required for Biowaste Treatment with respect to Anaerobic Digestion (AD) including the combustion or upgrading of the resulting biogas and treating digestate. This includes any overlap between Best Available Techniques (BAT) for waste installations and necessary measures for waste operations. The Environment Agency uses the term ‘appropriate measures’ to cover both sets of requirements.

Appropriate Measure	Description	How Biogen complies
3. Bespoke wastes suitable for biological treatment	**Animal Byproducts** Biological treatment facilities may need to comply with The Animal By-Products (Enforcement) (England) Regulations 2013 (ABPR) to accept and treat animal by-products. This is regulated by the Animal and Plant Health Agency (APHA). More information is available from the APHA on the definition and categorisation of animal by-products. Biological, organic treatment facilities can be authorised to accept category 3 animal by-products.	Biogen has an established Feedstock Pre-acceptance Procedure which demonstrates how Biogen meets the BAT requirements and those in sections 2.1.2. of Sector Guidance Note IPPC S5.06. The pre-acceptance requires a three-stage sign-off by a representative from the Operations, Compliance and Laboratory/Research team. Samples are requested and analysed where appropriate on a risk basis. The procedure also details the need to obtain: • Information on the nature of the waste. • The composition and characterisation of the waste. • Handling requirements and associated hazards. • Where appropriate a representative sample of the waste will be taken from the customer and analysed ensuring the collected sample is representative providing justification for any deviations. The procedure is directly linked to the Feedstock Pre- Acceptance Form which is completed prior to any of the waste being accepted. The form, in addition to the above, also ensures the relevant information stated as part of the guidance is obtained: • Information and contact details for the current holder of the waste. • Description of the waste. • Description of the process giving rise to the waste. • Whether it is considered a high-risk feedstock, an example could be a liquid feedstock high in fat/oils or yeast which require careful management to preserve biology, or one where it is deemed a risk because of the nature in the way waste is collected. This requires additional sign-off at Director level. • The EWC/LOW code assigned to the waste.

		• The SIC code assigned to the producer of the waste. • The physical form the waste is in, e.g., solid, liquid, sludge. • Whether it contains Animal By-Products Regulations (ABPR) material, if yes, which category. • Whether it contains packaging, if yes, what type of packaging and estimated percentage. • The anticipated quantities of waste. • Waste testing (this is primarily for liquid-based feedstocks). Biogen undertake an extensive sampling program and work with an external laboratory to cover the following determinands: Total Solids % w/w, Organic Dry Matter % w/w, Total Nitrogen % w/w, Ammonium Nitrogen (mg/kg), Total Phosphorus (P) (mg/kg), Total Potassium (K) (mg/kg), Total Magnesium (Mg), Total Copper (Cu), Total Zinc (Zn), Total Sulphur (S), Total Molybdenum (Mo), Total Lead (Pb), Total Cadmium (Cd), Total Mercury (Hg), Total Nickel (Ni), Total Chromium (Cr), Total Sodium (Na), pH, Chloride, Fluoride, Total Arsenic (As), Total Selenium (Se), Water Soluble Sodium, CLS Fat Test (g / 100g), Microbial inhibition at pH 6.0, Microbial inhibition at pH 7.2, Microbial inhibition at pH 7.4, Microbial inhibition at pH 8.0, Biological Methane Production (LCH4/kg VS), Electricity Production (kWh/ AD tonne), COD (g/L). Routine samples are taken prior to acceptance and then either on a 6-monthly or 12-monthly basis, this is decided on a risk basis. Instances where there is cause of concern over variance, the research team will increase the frequency of testing for determinants of concern. Biogen have an agreed Feedstock Agreement; it stipulates that the customer must notify Biogen if there is a deviation from the feedstock described in their Agreement. This is a legally binding document that had input from legal advisors. It is signed by the customer. • Whether there are any special handling requirements with respect to H&S of personnel or in respect of the environment.

		• Any hazards associated with the waste. • Haulier details, including Waste Carriers Licence, ABPR approval where applicable including labelled Cat2/3 vehicles. • The type of vehicle the waste will be transported in.

	Wash down waters, liquor and leachate Materials produced incidentally to a process, for example clean down or wash waters, leachates and liquors from feedstock storage, are waste. For example, where water has: • permeated through a material • resulted from that material being stored (such as silage liquor) • resulted from composting Transfer and disposal of waste must comply with the duty of care code of practice under section 34 (7) of the Environmental Protection Act 1990.	In respect of wastewater, the Westwood AD facility is designed with a sealed drainage system. All leachates or liquors derived from incoming feedstocks are captured in the sealed drainage system within the waste reception building. The reinforced impermeable surfacing within the building is engineered to drain away from the roller shutter doors and towards the below ground pit which is then directed into the process for full treatment. This ultimately then forms our final digestate which meets full PAS 110 compliance and is not classified as waste but instead is recognised as a product for agricultural benefit. The waste reception and processing building is entirely sealed and undercover. All drainage including runoff is contained within the building's sealed drainage system with the drainage gradient engineered to flow to gully drains connected to the below ground pit. Biogen has a Delivery Offloading Procedure, this includes a requirement for the weighbridge operator to confirm the load with the driver at the point of weigh-in and prior to tipping. Here they will also check the EWC/LOW code, and the Waste Transfer Notes (WTN)/Duty of Care (DOC) paperwork and ensure they are booked in on the pre-agreed Commercial schedule.
4. Site location, Design and Capacity	**Site location** You should consider the potential impacts on local sensitive receptors when selecting a new site. You must choose the location of your site, so you prevent or minimise fugitive emissions to air. This includes dust, bioaerosols, odours and other gaseous emissions including ammonia.	The Westwood AD facility is an established site which has been in operation since 2009. The site has been operating under an environmental permit since the permit was issued by the Environment Agency on 09/10/2009. This is permit variation is to modernise the site to upgrade biogas to produce and export biomethane to the National Grid alongside the existing gas to engines for electricity generation pending export. New Gas to Grid infrastructure will include, but not limited to, a Biogas Upgrade Plant (BUP), propane tanks and a Gas

	You should also consider the possible impact of climate change, especially: • flood risk • drought • extreme temperatures • other extreme weather events Existing sites must consider the risk of climate change on their existing facilities and as far as possible have contingency measures in place.	Entry Unit (GEU) for the treatment of biogas to biomethane pending export via a pipeline to the National Grid. Maximum annual tonnage will increase from 65,000 to 110,000 tonnes per annum. Further works include the replacement of existing process tanks, the installation of a new process tank, an additional gas holder and auxiliary flare. There will be new point source emissions to air from new abatement plant treating air from the new purpose-built screening room, as well as the installation of gas boilers with an emission stack. The existing carbon filter treating air from the waste reception building will be replaced and upgraded. Currently, the screening of digestate takes place outside with no extraction or abatement. Constructing a sealed screening room with extracted air passing through a purpose designed acid scrubber for treatment will significantly reduce localised odour. The new abatement systems are designed and will be installed in accordance with BAT and appropriate measures. Biogen have utilised independent odour abatement expertise at significant cost. The new extraction and carbon filtration system treating channelled air from the waste reception building will provide a minimum of three air changes per hour and will be subject to emissions testing at least twice a year to ensure emissions are within the ELVs specified in the permit variation and compliant with BAT. The Westwood AD facility is located in a rural setting approximately 3 km from Rushden. The nearest residential receptor is located approximately 600 metres from the site boundary. The upgrade and replacement of the carbon filter together with the screening of digestate to take place in an enclosed purpose-built building with extracted air treated through a scrubber, which currently takes place outside with no abatement, will significantly reduce odour

		and ammonia, and therefore further reduce the likelihood of odour being detected offsite. Biogen has purchased a Opgal Eyecsite gas detection camera at considerable cost and members of the Biogen compliance team are trained to use the camera to assist with the LDAR programme across the business. Where a minor methane leak is detected, corrective actions are recorded and put in place. By having our own gas detection camera, we are in a position to not only fulfil the six monthly LDAR requirement, but to also address any potential concerns around methane slippage which can be investigated and resolved. Biogen has an appointed Technical Compliance Manager who oversees the LDAR schedule and monitoring schedule. A full LDAR survey is conducted every six months at Westwood which will continue as part of this permit variation and includes, but not limited to, all process and storage tanks, PRVs, CHP engines, gas holders, flares, Gas to grid infrastructure and pipework. Biogen operate to a very intensive maintenance regime to ensure the optimal performance of all their CHP engines. This is contracted to a specialist third party. This ensures the CHPs are maintained to their highest standard. The CHP running hours are recorded on SCADA and documented on a Plant Monitoring Spreadsheet. The engines are fitted with a 'Leanox System', which evaluates the gas quality and adjusts itself to ensure the most efficient burn of the gas and eliminating any methane slippage that could occur. By having this advanced technology on the CHP engines and also by maintaining to a high level, we believe we are operating to the current highest level of BAT.

		Annual MCerts CHP stack emissions testing takes place in accordance with the permit which will continue as part of this permit variation. The Daily Checks Procedure in place for the site includes weekly inspections including checks to all PRVs and also the remaining assets on site including pipework. All existing PRVs are being replaced as the existing process tanks are being demolished and replaced with new purpose-built tanks. All PRVs are being replaced with new upgraded valves when each new tank is constructed and equipped with, but not limited to, isolation valves and spool pieces for in situ testing as well being subject to independent bench test certification. All PRVs will be installed, maintained and tested in accordance with appropriate measures for biowaste treatment section 8.11. The Odour Abatement Maintenance Procedure states the parameters routinely tested for the odour abatement which include, but not limited to, flow, temperature, and pH for example. This will be subject to periodic VOC/GCMS analysis, however the variability in the feedstock is limited and the cost and time to sample is high, therefore this will not be done as frequently as olfactory, but instead will be done if concerns are present on abatement performance. Due to the nature of the feedstocks and the wet AD process, dust is low risk in our process. Pre-acceptance also considers dusty feedstock, if dusty feedstocks were to be accepted going forward, independent occupational and environmental dust monitoring would be commissioned as required, it is the responsibility of the Compliance Team to commission additional testing as required. There is no requirement for bioaerosol monitoring in the current permit for site. Should bioaerosol monitoring be required as part of this variation application, then Biogen will take all appropriate measures, to

		prevent or where that is not practicable to minimise the release of bioaerosols. Emissions of bioaerosols from the operational activities shall not exceed the emission action levels specified in the permit. Gas entering the Biogas Upgrade Plant (BUP) pending export to the national grid will be subject to further H_2S and ammonia removal, compression, condensate removal and CO_2 removal by being passed through a series of membranes which are impermeable to CO_2 and allow CH_4 to pass through with a minimum target CH_4 composition >97% to produce biomethane. CO_2 can be recovered for alternative use. All attempts of reducing NH_3 levels are targeted at source as much as possible. This includes pre-acceptance checks and feedstock management. Air within the waste reception hall is extracted and channelled through to a new purpose designed carbon filter. A new carbon filter will be installed together with replacement ventilation and extraction ducting with point source emission extraction hoods above the point of predominant sources of odour. Air from the new purpose-built sealed screening room will be extracted through to a new acid scrubber prior for treatment. This is principally targeted towards removing soluble VOCs, hydrogen sulphide, ammonia and odour concentration. The Odour Abatement Maintenance Procedure states the parameters routinely tested. The emissions from the carbon filter stack, and the acid scrubber stack are to be subject to periodic emissions testing against specified ELV's in the permit and against BAT. This includes for NH_3, H_2S, odour concentration and an emissions removal efficiency test. Samples are taken from the homogenous mix within the RWBT weekly prior to discharge to the digesters. Digester samples are taken three times a week. This includes pH and alkalinity testing. Daily feed rates

		are recorded into the RWBT and to the Digesters. The concentration of VFA's and ammonia within the digesters and digestate are recorded. The Westwood AD facility operates in accordance with a site-specific Environmental Accident Management Plan (EAMP). The EAMP assesses the likelihood of an incident occurring from site operations when taking into account the control measures in place. The EAMP forms part of the Integrated Environmental Management System (IEMS) for the site. Specific sections comprised within the EAMP include, but not limited to flooding of site A flood risk assessment was undertaken in support of the planning application, with the risk of flooding from rivers being 0.1% (1 in 1000) or less. The attenuation pond would act as the final containment for contaminated runoff water. The balancing pond has capacity to store a 1 in 100-year return period storm. The Westwood AD facility has a site-specific Climate Change Adaptation Risk Assessment which includes sections, but not limited to, on flooding, drought, and extremes of temperature which has been shared with the Environment Agency. This risk assessment considers the risk of climate change on site operations and addresses the contingency measures in place to prevent or mitigate against the impacts.
	Site Design The storage and handling of waste on site must be located as far as technically and economically possible from any sensitive receptors. When designing your biological treatment site, you must consider minimising the unnecessary handling of waste	The Westwood AD facility will continue to accept predominantly source segregated food waste that was intended for consumption. To achieve the optimum biological conditions, Biogen agitate the contents of the Raw Waste Buffer Tank (RWBT) to ensure a homogenous mix. The waste pre-acceptance process would rule out any incoming material that couldn't be mixed at the waste acceptance stage or in the RWBT, or at the very least, would identify maximum volumes that could be accepted at any one time/over a period. Biogen have an established

	between each step in the process, from receipt, during treatment, and during storage of the final material. All biological treatment facilities must be designed by a suitably qualified or experienced person. Facilities must be built to recognised industry standards. You must design your plant to minimise emissions during the transfer of waste from one step to another. For example, the transfer of feedstock from reception to a feed hopper. You must consider at the design stage where there is an opportunity to cover storage areas and where possible contain, treat and abate air using appropriately engineered plant. To prevent emissions (including ammonia) you must cover digestate stores and compost liquor. Where fixed covers are used these must have a system that can remove and effectively treat emissions. You must consider the location of access doors in relation to sensitive receptors to prevent loss of containment. **Reducing or preventing contamination** Preventing cross contamination by segregation relies on both the: • physical separation of waste • procedures that identify when and where wastes are stored	Research Team who form part of the pre-waste acceptance team and provide feedback and advice on new feedstocks and process monitoring. Segregation in the Westwood process therefore generally relates to the different stages of treatment where control measures are in place to ensure partially treated material cannot come into contact with fully treated material. This is controlled through engineering, including both software control and hardwired controls as part of our HAZOP process. An example of a procedure that covers these controls is the Pasteuriser Fill Discharge Procedure, the HACCP Plan, and Process Flow and Hazard Identification for HACCP Production. Biogen has an established Feedstock Pre-acceptance Procedure, which demonstrates how Biogen meets the BAT requirements and those in sections 2.1.2. of Sector Guidance Note IPPC S5.06. The pre-acceptance requires a three-stage sign-off by a representative from the Operations, Compliance and Laboratory/Research team. Samples are requested and analysed where appropriate on a risk basis. The procedure also details the need to obtain: • Information on the nature of the waste. • The composition and characterisation of the waste. • Handling requirements and associated hazards. • Where appropriate a representative sample of the waste will be taken from the customer and analysed ensuring the collected sample is representative providing justification for any deviations. The procedure is directly linked to the Feedstock Pre- Acceptance Form which is completed prior to any of the waste being accepted. The

	Primary and secondary containment **Existing sites** Operators of existing sites must use a chartered engineer to carry out a detailed assessment of primary and secondary containment where it has not previously been validated to industry recognised standards. You must assess containment structures against CIRIA 736. This is a risk-based assessment. Where you have not used CIRIA 736, the assessment must be an equivalent approved standard. Where improvements are identified, you must propose an improvement programme or process monitoring to make sure there are no uncontrolled process releases. You should monitor underground pipe work or ducting and drainage to make sure there is no leakage. Underground tanks should have secondary containment. You must implement a method of inspection and leakage detection as a minimum. **Site Capacity** You must determine the actual physical capacity needed to manage, treat and store waste on your site without causing pollution. You must include factors like seasonal changes in feedstock supplies and in markets for outputs. Exceeding the site capacity will significantly increase the risks of pollution. This includes the capacity of storm tanks.	form, in addition to the above, also ensures the relevant information stated as part of the guidance is obtained including, but not limited to: • Whether it is considered a high-risk feedstock, an example could be a liquid feedstock high in fat/oils or yeast which require careful management to preserve biology, or one where it is deemed a risk because of the nature in the way waste is collected. This requires additional sign-off at Director level. • The physical form the waste is in, e.g., solid, liquid, sludge. • Whether it contains Animal By-Products Regulations (ABPR) material, if yes, which category. • Whether there are any special handling requirements with respect to H&S of personnel or in respect of the environment. • Any hazards associated with the waste. Biogen has a Delivery Offloading Procedure, this includes a requirement for the weighbridge operator to confirm the load with the driver at the point of weigh-in and prior to tipping. Here they will also check the EWC/LOW code, and the Waste Transfer Notes (WTN)/Duty of Care (DOC) paperwork and ensure they are booked in on the pre-agreed Commercial schedule. When waste is tipped the load is visually inspected for any non-conforming items, and material is again visually assessed for any obvious contamination prior to loading into the hoppers. In the event contamination is identified, it is quarantined to one side, and photographs are taken and the relevant persons notified as per the Contaminated Feedstock Procedure. The site team are familiar with the waste acceptance criteria for the site and the need to report deviation from this. Likewise, the team will raise any other hazards resulting from waste streams that could impact on process safety, occupational safety or the environment. Biogen undertake frequent occupational and environmental monitoring, the frequency of which may be reviewed if necessary following feedback on feedstocks.

	You must provide enough space on site to operate your plant and equipment safely, and to allow easy and environmentally safe storage and treatment. Environmental permits set limits on the amount of waste you can: • bring onto site on an annual basis • treat at any one time • store at any one time To determine the daily and annual throughput, you must establish the following critical volumes or tonnes: • waste storage capacity at any one time for both incoming waste and processed material • residence time for waste to be fully treated and recycled	Contamination tends to be objects which could cause mechanical damage to front end processing equipment as opposed to hazardous waste materials. However, to ensure this does not pose a risk, training is also provided to employees on hazardous waste, and this is also covered under the Disposal of Hazardous Waste Procedure. All waste is delivered to site in sealed or covered vehicles which are only discharged within the designated bays in the reception hall with the fast-acting roller shutter doors fully closed. The doors aren't allowed to be opened again until the vehicle has completed tipping and following wheel washing in accordance with ABP obligations. All liquors or runoff derived from feedstocks are captured within the buildings sealed drainage system. Gulley drains flow towards the below ground sump within the building, and any runoff is captured prior to being put through the treatment process. The gradient of the newly concreted reception hall floor is engineered to drain towards the below ground sump and away from the shutter doors to prevent any potential escape of material. The closest residential receptor is located approximately 600 metres from site and the nearest sensitive receptor outside of site is located approximately 500 metres away. There is no direct hydraulic connection from site to the Nene Valley Gravel Pits Ramsar and Special Protection Area which lies within 10km of the installation or Sheeprack Wood, Halsey Wood ancient woodlands and Forty-foot Lane, Strawberry Hill Knottingley, Newton Gorse Green Lane, Sharnbrook Summit and Halsey Wood County Wildlife Sites which are within 2km of site. Biogen's Integrated Management System (IMS) utilises an electronic management software system (Activ) that stores all data relating to pre-waste acceptance (as described in detail above, including but not limited to ongoing analysis results). This same management system

		captures any issues with loads and the action taken via the "incident log" module. In addition to the electronic IMS, our weighbridge software captures all input and outputs to the site. This is done in accordance with the Wastemetrics Work Instruction for Weighbridge Staff, which also highlights where a load can be marked as "rejected". Biogen's monitoring of incoming waste with unique customer references, dates, time of arrival, tank level monitoring, digestate outloads, etc allow for accurate monitoring of tank volumes. However, as the process operates on a continuous flow process it is not possible to definitively pinpoint the exact location (albeit with the knowledge of retention times at each stage it is possible to give an indication), this differs to a batch process that allows full identification at each stage. However, on a risk basis, we take low risk material (i.e. food waste that was intended for consumption), and where liquid feedstocks are involved, we apply customer site visits/audits and sample analysis. All new and existing tanks are purpose-built designed to contain food waste and digestate. These tanks have a minimum 30-year design lifespan in accordance with BS ISO 15686 Part 1 and incorporate the relevant international standards. The tanks are constructed of glass fused steel and comply with BS 5502 Parts 50 and 22. The integrity of the tanks are inspected daily as part of the Daily Checks' Procedure and in accordance with the Environmental Accident Management Plan. All concrete storage and process tanks are cast in-situ reinforced concrete which includes the base, walls and roof (where applicable). The design specification of all tanks is in accordance with BS 8007 (Code of practice for design of concrete structures for retaining aqueous liquids), BS 8110 (Structural use of concrete code of practice for design and construction) and Eurocode 2 (BS EN 1992, Design of concrete structures. General rules and rules for buildings). These codes are the UK's and EU's industry standard codes for construction

		of such structures and so are fit for purpose. The Digesters and the Pasteuriser tanks are insulated and fitted with exterior metal cladding. The site has been subject to HAZOP studies and periodic HAZOP reviews. The site has been designed with the technical support of fully qualified independent tank and AD expertise. Evidence of competence is available on request. The new replacement extraction ducting in the waste reception building will incorporate point source extraction above all predominant sources of odour including the waste reception bays, and both hoppers where feedstocks are loaded into the hammermills for processing. This extracted air is channelled through to a carbon filtration system for treatment prior to emission to air via a stack to aid dispersion. This will be replaced with a new purpose designed carbon filter and emission stack as part of this permit variation proposal. Digestate storage tank 1 has a fixed roof. Digestate storage tanks 2 and 3 are equipped with Hex-a-Blocs. Hex-a-blocs are proven to be highly successful in minimising malodour and ammonia emissions when installed as a floating cover on digestate storage tanks including at a number of our other AD sites. Hex-a-blocs work on the same principle as the Lightweight Expandable Clay Aggregate (LECA) in that they form a floating cover, sitting immediately on the liquid surface, rising and falling with the liquid level in the tank. They are comprised of recycled polypropylene segments which float to create a flexible cover. Hex-a-blocs are proven to be highly successful in minimising malodour emissions when installed as a floating cover on Digestate Storage Tanks including at a number of our other AD sites. The hexagonal pieces fit together and offer an effective way to significantly reduce emissions. The manufacturers state they prevent **~95%** of emissions by blocking light out and gas in.

		Their life expectancy is 25 years and they are heat and frost resistant, as well as windproof. In addition, following pasteurisation to a minimum of 70.7°C for 65 minutes, digestate is cooled following screening prior to being discharged into the storage tanks. Without this cooling, processed material would predominantly remain at this temperature. As you would expect with a reduction in temperature, this significantly reduces ammonia and odour concentration, which has been demonstrated by physical trials at varying temperatures at our other sites. This clearly demonstrated that it is beneficial from an odour potential to cool the digestate in addition to installing a Hex-a-bloc floating cover. Segregation in the Westwood AD process is comprised of different stages of treatment where control measures are in place to ensure partially treated material cannot come into contact with fully treated material. This is controlled through engineering, including both software control and hardwired controls as part of our HAZOP process. An example of a procedure that covers these controls is the Pasteuriser Fill Discharge Procedure, the HACCP Plan, and Process Flow and Hazard Identification for HACCP Production. The Westwood AD facility was constructed in 2009 and so predates the publication of CIRIA 736 which was published in mid-2014. The secondary containment on site is largely provided by an unlined engineered clay bund, with minor sections of concrete walls. A containment review was conducted by SLR Consultancy based on C736 as this represents current best practice. A Bund Ground Investigation was also completed to prepare a factual Ground Investigation Report.

		A permeability assessment was previously completed for the bund during 2009 as part of the original design and construction works. This assessment determined the site to be underlain by 20 metres of glacial clay with a permeability significantly less than $1x10^{-09}$m/sec which was classed as acceptable in accordance with the guidance at time (since superseded by C736). SLR Consultancy completed a C736 risk assessment for the site using the Anaerobic Digestion and Bioresources Association (ADBA) methodology. The risk assessment indicates that the site is considered to be 'low' risk and therefore requires a class 1 design. Unlined earth bunds are an allowable design for class 1 sites, with C736 specifying a minimum thickness of one metre of Clay with an impermeability lower than $1x\ 10^{-09}$ m/s. The bund at Westwood exceeds these minimum criteria, with a greater thickness of material with significantly lower permeability. At Westwood, 25% of the total inventory dominates and the required secondary containment capacity is 10,875m^3. A topographical survey determined that the total secondary containment capacity provided by the existing bund of 14,008m^3 exceeds the required figure of 10,875m^3, and therefore the secondary containment bund has adequate volume. This is assuming that the low point identified is remediated. This low point identified by the survey is to be remediated as part of the Gas to Grid upgrade proposals where the earth bund meets a concrete bund wall in the northwest corner of bund. This will also include remediating the additional actions to address issues with the bund including works to a section of precast concrete wall within the bund and repair works to concrete joints. These works will be completed by 31/12/2026. The process pipework is of high-quality infrastructure and is mainly above ground and is constructed of stainless steel providing an easy means of checking/maintaining. In order to minimise the number of

		potential diffuse emissions sources, the upgraded site layout as part of this permit variation has been designed and engineered with the intention of minimising pipe run lengths. Most piping is above ground stainless steel with welded fittings and pipes. The existing below ground sealed sump to captured rainwater and a new condensate sump within the secondary containment area where all process tanks are sited is cast in reinforced concrete. Both sumps are to be equipped with level detection and flood probes connected to SCADA activating an alarm to alert the site and out of hours duty manager. Please refer to the Plant Design Capacity & Pollution Control document submitted in support of this permit variation which provides a technical breakdown of the AD process on site and demonstrates plant capacity to justify an increase in the maximum waste throughput from the current 65,000 to 110,000 tonnes per annum. This document demonstrates how both the new and existing plant design capacity, site infrastructure, containment measures and the process controls in place are appropriate to accept, treat and process an additional 45,000 tonnes of feedstock per annum. The maximum storage capacity in the reception building is approximately 400 tonnes at any one time. This allows for seasonal variation sin feedstock including the peak operational time immediately following the Christmas period. Please refer to the Plant Design Capacity & Pollution Control document submitted in support of this permit variation which demonstrates plant capacity from front end through to digestate storage. PAS 110 compliant digestate is stored in 3 purpose built Digestate Storage Tanks at 9700m^3 each (29,100m^3 total) equipped with mechanical mixing. The PAS 110 digestate is then utilised as a

		biofertiliser on receiving farms. Although a proposed increase in annual throughput from 65,000 to 110,000 tonnes will increase digestate production by approximately 40,500 tonnes per year, no increase in on site digestate storage capacity is required. This is because the site benefits from an agreement with a third party who is contractually obliged to collect all PAS 110 digestate pending storage elsewhere for use for agricultural benefit. This contractual agreement ensures the third party collects and manages all digestate regardless of expected throughput and must do so without compromising PAS110 status, site operations or processing. There is also an irrigation ring main on site to pump digestate directly to local arable Bedfordia land. The maximum storage time for feedstock within the reception building prior to processing is 48 hours to comply with ABP obligations. This is a worst-case scenario and would only approach this length of time in the event of significant plant malfunction and can be demonstrated through CCTV footage.
5. General management appropriate measures	**5.1 Management System** You must have an up to date, written management system. The level of detail you need will be related to the size of your operation, site location and complexity. Your management system must aim to improve the overall environmental performance of the site. You must have management commitment, including from senior managers (where applicable) to develop an environmental policy that is defined by senior managers (where applicable). This policy must include the continuous improvement of the facility's environmental performance, so you can identify pollution risks and minimise them through	Biogen's Integrated Management System (IMS) utilises an electronic management software system (Activ) that stores all data relating to pre-waste acceptance. This same management system captures any issues with loads and the action taken via the "incident log" module. In addition to the electronic IMS, our weighbridge software captures all input and outputs to the site. This is done in accordance with the Wastemetrics Work Instruction for Weighbridge Staff, which also highlights where a load can be marked as "rejected".t All records of accidents, incidents, changes to procedures and the outcome of inspections are logged and tracked on an internal Integrated Management System (IMS) as an Improvement Log or Incident Log. All records are periodically reviewed by Biogen's Management Executive Team.

	appropriate measures and make best and most efficient use of resources. You plan and establish the resources, procedures, objectives and targets needed for environmental performance alongside your financial planning and investment. You implement your environmental performance procedures, paying particular attention to: • staff structure and relevant responsibilities • staff recruitment, training, awareness and competence • communication (for example, of performance measures and targets) • employee involvement • documentation • effective process control • maintenance programmes • emergency preparedness and response • making sure you comply with environmental legislation You check environmental performance and take corrective or preventative action (or both), paying particular attention to: • monitoring and measurement • investigating and learning from incidents, near misses and mistakes including those of other organisations • records maintenance • independent (where practicable) internal or external auditing of the management system to confirm it has been properly implemented and maintained	An Environmental Policy has been incorporated into the Biogen's IMS which is reviewed annually by the company's CEO. Biogen have an internal auditing regime and are subject to an annual auditing schedule by an accredited third party for ISO9001 (Quality), ISO 14001 (Environment) and ISO45001 (Health & Safety). The key principles being based on achieving: • Risk-based thinking; • Continual improvement; • Process approach; • Evidence based decision making; • Relationship management; • Engagement of people; • Leadership; and • Customer focus. Other integrated policies include a Digestate Quality Policy, an Emergency Preparedness and Response procedure, and an Environmental Reporting Procedure for example. Biogen are committed to continually reviewing operational practices and technologies as well as continually monitoring the environmental impact of its business activities. An internal review is conducted by the Management Executive Team immediately following an incident or accident. This includes a documented 'lessons learnt' procedure to prevent the reoccurrence of similar events. Any new procedures or changes to operations are implemented with immediate effect following review. Control measures are in place which are controlled through engineering, including both software control and hardwired controls as part of our HAZOP process. An example of a procedure that covers

	Senior managers and or operators must periodically review the management system to check it is still suitable, adequate and effective. You review the development of cleaner technologies and their applicability to site operations. The Environment Agency would expect you to consider cleaner technologies: • as a result of substantiated pollution incidents • when reviewing management systems • when planning investment decisions, for example new items of plant. You must have a written procedure for proposing, considering and approving changes to procedures or infrastructure related to storing or treating waste or pollution control. This is so you can track and control the process of change. You consider the risks a changing climate presents to your operations and have appropriate contingency plans in place to assess and manage future risks. You compare your facility's performance against relevant sector guidance and standards on a regular basis, known as 'sectoral benchmarking'. You document and implement appropriate waste stream management. You have and maintain a site condition report for installations. For waste facilities the Environment Agency recommends that you carry out a site condition assessment during the life of the site. You would need to carry out this assessment on surrender. Please read the guidance Environmental permitting: H5 site condition report.	these controls is the Pasteuriser Fill Discharge Procedure, the HACCP Plan, and Process Flow and Hazard Identification for HACCP Production. The Westwood AD facility has a site-specific Climate Change Adaptation Risk Assessment. This risk assessment considers the risk of climate change on site operations and addresses the contingency measures in place to prevent or mitigate against the impacts. Biogen's Environmental Policy includes an objective to continually review operational practices and technologies employed. Biogen are registered members of the Renewable Energy Association (REA). Biogen are consulted and asked to represent industry in forums and in sector meetings. Again, with this membership we are party to conferences, webinars, forums, etc, where technology providers exhibit with emerging technologies and alternatives. Biogen will also assess its Compliance Band Rating and assess performance against other operators in the sector. Biogen has also registered to the carbon reduction programme aforementioned (Achilles, the UK's only Accredited Greenhouse Gas Certification Scheme). Since 2008, Achilles has delivered the Carbon Reduce Certification Scheme (Formerly known as CEMARS) under licence from Toitū Envirocare. The programme is accredited to ISO 14065 and ISO/IEC 17065. Biogen maintain a site closure plan. Biogen's monitoring of incoming waste with unique customer references, dates, time of arrival, tank level monitoring, digestate outloads, etc allow for accurate monitoring of tank volumes. However, as the process operates on a continuous flow process it is not possible to definitively pinpoint the exact location (albeit with the knowledge of

	You have and maintain: • an inventory of waste water, waste gas streams or fugitive emissions • a product and residues management plan • an accident management plan • a site infrastructure plan • an odour management plan • a bioaerosol risk assessment and management plan • a fire prevention plan, if required • a noise and vibration management plan, if required • a pest management plan, if required • a dust, mud and litter management plan (emissions management plan) if required • a leak detection and repair plan, if required. **5.2 Inspection, Monitoring & monitoring** You must have a schedule of inspection, maintenance and monitoring programmes for all plant and equipment (including the impermeable surfacing and drainage systems). You must inspect, maintain and monitor plant, equipment and infrastructure in accordance with manufacturer or design guidelines. You must be able to produce proof of all inspection and maintenance through records of maintenance and inspection when requested. If the site is more complex (AD, IVC and MBT plants) you must do a Hazard and Operability Study (HAZOP) or a similar study or risk assessment.	retention times at each stage it is possible to give an indication), this differs to a batch process that allows full identification at each stage. However, on a risk basis, we take low risk material (i.e. food waste that was intended for consumption), and where liquid feedstocks are involved, we apply customer site visits/audits and sample analysis. In respect of wastewater, the Westwood AD facility is designed with a sealed drainage system. All leachates or liquors derived from incoming feedstocks are captured in the sealed drainage system within the waste reception building. The impermeable surfacing within the building is engineered to drain away from the shutter doors and towards the below ground pit which is then directed into the process for full treatment. This ultimately then forms their final digestate which meets full PAS 110 compliance and is not classified as waste but instead is recognised as a product for agricultural benefit. The same is also true of any condensates produced in the treatment process, these are fed back into the process to undergo full treatment and form our end PAS 110 product. Rainwater captured within the secondary containment area is put through the AD treatment process. Total water returned to process is recorded daily on the Plant Monitoring Spreadsheet. Clean uncontaminated surface water from roofs, or from areas of the site not being directly used for waste management activities is kept isolated and discharged directly to the onsite attenuation pond. The site has an Environmental Accident Management Plan (EAMP), an Odour Management Plan (OMP), Noise Management Plan (NMP), Fugitive Emissions Management Plan (FEMP) which are periodically reviewed and updated.

	You must consider stocking or holding a list of critical spare parts and chemicals. You must be able to procure and install spares without undue delay. You must have a programme of review and consider design improvements which take into account future de-commissioning (for existing plants). **5.3 Staff competence** Your site must always be operated or monitored (or both) by an adequate number of staff who have appropriate qualifications or training (or both) and competence. If you operate a 24-hour process, for example an in vessel or AD facility you must have: • remote or telemetric systems in place to make sure an alarm would be raised in the event of an incident during unmanned hours • appropriate personnel on call to deal with such incidents You must adequately explain these procedures in your management system and make sure they are implemented. The design, installation and maintenance of infrastructure, plant and equipment must be carried out by competent people, including using CQA where appropriate. You must have appropriately qualified managers for your waste activity who are members of a government-approved technical competence scheme. **5.4 Accident Management Plan**	Biogen has purchased a Opgal Eyecsite gas detection camera at considerable cost and members of the Biogen compliance team are trained to use the camera to assist with the LDAR programme across the business. Where a methane leak is detected, corrective actions will be put in place. By having our own gas detection camera, we are in a position to not only fulfil the six monthly LDAR requirement, but to also address any potential concerns around methane slippage which can be investigated and resolved. Biogen has an appointed Technical Compliance Manager who oversees the LDAR schedule and monitoring schedule. A full LDAR survey is conducted every six months and includes, but not limited to, all process and storage tanks, PRVs, CHP engines, gas holders, flares, Gas to grid infrastructure and pipework. The Odour Abatement Maintenance Procedure states the parameters routinely tested which include, but not limited to, flow, temperature, and pH. This will be subject to periodic VOC/GCMS analysis, however the variability in the feedstock is limited and the cost and time to sample is high, therefore this will not be done as frequently as olfactory but instead will be done if concerns are present on abatement performance. Representative samples can be taken to complete a full VOC characterisation analysis at an independent MCerts accredited laboratory. A documented General Maintenance Procedure ensures that work is undertaken on site in a manner that does not compromise safety. Potentially leaking equipment on site may include for example the separator and macerators. Documented maintenance procedures are in place for key plant and equipment including, but not limited to: • Pump operations and maintenance procedures • Separator operation procedure; and • Macerator maintenance procedure.

	As part of your written management system you must have a plan for dealing with incidents or accidents that could result in pollution, including near misses. Your accident management plan must identify the hazards, risk and mitigation measures that will protect the environment in the event of an accident or event. Particular areas to consider may include: • waste types and reactions of mixed waste • transferring substances, for example filling (including overfilling) or emptying of vessels and containers, over pressure of vessels and pipework, blocked drains • preventing incompatible substances coming into contact with each other • failure of plant and equipment, for example storage tanks and pipework, or blocked drains • failure of containment, for example bund failure or drainage sumps overfilling • making the wrong connections in drains or other systems • failure to contain firefighting water • failure of abatement systems • hazardous atmospheres in confined spaces • failure of main services, for example power, steam or cooling water • checking the composition of effluents before their emission • vandalism and arson • operator error • accessibility of control equipment in emergency situations • extreme weather conditions, for example flooding or very high winds	A daily check is undertaken of the roller shutter doors and incorporated into the Daily Checks Procedure. A critical spare parts procedure is in place to enable essential key parts to be held in stock pending use. This enables other Biogen AD sites within a geographical area to share spare parts when required. Biogen operate to a very intensive maintenance regime to ensure the optimal performance of all their CHP engines. This is contracted to a specialist third party. This ensures the CHPs are maintained to their highest standard. All front-end processing equipment and machinery is subject to ongoing documented maintenance to ensure it is operating effectively including with as low as possible noise generation. All critical control and processing equipment is subject to a routine inspection and maintenance programme. This includes daily checks for the depackaging plant and mobile plant for example. Site management maintain a Plant Equipment and Maintenance Checks Record to ensure all critical plant and equipment is maintained in accordance with the manufacturer's recommendations. This includes minimising noise. The replacement of machinery and equipment with low noise substitutes will take precedence. Biogen has documented Contingency Arrangements for Equipment or System Failure to provide guidance on contingency measures in the event of system or equipment failure. This would include any plant or equipment malfunction which could generate excessive noise or vibration. All plant and equipment is maintained in accordance with the manufacturer's recommendations and is subject to a routine

	• having a contingency arrangement to divert waste feedstock when your ability to spread outputs to land, or inject gas to grid, is limited Risk is the combination of the likelihood that a hazard will occur and the severity of the impact resulting from that hazard. Having identified the hazards, you can assess the risks. Through your accident management plan, you must also identify the roles and responsibilities of the staff involved in managing accidents. You must provide them with clear guidance on how to manage each accident scenario, for example as a result of a spillage of a potentially polluting liquid. You must have a suitably trained facility employee available at all times who will act as an emergency co-ordinator and will take responsibility for implementing the accident management plan. You must train your employees so they can perform their duties effectively and safely and know how to respond to an emergency. Following a flooding event, you must inspect and assess the integrity of affected plant and equipment, in particular infrastructure that may have been in contact with floodwater or groundwater. Tank inspections should include non-destructive testing methods to verify their integrity. **5.5 Preventing accidental emissions** You must have a drainage plan and in the event of an emergency this must be available to emergency services. The	inspection and maintenance schedule. This includes maintenance and repair of all pumps, motors, compressors, gas to grid infrastructure and the gas flares in accordance with the Emergency Flare Operating Manual. The documented Daily Checks Procedure including checks and visual inspections of all site drainage to ensure gulleys and drains are clear and free flowing, as well as visual checks of the impermeable concrete surfacing. Documented checks are recorded on an electronic Planned Preventative Maintenance System and all records are available on request. Control measures are in place which are controlled through engineering, including both software control and hardwired controls. Control measures including all engineering changes and upgrades as a result of the Gas to Grid modernisation project have been subject to a full HAZOP assessment including for gas, sludge and water. Biogen as an entity is accredited under the EU Skills Competence Management System. All Biogen employees must complete a minimum number of required training days each year to demonstrate and increase the level of ongoing continued competence. All equipment and plant are operated and maintained by fully qualified, trained and experienced staff. All relevant employees need to demonstrate continued operational competence and receive periodic training. Level detection probes installed within the bund sump, reception hall and the pump room are connected to SCADA. The bund is fitted with flood detection probes which are hard-wired to shut-off feed pumps and close applicable valves on activation. They are also linked to SCADA and integrated into the software controls.

	drainage plan should clearly identify clean and dirty or foul drainage. You must make sure that in an emergency you can contain on site: • process waters • contaminated site drainage waters • emergency firefighting water • chemically contaminated waters • spillages of chemicals You must put spill contingency procedures in place to minimise the risk of an accidental emission of raw materials, products, and waste materials, and to prevent their entry into water, land and air. Your drainage and collection system must take account of additional firefighting water flows or firefighting foams. You may need emergency storage to prevent contaminated firefighting water reaching a receiving water body. You must consider and reduce the risk of accidental emissions from: • loss of containment – all polluting matter • vents • safety relief valves – making sure these are checked and maintained (preventing sticking and over feeding, see site capacity in section 4) • bursting discs and seals • tank wall penetrations • storage containers Liquids or fire water held in the buffer storage must be removed from site. **5.6 Security measures**	SCADA (Supervisory Control & Data Acquisition) provides a continuous automated process monitoring system for, but not limited to, tank levels, gas levels, gas pressures, tank temperatures and gas to grid upgrade plant which is remotely accessible by all relevant staff including site managers and operations managers including the out of hours duty manager. Any process monitoring parameters not monitored with the use of SCADA are also recorded daily on the live Plant Monitoring Spreadsheet. An Environmental Accident Management Plan is in place for the site identifies the environmental controls in place to minimise the risk of an incident occurring on site. It assesses the different areas of the site or activities with the potential to cause harm and the overall risk of this occurring on site after considering the environmental controls installed onsite. Key sections of the Environmental Accident Management Plan include: • Spillage from vehicles including during waste acceptance • Spillages from tanks • Odour from waste acceptance • Plant/equipment failure resulting in leaks • Release of contaminated water from sump • Flooding of site • Gas release • Unauthorised entry / arson and/or from vandalism causing a pollution incident • Catastrophic tank failure or of gas storage holder • Incompatible substances • Misconnections to drains or other connections • Failure of mains services • Operator error

	You must have security measures in place (including staff) to prevent: • entry by vandals and intruders • damage to the equipment • theft • fly-tipping • arson Facilities must use one or a combination of the following measures: • security guards • total enclosure (usually with fences) • controlled entry points • adequate lighting • warning signs • 24-hour surveillance such as CCTV **5.7 Fire & explosion prevention** You must have a fire prevention plan that meets the requirements of the Environment Agency's fire prevention plan guidance. You must prevent the build-up of loose combustible material (including dust and waste) particularly around treatment plant, equipment and other potential sources of ignition. You must: • make sure that all the measurement and control devices you would need in an emergency are easy to access and operate in an emergency situation	As a new lower tier COMAH installation once fully operational, Biogen will conduct regular incident response training exercises at least twice a year. This will give an opportunity to test the control measures in place and employee's competency for different scenarios to address all foreseeable risks. This will involve direct involvement and consultation with emergency services and the Local Authority Emergency Planning Lead. Biogen have produced a draft Major Accident Prevention Plan (MAPP) to comply with COMAH pending submission to the HSE. This will allow us to test the effectiveness of the MAPP in a real time scenario. This will be overseen and orchestrated by our Health and Safety Manager. Exercises and emergency duties will be allocated to specifically trained personnel with their duties and responsibilities clearly defined and recorded. The MAPP will have defined Memorandum of Understanding (MOU) with all emergency services as well clear, effective and tested communications between sensitive receptors in the event of an incident. These MoU's and communications will be tested and recorded as part of scenarios-based training exercises at pre, during and post incidents stages. Following any significant flooding event or large-scale loss of containment, the structural integrity of all primary and secondary containment would be assessed by qualified independent expertise. All process and storage tanks on site are subject to a full internal examination following s tank degrit. Biogen has an established Non-Destructive Testing (NDT) regime in place to measure and monitor any deterioration in the thickness of pipework and tanks utilising an ultrasonic Thickness Testing (UTT) device. This takes place at Westwood a minimum of four times a year. Any significant deterioration in infrastructure thickness is immediately recorded and remedial actions instigated to replace and/or repair the

	• maintain plant in a good state through a preventive maintenance programme and a control and testing programme • use techniques such as suitable barriers to prevent moving vehicles damaging equipment • put procedures in place to avoid incidents due to poor communication between operating staff – during shift changes, periods of cover by temporary staff and following maintenance or other engineering work • where relevant, use equipment and protective systems designed for use in potentially explosive atmospheres You must make sure that critical safety equipment, for example sprinklers, pressure relief valves and flares are maintained and kept in good working order. Workers on site must be protected and monitored in line with the Health and Safety Executive (HSE) guidelines and regulations. You must carry out all assessments in line with your facility's occupational exposure process and health and safety guidelines. All AD facilities must comply with The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR). More information is available from HSE. All AD plants must undertake a DSEAR risk assessment. This is not only for facility staff but for those attending the site in an emergency.	area of concern as well as determining the root cause of the deterioration to prevent reoccurrence. A site drainage plan is in place and available electronically and as a hard copy on site noticeboards which clearly shows defined areas for clean and dirty water. The Westwood AD facility is designed with a sealed drainage system. All leachates from the incoming waste feedstocks are captured in a below ground pit which is then directed into the process for full treatment. The impermeable surfacing within the reception hall is engineered to drain towards the below ground sump and away from the doors. The waste reception and processing building is entirely sealed and undercover. All drainage including runoff is contained within the building's sealed drainage system with the drainage gradient engineered to flow to gully drains connected to the below ground pit. The reception hall floor is designed to drain away from the entrance points. Rainwater captured within the secondary containment area is put through the process for treatment to offset mains water consumption, which therefore forms part of Biogen's PAS 110 digestate final product. Total water to returned to process is recorded daily on the Plant Monitoring Spreadsheet. Biogen also recirculate from the RWBT and Digesters to the front end. Any firewater applied within the secondary containment area would be contained within the bund pending removal offsite by a registered waste carrier to an appropriate permitted facility for treatment. The 140m^3 former FOG tank can be used for contaminated water storage and/or firefighting water pending removal offsite.

	If a DSEAR risk assessment has identified potential explosion hazards you must make sure the design and planning of your plant includes appropriate structural, technical and organisational fire protection measures. You must install protective measures on your site and implement procedures such as: • a permit to work system • using specialised personal protective equipment (PPE) • health and safety protection signage • using ATEX-rated equipment Organisational protective measures include regular maintenance of the plant, systems and components. You must consider whether the Control of Major Accident Hazard (COMAH) Regulations 2015 apply to your activities, for example, the quantity of flammable gas (biogas) in combination with any other dangerous substances stored on site. You must risk assess your site in line with BS EN 62305-2 to determine the lightning protection level. Where you have assessed that lightning protection measures are not necessary, you must make an assessment against transient over voltage, complying with BS7671. Where lightening condition systems are in place, they must comply with BS 62305 (part 1 to 4). A competent person must validate the system. You must maintain plant control in an emergency using one or a combination of the following measures: • alarms • process trips and interlocks	Clean surface water from roofs, or from areas of the site that are not being used in connection with waste management activities can be discharged directly to the attenuation pond and/or to groundwater by seepage through the soil via soakaways. Rainwater collected in the attenuation pond is not released into the adjacent drainage ditch until after an inspection. The penstock valve remains shut at all times unless opened for release following further inspection and testing. The surface water attenuation pond level is checked as part of the daily checks' procedure. If the level in the pond is high and therefore requires a release through the drainage ditch system a visual inspection of the water must be undertaken for signs of contamination. The attenuation pond is also equipped with an aerator to improve water quality and prevent stagnation. All testing of the pond water and releases from the pond into the drainage ditch system must be recorded on a Plant Monitoring Spreadsheet. The RWBT, all five digesters and both pasteurisers are all equipped with Pressure Relief Valves (PRVs) which are visually inspected every week to ensure they are seated correctly and a gas monitor is used to test for leaks. In addition, twice yearly LDAR surveys are conducted with the use highly sensitive camera leak detection camera. As a tank is replaced as part of this Gas to Grid upgrade project, a new replacement PRV is to be installed. The current PRVs are to be replaced and upgraded with new PRVs equipped with isolation valves and spool pieces for testing in situ. All PRVs will be subject to independent bench test certification at least every three years. All PRVs are checked, maintained and tested in accordance with a documented PRV SOP. Emergency Relief Valves (ERVs) are also tested and inspected weekly in accordance with a documented procedure. The site perimeter is served by secure fencing and lockable gates with established dense vegetation to prevent unauthorised entry with security doors and locks. A new CCTV system has been installed to

	• automatic systems based on microprocessor control and valve control • tank level readings such as ultrasonic gauges, high level warnings, process interlocks and process parameters • using a flare to manage biogas in AD systems **5.8 Firefighting** Your accident plan must clearly state what actions are taken to extinguish fires on site and operators must be trained in these procedures. Your facility must have access to water supplies to extinguish fires. In remote locations where water supplies are not available you must seek advice from your local fire service. In the event of a fire on site, your accident plan must consider how you will prevent firefighting run-off leaving site. Where possible you should have the capability to collect, contain and store firefighting water run-off. You must isolate drainage systems from flammable waste storage areas to prevent fire spreading along the drainage system by solvents or other flammable hydrocarbons. **5.9 Record keeping & procedures** You must: • keep an up-to-date record of all accidents, incidents, near misses, changes to procedures, abnormal events, and the findings of maintenance inspections • carry out investigations into accidents, incidents, near misses and abnormal events and record the steps taken to prevent their reoccurrence	provide full site coverage and is remotely accessible. The property is equipped with a security and fire alarm system. The site is to be supervised on a 24/7 basis between Monday to Friday for processing. The site is checked visually at weekends and public holidays. A lock up procedure is in place to ensure the site remains secure at all times including a site perimeter walkaround and a standard shutdown procedure provides updates to the wider business. Westwood will continue to operate as a wet AD process as part of this permit variation. Due to the nature of the feedstocks and the wet nature of the process, the fire risk associated with the waste is negligible. Section 3 of the Fire Prevention Plan guidance (updated 11 January 2021) states that biowaste treatment (wet anaerobic digestion) does not apply. Due to the nature of the feedstocks and the wet nature of the process, dust is low risk in our process. Pre-acceptance also considers dusty feedstock, if dusty feedstocks were to be accepted going forward, independent occupational and environmental dust monitoring would be commissioned, and the feedstock would be mixed and blended with other wet or liquid nae feedstocks. SCADA (Supervisory Control & Data Acquisition) provides a continuous automated process monitoring system for tank levels, gas levels, gas pressures, tank temperatures and gas to grid upgrade plant for example which is remotely accessible by all relevant staff including site managers and operations managers. All process tanks at Westwood are fitted with high level detection probes continuously monitored and connected to SCADA. In addition to this they are hard-wired to automated valves and feed pumps. Pressure transducers automatically shut down all feeding into the

	• maintain an inventory of substances, which are present (or likely to be) and which could have environmental consequences if they escape • record and hold a critical plant and equipment asset register, including a register of equipment installed in explosive atmospheres (ATEX-rated equipment) You must notify the Environment Agency without delay if you detect any of the following events and they are causing, or may cause, significant pollution: • a malfunction • a breakdown or failure • an accident • an emission of a substance not controlled by an emissions limit • a breach of an emissions limit **5.10 Contingency plans and procedures** You must have and implement a contingency plan which makes sure that you: • comply with all your permit rules and operating procedures during maintenance or shutdown, or critical failure at your site or elsewhere • do not exceed limits in your permit and you continue to apply appropriate measures for waste storage, handling and treatment • stop accepting waste unless you have a clearly defined method of recovery or disposal, and enough permitted storage capacity when land bank availability is limited, for example, during exceptional weather events such as prolonged rain or snowfall, deep frosts and severe drought • plan for any restrictions that will affect the spreading of digestate or compost to land, for example, nitrate vulnerable zones (NVZ) closed periods	digesters when activated. The high-level tank detection probes are subject to monthly testing. The site including the bund is equipped with flood detection probes which are hard-wired to shut-off feed pumps and close applicable valves on activation. They are also linked to SCADA and integrated into the software controls. All key operational plant and critical safety equipment is maintained and records retained on a Planned Preventative Maintenance System. This includes for example, both auxiliary flares subject to six monthly servicing, the PRVs through weekly checks, and the back up generators tested weekly and an external service once a year. Crash barriers are installed around all vessels and key infrastructure within proximity to vehicle movements. In respect of flammability, UEL and LELs, Biogen has appointed specialist consultants to conduct DSEAR reviews and risk assessments including the use of ATEX rated plant and equipment, where they consider all aspects of the site's operations in these reviews. Full DSEAR assessments take place under a Control of Change procedure and have already taken place in advance of the infrastructure changes on site as part of this permit variation. DSEAR plans are available in physical form on site including within the secondary containment area as well as available electronically. Plans are revised following infrastructure changes. Biogen has an Occupational Health and Safety Policy with a Statement of Intent. An established Permit to Work (PtW) system is in place at all Biogen's sites which is audited under a SHEQ schedule by the Compliance

	You must have the following information in your contingency plan: • a description of each waste and material and the correct LoW code for each waste (inputs and outputs) • details of permitted waste facilities that could accept and manage your waste if site holding capacity will be exceeded – you must obtain a copy of the site permit to make sure it can accept your waste type • the capacity (volume) of all contingency options and the length of time for which it would be available or needed • potential environmental and health and safety risks and hazards of all contingency options (for example, odour and emission generation, or leachate production from longer-term storage) • any legal restrictions or constraints for each contingency option You must identify your contingency options for use over the short term (1 to 2 weeks), medium term (4 to 6 weeks) and the long term (up to 6 months). Your management procedures and contingency plan must also: • identify known or predictable malfunctions associated with your technology and the procedures, spare parts, tools and expertise needed to deal with them • make sure you have the spare parts, tools, and competent staff needed before you start maintenance • record where you can get critical spare parts from and how long it would take to obtain them if you cannot hold them on site	team. This ensures that all works not covered by an SOP and/or Risk Assessment are appropriately controlled through the Permit to Work process. Permits must include references to RAMS, included inspections and lock-off procedures. Biogen has an established Health and Safety Policy with a dedicated Health and Safety Manager and Advisor within the Compliance team. As part of this Gas to Grid upgrade of our Westwood AD facility, the amount of biogas and propane stored on site at any one time on site will exceed the lower tier threshold under the Control of Major Accident Hazard (COMAH) Regulations 2015. As such, Biogen will be submitting a COMAH notification application to the HSE for determination. A Hazardous Substance Consent application has already been submitted to the Local Authority for determination. Certificates of testing and inspection are completed on site every year by an independent qualified Lightning Conductor Engineers and certificates are saved on our IEMS and available on request. Additional lightning protection maybe required as a result of the sites upgrade to Gas to Grid subject to further assessment. An existing Environmental Accident Management Plan (EAMP), Emergency Plans, and Fire Risk Assessment specify what actions need to be taken to extinguish fires on site and operators received regular training and refreshes including fire marshals with records maintained. Northamptonshire Fire & Rescue Service conduct yearly site inspections and have participated in an onsite join training exercise. Water supply is available through mains and alternative sources could be utilised, if necessary, from the onsite attenuation pond for example.

	• have a defined procedure to identify, review and prioritise items of plant which need a preventative regime • include all equipment or plant whose failure could directly or indirectly lead to an impact on the environment or human health • identify non-productive or redundant items such as tanks, pipework, retaining walls, bunds, reusable waste containers, ducts, filters and security systems You must make your feedstock suppliers and customers aware of your contingency plan, and of the circumstances in which you would stop accepting waste from them. You must consider whether the sites or companies you rely on in your contingency plan: • can take the waste at short notice • are authorised to do so in the quantities and types likely to be needed in addition to carrying out their existing activities – if in doubt contact your local Environment Agency office for advice Your management system must include procedures for auditing your performance against all the contingency measures detailed above and for reporting the audit results to the site manager. You must stop accepting waste or reduce feeding rates unless you have a clearly defined method of gas management when national grid capacity is restricted. **5.11 Plant commissioning, validation & decommissioning** The term commissioning means to bring an item of plant or equipment into working condition. You must notify the	In the event of a fire on site, your accident plan must consider how you will prevent firefighting run-off leaving site. Where possible you should have the capability to collect, contain and store firefighting water run-off. The current disused former 140m^3 FOG tank can be used for additional temporary containment. The sites EAMP, Emergency Plans, Fire Risk Assessment as well as the Major Accident Prevention Plan (MAPP) will be revised and updated to address freighting measures and protection. An independent Fire Risk & Protection Assessor will conduct a full assessment as part of our Gas to Grid upgrade scheme. Any firefighting water if applied to the waste reception building would be retained within the buildings sealed drainage system or runoff to the attenuation pond which is an enclosed body of water with the overflow equipped with a penstock which is always kept in a closed position. Likewise, any firefighting water from within the secondary containment area would be retained within the bund pending removal by a registered waste carrier to a suitably permitted facility for treatment. In addition to the above, regular fire drills are conducted and fire evacuation records are updated as required. The sites fire alarm system has recently been upgraded and is subject to annual certification checks. All fire extinguishers on site are inspected and serviced. All records of accidents, incidents, changes to procedures and the outcome of inspections are logged and tracked on an internal Integrated Management System (IMS) as an Improvement Log or Incident Log. All records are periodically reviewed by Biogen's Management Executive Team. An internal review is conducted by the Management Executive Team immediately following an incident or accident. This includes a documented 'lessons learnt' procedure to prevent the reoccurrence of similar events. Any new procedures or

	Environment Agency before you start commissioning. You must consider communicating with local communities during the commissioning phase, to comply with your management system and odour management plan. You must consider the arrangements for commissioning your plant at the design stage. You must have a commissioning plan in place before you start commissioning to minimise the risks of pollution and harm to human health and the environment. The level of detail can be based on the complexity of, and risks associated with, the process. You must review and refine the relevant monitoring parameters during the facility's operation as part of an on-going process of system optimisation. You must test and validate all systems and components of your plant and building(s) against operational requirements identified at the design stage. This must include, for example, the air extraction and abatement system and containment structures. You must have completion certificates (for each commissioning phase) in place, signed by an appropriately qualified person. Commissioning must be carried out to relevant industry standards where they are available or follow manufacturers' guidelines. As a minimum, the commissioning plan must include summaries of: • commissioning phases (and sequences) including milestones and timeframes (for example pre, cold, hot commissioning) • procedures and mechanical tests at each phase including relevant industry test standard (or otherwise), for example manufacturers' guidelines	changes to operations are implemented with immediate effect following review. Biogen's Integrated Management System (IMS) utilises an electronic management software system (Activ) that stores all data relating to pre-waste acceptance. This same management system captures any issues with loads and the action taken via the "incident log" module. In addition to the electronic IMS, our weighbridge software captures all input and outputs to the site. An inventory together with Gas Safety Case and a Hazardous Substances Consent submission provide detail inventory of biogas, propane and liquid fuel stored on site as part of the sites Gas to Grid upgrade. A Critical Plant and Equipment Asset Register is available which includes a register of equipment and plant installed in explosive atmospheres subject to the DSEAR risk assessment and are ATEX-rated which maintained throughout the life of the plant. The register forms part of the IMS. The Environment Agency would be notified without delay which will be supported by a completed Schedule 5 following any event which is causing or has caused actual pollution or have the potential to cause significant pollution. Document and tested contingency plans are in place including a Compliance Monitoring Schedule which ensures all permit requirements and operating procedures during maintenance or shutdown or critical plant/equipment are in place. Measures ensure that adequate contingency procedures are in place to ensure permit compliance is maintained at all times including waste acceptance procedures. For example, if Westwood suffered significant front end mechanical failure, feedstocks would be diverted elsewhere to one of

	Mechanical tests could include, for example: • tests for leaks • pressure tests of piping and equipment • purging or inerting requirements • pressure and vacuum safety relief where required • temperature • flow and pressure control • mixing • air flow ventilation • extraction Your commissioning plan must also include the: • scope of performance tests, for example, acceptance criteria, measurement requirements, sampling requirements, reference to analytical procedures, chemical and biological analysis • identification of potential releases to the environment of displaced and generated emissions and measure to mitigate these, for example, lean burn flares • scope of responsibilities of the person(s) related to the test procedures, including the sign-off process • qualifications of the responsible person(s) involved • process for dealing with failed tests and problems that you may encounter • health and safety precautions and protective measures employed When commissioning AD plants that have mixing systems installed, you must test the mixing system is effective. You should document the methodology in the commissioning plan. You can only seed and commission AD plants using waste after the Environment Agency has issued your environmental	Biogen's 11 alternative food waste AD sites. The closest sites being Twinwoods (8 miles) and Bygrave (34 miles). The Westwood facility will continue to have a total of 29,100m^3 of storage capacity for PAS 110 compliant digestate in three purpose-built tanks at 9700m^3 each equipped with mechanical mixing. Although a proposed increase in annual throughput from 65,000 to 110,000 tonnes will increase digestate production by approximately 40,500 tonnes per year, no increase in on site digestate storage capacity is required. This is because the site benefits from an agreement with a third party who is contractually obliged to collect all PAS 110 digestate pending storage elsewhere for use for agricultural benefit. This contractual agreement ensures the third party collects and manages all digestate regardless of expected throughput and must do so without compromising PAS110 status, site operations or processing. There is also an irrigation ring main on site to pump digestate directly to local arable Bedfordia land. A procedure for Contingency arrangements for equipment or system failure is in place. This provides guidance on contingency in the event of system or equipment failure through part of the AD process or an incident/accident which could affect digestate quality. Other integrated policies include a Digestate Quality Policy, an Emergency Preparedness and Response procedure, and an Environmental Reporting Procedure for example. A critical spare parts procedure is in place to enable essential key parts to be held in stock pending use. This enables other Biogen AD sites within a defined geographical area to share spare parts when required.

	permit. The permit must contain the relevant LoW code and description for the seeding material. You should source the biomass (inoculum) used in seeding a digester that matches the type of feedstock the facility is designed to process. This will provide a more stable substrate. **5.12 Decommissioning & mothballing** You must consider plant decommissioning or ceasing activities (mothballing) at the design stage. You must have plans that minimise risks during the time decommissioning or mothballing takes place. This includes removing or replacing individual items of plant throughout the life of the facility. Before you decommission plant, you must notify the Environment Agency and provide a copy of your decommissioning plan. Once decommissioning is complete you must provide a written report to the Environment Agency verifying that you have carried out activities in line with your plan. If you bring plant back into service after a period of dormancy you must follow the commissioning requirements set out in this document or be directed by a suitably qualified person. You must have a decommissioning plan to demonstrate that: • plant can be decommissioned without causing pollution • the site will be returned to a satisfactory condition, for example in line with your site condition report	All critical control and processing equipment is subject to a routine inspection and maintenance programme. This includes daily checks for the depackaging plant and mobile plant for example. Site management maintain a Plant Equipment and Maintenance Checks Record to ensure all critical plant and equipment is maintained in accordance with the manufacturer's recommendations. All feedstock suppliers and customers are contractually obligated and have signed Contracts of Supply which specifies the contingency measures in place and of the circumstances in which Biogen would stop accepting waste. Biogen's monitoring of incoming waste with unique customer references, dates, time of arrival, tank level monitoring, digestate outloads, etc allow for accurate monitoring of tank volumes. However, as the process operates on a continuous flow process it is not possible to definitively pinpoint the exact location (albeit with the knowledge of retention times at each stage it is possible to give an indication), this differs to a batch process that allows full identification at each stage. However, on a risk basis, we take low risk material (i.e. food waste that was intended for consumption), and where liquid feedstocks are involved, we apply customer site visits/audits and sample analysis. An Environmental Policy has been incorporated into the Biogen's IMS which is reviewed annually by the company's CEO. Biogen have an internal auditing regime and are subject to an annual auditing schedule by an accredited third party for ISO9001 (Quality), ISO 14001 (Environment) and ISO45001 (Health & Safety). Where export of biomethane to the national grid is restricted, the new upgraded facility has been engineered to return biogas to the gas holder for storage and/or divert biogas to the three CHP engines. In addition, the rate of feeding to the digesters feeding gas to grid and

	The decommissioning plan must include details of (but not limited to): • removing or flushing out pipelines and vessels where appropriate and completely emptying any potentially harmful contents • drawings showing all the underground pipes and vessels • the method and resources needed for clearing lagoons • how you will dismantle buildings and other structures in a way that protects surface water and groundwater at construction and demolition sites • the soil testing needed to understand the degree of any pollution caused by the site activities, and information on what remediation is needed to return the site to a satisfactory state as defined by the initial site report • the measures proposed, once activities have ceased, to avoid any pollution risk and to return the site to a satisfactory state (including, where appropriate, those covering the design and construction of the plant) • how you will clear any residues, waste, and any contamination resulting from the waste treatment activities Decommissioning plant and equipment, where there are potentially explosive atmospheres, is a specialist activity. You must make sure you have written procedures in place and follow it to support the safe removal or closure of plant on site. You must make sure that equipment permanently taken out of use is decontaminated and removed from the site.	mixing would be reduced or stopped. In the event of prolonged restriction to the national grid, feedstocks would be diverted elsewhere to one of Biogen's other 11 food waste AD facilities for processing. The Environment Agency has been notified in advance of any tank degrits and has been continuously kept informed and updated on site commissioning works as part of the Gas to Grid upgrade pf the existing site. A commissioning plan is in place for the phased Gas to Grid upgrade scheme including a Gantt chart from the design stage through to commissioning. This includes pollution prevention measures and to minimise the risk of harm to human health and the environment. The commissioning plan includes functionality testing and validation process of all hardwired and software controls as well as physical and operational testing against operational requirements identified at the design stage. This will include function testing and emissions testing for the new replacement air extraction system and carbon filter, and acid scrubber. The phased works as part of the upgrade to Gas to Grid will be accompanied by completion certificates or alternative form of evidence to the required industry standard and best practice provided by independent qualified persons for all applicable works including new tank installations. All new infrastructure will be subject to the required testing methods including, but not limited to, pressure testing, feeding, mixing systems, high level detection, flood probes, PRVs, ERVs, and demonstrating the minimum required air changes for extraction and ventilation systems for example as part of the commissioning process. A full LDAR survey will also be completed as part of commissioning. All records will be retained for the life of the plant.

	You must have a procedure and follow it for inspecting, maintaining and validating the recommissioning of plant and equipment following periods of dormancy.	As an existing permitted facility, Biogen will seed new digesters with either digester material transferred from other digesters on site and/or from Biogen's other AD sites elsewhere. All inoculum transferred from elsewhere will be derived from other food waste AD facilities with a stable and consistent digestion process which have a similar permitted waste list as Westwood. The design and commissioning stage also considers the potential for decommissioning and ceasing operations. These measures in place are to ensure the site didn't present any potential risk of pollution to the environment, harm to human health or detriment local amenities in the unlikely event of decommissioning and mothballing. This would be accompanied by a full detailed decommissioning plan and approved with the Environment Agency in advance of works taking place. On completion, a full validation and verification report would be submitted demonstrating the approved works have been completed in accordance with a site condition report.
6. Waste pre-acceptance, acceptance and tracking	Wastes accepted at sites must be capable of biological treatment and be fully recovered and suitable for their intended end use. A waste is only suitable for biological treatment if your treatment process is designed to: • treat the types of wastes included on your environmental permit • manage variability in feedstock and optimise process conditions • make sure there is sufficient capacity to treat waste within the retention time of the process You must implement waste pre-acceptance and acceptance procedures for all new waste streams so that you know enough about a waste (including its composition,	The Westwood AD facility will continue to accept predominantly source segregated food waste that was intended for consumption. No new feedstocks or EWC codes are to be introduced as part of this permit variation, all existing EWC codes in the current permitted waste list shall remain unchanged. To achieve the optimum biological conditions, Biogen agitate the contents of the Raw Waste Buffer Tank (RWBT) to ensure a homogenous mix. The waste pre-acceptance process would rule out any incoming material that couldn't be mixed at the waste acceptance stage or in the RWBT, or at the very least, would identify maximum volumes that could be accepted at any one time/over a period. Biogen have an established Research Team who form part of the pre-waste acceptance team and provide feedback and advice on new feedstocks and process monitoring.

	characteristics and predicted age) before it arrives at your facility. You need to do this to assess and confirm the waste is technically and legally suitable for your facility. You must document you waste pre-acceptance and acceptance procedures in your management system. You must assess waste on initial acceptance and periodically to ensure constancy. You must obtain representative test data and undertake upstream auditing of the production process to fully characterise the waste and identify the substances it contains. You must have a system in place to track waste from receipt, handling on site and transfer off site. You cannot accept waste containing animal by-products unless your facility has been validated following the regulations and approved by the Animal and Plant Health Agency (APHA). You must monitor your process in line with animal by-products regulations where required to do so. **6.1 Waste pre-acceptance and characterisation** You must use WM3 technical guidance on waste classification to be able to assign the correct waste classification code. When you receive a customer enquiry and before the waste arrives at the facility, you must obtain the following in writing or in an electronic form: • details of the waste producer including their organisation name, address and contact details	Biogen's monitoring of incoming waste with unique customer references, dates, time of arrival, tank level monitoring, digestate outloads, etc allow for accurate monitoring of tank volumes. However, as the process operates on a continuous flow process it is not possible to definitively pinpoint the exact location (albeit with the knowledge of retention times at each stage it is possible to give an indication), this differs to a batch process that allows full identification at each stage. However, on a risk basis, we take low risk material (i.e. food waste that was intended for consumption), and where liquid feedstocks are involved, we apply customer site visits/audits and sample analysis. The proposed increase in annual waste acceptance will not exceed the existing maximum storage capacity within the building of 400 tonnes at any one time. Additional processing time will ensure feedstocks are managed accordingly to demonstrate the first in, first out principle. As such, there is no requirement to increase the size of the waste reception building Biogen has an established Feedstock Pre-acceptance Procedure, which demonstrates how Biogen meets the BAT requirements and those in sections 2.1.2. of Sector Guidance Note IPPC S5.06. The pre-acceptance requires a three-stage sign-off by a representative from the Operations, Compliance and Laboratory/Research team. Samples are requested and analysed where appropriate on a risk basis in accordance with WM3 technical guidance on waste classification. The procedure also details the need to obtain: • Information on the nature of the waste. • The composition and characterisation of the waste. • Handling requirements and associated hazards.

	• the source and nature of the waste, at the point of production (the process that gives rise to the waste) • a description of the waste including its physical form • the full characteristics of the waste including the variability of each waste (for example, liquid effluents must be individually assessed and tested, understanding of the waste's composition and characterisation must be based on representative samples) • a description of any hazardous properties including potential risks to process safety, occupational safety and the environment • the odour potential • the type of packaging and risks of contamination • an estimate of the quantity you expect to receive in each load and in a year • the potential for self-heating, self-reactivity or reactivity to moisture or air • the age of the waste You must verify the pre-acceptance information by contacting or visiting the producer. Dealing with staff directly involved in waste production can help to fully characterise a waste. You must keep pre-acceptance records for at least 3 years (in a computerised waste tracking system) following receipt of the waste. If an enquiry does not lead to receipt of the waste, you do not need to keep records. You must reassess the information you had at pre-acceptance yearly. You must also reassess information required at pre-acceptance if the: • waste changes • process giving rise to the waste changes	• Where appropriate a representative sample of the waste will be taken from the customer and analysed ensuring the collected sample is representative providing justification for any deviations. The procedure is directly linked to the Feedstock Pre- Acceptance Form which is completed prior to any of the waste being accepted. The form, in addition to the above, also ensures the relevant information stated as part of the guidance is obtained: • Information and contact details for the current holder of the waste. • Description of the waste. • Description of the process giving rise to the waste. • Whether it is considered a high-risk feedstock, an example could be a liquid feedstock high in fat/oils or yeast which require careful management to preserve biology, or one where it is deemed a risk because of the nature in the way waste is collected. This requires additional sign-off at Director level. • The EWC/LOW code assigned to the waste. • The SIC code assigned to the producer of the waste. • The physical form the waste is in, e.g., solid, liquid, sludge. • Whether it contains Animal By-Products Regulations (ABPR) material, if yes, which category. • Whether it contains packaging, if yes, what type of packaging and estimated percentage. • The anticipated quantities of waste. • Waste testing (this is primarily for liquid-based feedstocks). Biogen undertake an extensive sampling program and work with an external laboratory to cover the following determinands: Total Solids % w/w, Organic Dry Matter % w/w, Total Nitrogen % w/w, Ammonium Nitrogen (mg/kg), Total Phosphorus (P) (mg/kg), Total Potassium (K) (mg/kg), Total Magnesium (Mg),

	• waste received does not to conform to the pre-acceptance information Before you accept waste, you must consider its potential odour and emissions impact (description and intensity), for example: • mercaptans, ammonia or other volatile organic compounds (VOCs) • low molecular weight amines, for example, decaying fish or meat • other high-nitrogen and odorous materials or chemicals, for example from highly decomposed food waste or poultry manure You can only accept odorous wastes using special handling and storage arrangements such as in adequately covered or air contained and abated areas. When you agree that you will accept waste from a customer, you must decide and record what parameters you will check at the acceptance stage. The checks could be visual (for example colour, phase, fuming), physical (for example pumpability, temperature, form) and chemical (for example pH, metals content) parameters. You must also record the criteria for non-conformance or rejection. You must advise your customers that they must avoid contaminating waste because it can cause handling difficulties and inhibit the biological treatment process. You must tell them what wastes are likely to contaminate your process.	Total Copper (Cu), Total Zinc (Zn), Total Sulphur (S), Total Molybdenum (Mo), Total Lead (Pb), Total Cadmium (Cd), Total Mercury (Hg), Total Nickel (Ni), Total Chromium (Cr), Total Sodium (Na), pH, Chloride, Fluoride, Total Arsenic (As), Total Selenium (Se), Water Soluble Sodium, CLS Fat Test (g / 100g), Microbial inhibition at pH 6.0, Microbial inhibition at pH 7.2, Microbial inhibition at pH 7.4, Microbial inhibition at pH 8.0, Biological Methane Production (LCH4/kg VS), Electricity Production (kWh/ AD tonne), COD (g/L). Routine samples are taken prior to acceptance and then either on a 6-monthly or 12-monthly basis, this is decided on a risk basis. Instances where there is cause of concern over variance, the research team will increase the frequency of testing for determinants of concern. Biogen have an agreed Feedstock Agreement; it stipulates that the customer must notify Biogen if there is a deviation from the feedstock described in their Agreement. This is a legally binding document that had input from legal advisors. It is signed by the customer. • Whether there are any special handling requirements with respect to H&S of personnel or in respect of the environment. • Any hazards associated with the waste. • Haulier details, including Waste Carriers Licence, ABPR approval where applicable. • The type of vehicle the waste will be transported in. Biogen has a Delivery Offloading Procedure, this includes a requirement for the weighbridge operator to confirm the load with the driver at the point of weigh-in and prior to tipping. Here they will also check the EWC/LOW code, and the Waste Transfer Notes (WTN)/Duty of Care (DOC) paperwork and ensure they are booked in on the pre-agreed Commercial schedule.

	You must obtain a representative sample or analysis, or analyse a representative sample of a waste, if: • the chemical composition or variability of the waste is unclear from the information supplied by the customer • there are doubts about whether the sample analysed is representative of the waste • you will treat the waste at your facility (this will allow you to carry out tests to determine if the planned treatment will be safe and effective). You may not need a sample analysis at the pre-acceptance stage where the waste is: • packaged food waste from food manufacturers or food retailers – however, you must have confirmation of its origin and enough information to understand how it will affect your biological treatment process • food waste and co-mingled green and food waste from local authority collections only. You must make sure that feedstock testing and testing frequency reflects the nature of the material, how it arises and any potential variation within it. For example, taking account of seasonal variations. After fully characterising a waste, you must technically assess the waste's suitability for treatment and storage to make sure you can meet your permit conditions and any other regulatory requirements. You must make sure that the waste complies with the site's treatment capabilities and capacities. **6.2 Bespoke wastes**	When waste is tipped the load is visually inspected for any non-conforming items, and material is again visually assessed for any obvious contamination prior to loading into the hoppers. In the event contamination is identified, it is quarantined to one side and photographs are taken and the relevant persons notified as per the Contaminated Feedstock Procedure. The site team are familiar with the waste acceptance criteria for the site and the need to report deviation from this. Likewise, the team will raise any other hazards resulting from waste streams that could impact on process safety, occupational safety or the environment. Biogen undertake frequent occupational and environmental monitoring, the frequency of which may be reviewed if necessary following feedback on feedstocks. Contamination tends to be objects which could cause mechanical damage to front end processing equipment as opposed to hazardous waste materials. However, to ensure this does not pose a risk, training is also provided to employees on hazardous waste, and this is also covered under the Disposal of Hazardous Waste Procedure. The Westwood AD facility is certified and validated (reference 01/022/0052/02 ABP/CMP) with Animal and Plant Health Agency (APHA) to accept Category 3 and some Category 2 waste streams containing animal by-products in accordance with the Animal By-Products Regulations 2005. All attempts at reducing ammonia, mercaptans and other VOCs are targeted at source as much as possible. This includes pre-acceptance checks and feedstock management. The Odour Abatement Maintenance Procedure states the parameters routinely tested. All of Biogen's AD sites including Westwood operate on a continuous process system. Therefore, the temporary storage of feedstock within the waste reception building is for a minimum period and for no longer than 48 hours. Older feedstocks are typically accessed from the back

	The biological treatment process must be capable of fully treating the waste feedstock received. For example, within the time-temperature conditions of your process, the biodegradation of any packaging and full recovery of the waste should take place. You must fully assess and manage: • any effects or inhibition on the biological treatment process and quality of the final waste or product – critical where you accept novel waste streams or multiple waste streams as it may prevent or delay associated landspreading deployments • the effects of any potential carry-over of residual chemical components into the outputs and on using the final outputs. **Mirror entries and hazardous waste** If you accept hazardous, mirror-entry hazardous, or bespoke wastes, you must follow the requirements of Technical Guidance WM3 Waste Classification and the Chemical waste: appropriate measures for permitted facilities, in addition to this guidance. If you are permitted to accept mirror entries or hazardous wastes, the person carrying out the technical appraisal of a waste's suitability for receipt (at pre-acceptance) must be competent. **6.3 Waste acceptance and reception** You must implement waste acceptance procedures to check the characteristics of the waste received matches the information you obtained during waste pre-acceptance. This	of the reception bay to help demonstrate the first in, first out principle by processing the oldest feedstocks first. A new replacement air extraction system within the waste reception building is to be installed. This will be equipped with point source extraction hoods positioned above all predominant sources of odour including, but not limited to, the waste reception bays and the hammermills. This extracted air will be channelled through to a new replacement carbon filter for treatment prior to emission to air via a stack to air dispersion. Biogen's Integrated Management System (IMS) utilises an electronic management software system (Activ) that stores all data relating to pre-waste acceptance. This same management system captures any issues with loads and the action taken via the "incident log" module. In addition to the electronic IMS, our weighbridge software captures all input and outputs to the site. This is done in accordance with the Wastemetrics Work Instruction for Weighbridge Staff, which also highlights where a load can be marked as "rejected". There is a designated labelled quarantine area in the waste reception hall. Biogen have an established Research Team who form part of the pre-waste acceptance team and provide feedback and advice on new feedstocks and process monitoring. Samples are taken from the homogenous mix within the RWBT weekly prior to discharge to the digesters. Digester samples are taken three times a week. This includes pH and alkalinity testing. Daily feed rates are recorded into the RWBT and to the Digesters. The concentration of VFA's and ammonia within the digesters and digestate are recorded. The waste pre-acceptance process would rule out any incoming material that couldn't be mixed at the waste acceptance stage or in the

	is to confirm the waste is as expected and you can accept it, or that you must reject it. Your procedures must follow a risk-based approach, considering: • the source and nature of the waste • the variability of a waste (for example, liquid effluents) – you must carry out individual assessment and testing • any hazardous properties the waste may have • potential risks, process safety, occupational safety and the environment (for example from odour and other emissions) • knowledge about the previous waste holder(s) and the age of the waste • the waste's potential for self-heating, self-reactivity or reactivity to moisture or air. You must only receive bespoke waste onto site that you have prebooked and that matches the pre-acceptance information. If you need to take samples on site, they must be representative of the waste and taken by a technically competent person. This means they must be appropriately trained or hold the relevant qualifications. You must visually check wastes and verify them against pre-acceptance information and transfer documentation before you accept them on site. The extent of the initial visual check is determined by the waste type and how it is packaged. You must check and validate all transfer documentation and resolve discrepancies before you accept the waste. If you believe the incoming waste classification and description is	RWBT, or at the very least, would identify maximum volumes that could be accepted at any one time/over a period. Contamination tends to be objects which could cause mechanical damage to front end processing equipment as opposed to hazardous waste materials. However, to ensure this does not pose a risk, training is also provided to employees on hazardous waste, and this is also covered under the Disposal of Hazardous Waste Procedure. Hazardous materials are not accepted, and even with organic feedstocks great care is taken when introducing new feedstocks. No new waste streams or EWC codes are proposed as part of this permit variation. The permitted waste list will remain the same. When waste is tipped the load is visually inspected for any non-conforming items, and material is again visually assessed for any obvious contamination prior to loading into the hoppers. When waste is tipped the load is visually inspected for any non-conforming items, and material is again visually assessed for any obvious contamination prior to loading into the hoppers. In the event contamination is identified, it is quarantined to one side, and photographs are taken and the relevant persons notified as per the Contaminated Feedstock Procedure. Site staff are trained in waste acceptance criteria and the need to report deviation from this. Likewise, the team will raise any other hazards resulting from waste streams that could impact on process safety, occupational safety or the environment. Biogen undertake frequent occupational and environmental monitoring, the frequency of which may be reviewed if necessary following feedback on feedstocks. Contamination tends to be objects which could cause mechanical damage to front end processing equipment as opposed to hazardous waste materials. However, to ensure this does not pose a risk, training is also provided

	incorrect or incomplete, you must address this with the original waste producer during waste acceptance. You must record any non-conformances. You must have clear criteria that you use to identify non-conforming wastes and wastes to be rejected. You must also have written procedures for recording, reporting and tracking non-conforming and rejected wastes. These must include: • using quarantine storage • notifying the relevant customer or waste producer • recording a summary of your justification for accepting non-conforming waste in your electronic (or equivalent) system You must take measures to prevent the recurrence of non-conforming and rejected wastes. You must weigh and record each load of waste on arrival to confirm the quantities against the accompanying paperwork, unless there are other reliable systems (for example, based upon density and volume). You must record the weight in a system that enables tracking. The person carrying out waste acceptance checks must be trained to effectively identify and manage any non-conformances in the loads received. After the initial visual inspection and confirmatory checks, you must offload the waste into a dedicated reception or storage area to wait for detailed checks or sampling. Wastes	to employees on hazardous waste, and this is also covered under the Disposal of Hazardous Waste Procedure. All liquid wastes are to continue to be accepted from within the waste reception building and are subject to maceration down to 12mm in accordance with ABPR as a CCP prior to discharge to the RWBT. A jet washing procedure is incorporated into daily procedures at all Biogen AD sites in accordance with the Jet Wash Operations Procedure. Jet washers used on site currently rely on mains water supply. Jet washing is an essential part of maintaining good housekeeping and for ABPR compliance. Each waste reception bay will be subject a complete jet at least once a week. The waste reception building is constructed from concrete panel walls and a steel framework with metal cladding. All incoming feedstocks are discharged into the designated concrete bays as instructed by site foreman. The building will continue to be served by a new replacement ventilation and negative air extraction system with point source extraction hoods above all predominant sources of odour. Extracted air will be channelled through to a new replacement carbon filter with emission stack to aid dispersion. The carbon filter will be subject to twice yearly emissions testing in accordance with the permit and BAT. The air extraction system has been designed to provide a minimum of three air changes per hour. The seals of the fast-acting roller shutter doors will be inspected daily as part of the daily check's procedure. The structural integrity of the building is visually inspected as part of the daily check's procedure. Should the seal and integrity of the building ever be questioned, a physical or virtual smoke test would be repeated to demonstrate the integrity of the building and the minimum number of required air changes.

	that do not require further checking can go into the appropriate storage area. You must not offload wastes if you do not have enough space and capacity to treat the waste at that time. If you need to offload feedstock deliveries to inspect them, or carry out acceptance sampling before treatment, you must segregate the reception areas (typically into bays). You must verify the waste is compliant as soon as possible. If you use a bay every day you must clean it at least weekly. You must clean it more often (depending on the waste) if weekly cleans do not deal with the risk of vermin or fugitive emissions. The waste reception area must be inside an enclosed building for the following: • if receiving, storing or pre-treating (for example, de-packaging food waste) as the waste may lead to fugitive emissions • for food waste • for all waste containing animal by-products. A building is a covered structure, enclosed on all vertical sides, that is designed to provide sheltered cover and contain emissions of noise, particulate matter, odour and litter. You must design enclosed buildings with an air extraction that is capable of negative pressure within the waste reception area and have air-lock controls. You must make sure the ventilation extraction and air treatment is suitably designed and engineered.	The nature of accepted feedstocks and the wet AD process ensures that dust is negligible on site. Pre-acceptance also considers dusty feedstock, if dusty feedstocks were to be accepted going forward, independent occupational and environmental dust monitoring would be commissioned as required, it is the responsibility of the Compliance Team to commission additional testing as required. The waste reception and processing building is entirely sealed and undercover. All drainage including runoff is contained within the building's sealed drainage system with the drainage gradient engineered to flow to gully drains connected to the below ground pit. The reception hall floor is designed to drain away from the entrance doors. The Westwood AD facility is certified and validated (reference 01/022/0052/02 ABP/CMP) with Animal and Plant Health Agency (APHA) to accept Category 3 and some Category 2 waste streams containing animal by-products in accordance with the Animal By-Products Regulations 2005. Vehicle and wheel washing takes place with jet washers mixed with a DEFRA approved disinfectant to a required dilution factor. All runoff and washdown waters are contained within the reception buildings sealed drainage system and are put through the AD treatment process. The maximum storage time for feedstock within the reception building prior to processing is 48 hours. This is a worst-case scenario and would only approach this length of time in the event of significant plant malfunction. The bay rotation system helps demonstrate the 'first in, first out' principle, ensuring the oldest feedstocks are processed first where possible. It is not within Biogen's best interests to allow feedstocks to deteriorate or to accept feedstocks subject to depreciation. This is because any deterioration in the quality and digestive nutritional value of feedstocks is likely to generate low gas

	You must collect and treat all emissions in an appropriately engineered abatement system or air suction system close to the source. If you accept food and putrescible wastes, you must fit existing reception buildings with fast-acting roller shutter doors to allow delivery and other vehicles to enter and leave. You must design and maintain buildings used for feedstock reception and storage in a way that minimises fugitive emissions. A reception building should have enough space to minimise the time waste is held before treatment, and to allow you to follow the first-in, first-out principle for waste treatment. You should operate an alternate bay system or single bay all-in, all-out approach. All bays used to segregate wastes must have defined and visibly clear storage demarcation boundaries. Where there is a likelihood, you will generate bioaerosols and dust you must treat the air with a dust filter before releasing emissions. You must design reception areas for easy cleaning and include contained drainage so you can collect wash-water separately for disposal or reuse. If you are permitted to accept animal by-products you must: • segregate these from other waste	yields and/or produce malodours. The waste reception bays are periodically cleared of all waste which can be demonstrated by CCTV footage. Due to the continuous nature of the anaerobic digestion process, feedstocks cannot remain in the reception hall for long periods, as continuous feeding of the digesters is essential for digester health and biogas production. Consequently, uninterrupted pre-treatment of feedstocks must take place. Removed contamination predominantly in the form of plastics is subject to hot washing then compaction to be 'squeezed' prior to collection within a designed RoRo container pending removal from site for disposal elsewhere. The 12mm macerators are to be maintained in accordance with documented maintenance procedures which can process a maximum of approximately 25 tonnes per hour. Once de-packaged and following maceration, feedstock is discharged into the new RWBT tank via a pump averaging approximately 50m^3/hr. Following pasteurisation, digestate is fed through to a separator for screening to remove contaminates predominantly plastics down to <2mm particle size in accordance with the PAS110 QP. In order to maintain essential nutrient balance for effective biological digestive health to achieve maximum biogas yields, a Trace Element Additive (TEA) will continue to be applied directly into the in feed line to the RWBT on a periodic basis. The concentration and composition of TEA applied is dependent on current feedstocks and plant biology. Samples are routinely taken from the RWBT and sent for analysis by our established Research Team who determine the level of dosing required. Any additional so-called TEA 'hits' required to improve plant biology are dictated by our Research Team. All weekly TEA additives including 'hits' are recorded on a live Plant Monitoring Spreadsheet and can be made available on request. TEA is delivered to site in IBCs

	• keep liquors and leachate separate and provide wheel-wash facilities for disinfecting delivery vehicles on exit from the reception building You must characterise wash-down water containing cleaning chemicals, for example disinfectants, and dispose of them appropriately. You must minimise the time you store putrescible waste in reception before treatment and hold it for no longer than 5 working days. You must treat waste promptly and within 24 hours if there is risk of: • attracting vermin • causing fugitive emissions such as odour. Once offloaded, and as soon as is practicable to do so, you must assess the waste and verify it for acceptance, following your procedures. You must put non-conforming containers and wastes into quarantine and deal with them immediately. You must record all non-conformances. Operators of AD plants must characterise the feedstock to understand its effect on the biological treatment process. This includes understanding, for example: • particle size distribution and physical contaminants • total solids and volatile solids • biogas potential • total organic carbon (TOC) • chemical oxygen demand (COD) • nutrient analysis • fibre content	and is offloaded and stored within the secondary containment area in event of accidental spillage. To minimise the corrosive nature of H_2S throughout the anaerobic digestion process, ferrous chloride dosing will take place directly into the RWBT. Ferrous chloride will be securely stored in a new 30m^3 self-contained (double skinned) storage tank positioned within the secondary containment area. The daily quantities and dosing rates and associated data are recorded on a Plant Monitoring Spreadsheet. The decision to dose with ferrous chloride is dictated by the H_2S concentration within the biogas which is tested with the use of RAE tubes and portable gas analysers at least 2 to 3 times per week. The procedure is directly linked to the Feedstock Pre- Acceptance Form which is completed prior to any of the waste being accepted. The form, in addition to the above, also ensures the relevant information stated as part of the guidance is obtained: • Information and contact details for the current holder of the waste. • Description of the waste. • Description of the process giving rise to the waste. • Whether it is considered a high-risk feedstock, an example could be a liquid feedstock high in fat/oils or yeast which require careful management to preserve biology, or one where it is deemed a risk because of the nature in the way waste is collected. This requires additional sign-off at Director level. • The EWC/LOW code assigned to the waste. • The SIC code assigned to the producer of the waste. • The physical form the waste is in, e.g. solid, liquid, sludge. • Whether it contains Animal By-Products Regulations (ABPR) material, if yes, which category.

	• pH and alkalinity • volatile fatty acids (VFA) • ammonia and total nitrogen content – carbon to nitrogen (C to N) ratio • heavy metals and potentially toxic elements (PTEs) • carbohydrates and lipids **6.7 Removing packaging and plastic** You must remove packaging and non-biodegradable packaging items that are not independently certified as industrially or home compostable (or both). You must do this before and during treatment to minimise the contamination of outputs. Non-packaging items include: • non-biodegradable materials integral to the product, for example tea bags • items used when consuming food or drink, for example straws, single-use tableware • plastic bags, used for example, in a kitchen caddy, food bin liners, or garden waste sacks **6.8 Acceptance of bulk loads, drums and Intermediate Bulk Containers (IBC)** You must only offload bulk loads (liquid, sludge or solid) after they have been fully verified. You must not accept a non compliant bulk load for interim storage except in an emergency. Apart from packaged waste you must make sure that all waste is free from visual contaminants as far as practicable.	• Whether it contains packaging, if yes, what type of packaging and estimated percentage. • The anticipated quantities of waste. • Waste testing (this is primarily for liquid-based feedstocks). Biogen undertake an extensive sampling program and work with an external laboratory to cover the following determinands: Total Solids % w/w, Organic Dry Matter % w/w, Total Nitrogen % w/w, Ammonium Nitrogen (mg/kg), Total Phosphorus (P) (mg/kg), Total Potassium (K) (mg/kg), Total Magnesium (Mg), Total Copper (Cu), Total Zinc (Zn), Total Sulphur (S), Total Molybdenum (Mo), Total Lead (Pb), Total Cadmium (Cd), Total Mercury (Hg), Total Nickel (Ni), Total Chromium (Cr), Total Sodium (Na), pH, Chloride, Fluoride, Total Arsenic (As), Total Selenium (Se), Water Soluble Sodium, CLS Fat Test (g / 100g), Microbial inhibition at pH 6.0, Microbial inhibition at pH 7.2, Microbial inhibition at pH 7.4, Microbial inhibition at pH 8.0, Biological Methane Production (LCH4/kg VS), Electricity Production (kWh/ AD tonne), COD (g/L). Routine samples are taken prior to acceptance and then either on a 6-monthly or 12-monthly basis, this is decided on a risk basis *(example of results for a customer attached)*. In instances where there is cause of concern over variance, the research team will increase the frequency of testing for determinants of concern. Biogen have an agreed Feedstock Agreement; it stipulates that the customer must notify Biogen if there is a deviation from the feedstock described in their Agreement. This is a legally binding document that had input from legal advisors. It is signed by the customer. • Whether there are any special handling requirements with respect to H&S of personnel or in respect of the environment. Any hazards associated with the waste. • Haulier details, including Waste Carriers Licence, ABPR approval where applicable.

	Testing and analysis Where you sample a waste, you must test the waste for acceptance according to the parameters decided at pre-acceptance. You must record the results of the tests in the computerised waste tracking system. You must note and investigate any discrepancies. Laboratory samples must be analysed by a UKAS approved laboratory. **Quarantining waste** Your facility must have a dedicated waste quarantine area. Where there is a risk of fugitive emissions from quarantined waste you must store it in closed or covered containers or within a building or covered skip. Your quarantine storage must be separate from all other storage and clearly marked as a quarantine area. You must not keep quarantined waste longer than 5 working days. You must have written procedures in place for dealing with wastes held in quarantine, together with a maximum storage volume. The maximum storage time must take account of the potential for odour generation, pest infestation and storage conditions such as temperature effects. If the waste is infested or odorous you must remove it as soon as possible and in any event within 24 hours. The waste off-loading area, any sampling points, and quarantine areas, must have an impermeable surface with self-contained drainage. This is to prevent any spillage entering the storage systems or escaping off site. You must design all surfaces to allow effective cleaning.	• The type of vehicle the waste will be transported in. A designated labelled quarantine area is always available in the waste reception hall. All non-confirming wastes and items are removed from site for appropriate recovery or disposal elsewhere within 5 working days. All of Biogen's AD sites including Westwood operate on a continuous process system. Therefore, the temporary storage of feedstock within the waste reception and processing building is for a minimum period and for no longer than 48 hours. A pest control specialist is contracted to attend site regularly and a designated bait plan is in place. The waste reception building is served by impermeable reinforced concrete and sealed drainage. The gradient of the floor is engineered to drain away from the entrance doors and to the below ground sealed sump. All runoff and liquor are pout through the treatment process to offset mains water consumption. A jet washing procedure is incorporated into daily procedures at all Biogen AD sites in accordance with the Jet Wash Operations Procedure. Biogen's Integrated Management System (IMS) utilises an electronic management software system (Activ) that stores all data relating to pre-waste acceptance (as described in detail above, including but not limited to ongoing analysis results). This same management system captures any issues with loads and the action taken via the "incident log" module. In addition to the electronic IMS, our weighbridge software captures all input and outputs to the site. This is done in accordance with the Wastemetrics Work Instruction for Weighbridge Staff, which also highlights where a load can be marked as "rejected".

	6.9 Waste tracking You must use a waste tracking system which records information about the available capacity of the waste quarantine, reception, general and bulk storage areas of your facility. Your information must include treatment residues and end of waste product materials. Your tracking system must hold all the information produced during: • pre-acceptance • acceptance • non-conformance or rejection • storage • repackaging • treatment • removal off site This information must be in a readily accessible format. Where possible this should be computerised. You must create records and update them to reflect deliveries, on site treatment and despatches. Your tracking system will operate as a waste inventory and stock control system. It must include this information as a minimum: • the date the waste arrived on site • the original producer's details • all previous holders • a unique reference number • the pre-acceptance and acceptance analysis results • the package type and size • the intended treatment or disposal route • the nature and quantity of wastes held on site • where the waste is physically located on site • where the waste is in the designated disposal route	Wastemetrics is remotely accessible by all staff and records are retained for at least six years. Biogen's monitoring of incoming waste with unique customer references, dates, time of arrival, tank level monitoring, digestate outloads, etc allow for accurate monitoring of tank volumes. However, as the process operates on a continuous flow process it is not possible to definitively pinpoint the exact location (albeit with the knowledge of retention times at each stage it is possible to give an indication), this differs to a batch process that allows full identification at each stage. However, on a risk basis, we take low risk material (i.e. food waste that was intended for consumption), and where liquid feedstocks are involved, we apply customer site visits/audits and sample analysis.

	• staff (name and position) who have taken any decisions about accepting or rejecting waste streams and who have decided on recovery or disposal options • details that link each waste container accepted to its consignment or transfer note • non-conformances and rejections The tracking system must be able to report: • the total quantity of waste present on site at any one time and how that compares with the limits authorised by your permit • the total quantity of end of waste product materials on site at any one time • a breakdown of the waste quantities you are storing pending on-site treatment or waiting for onward transfer • a breakdown of the waste quantities by hazardous property • where a batch or load of waste is located based on the site plan • the length of time a waste has been on site You must store backup copies of computer records off site. Records must be easily accessed in an emergency. You must hold acceptance records for a minimum of 2 years after you have treated the waste or removed it off site. You may have to keep some records for longer if they are required for other purposes, for example hazardous waste consignment notes.	

7. Waste storage, segregation, transfer and handling	Your facility must have enough physical and permitted capacity for the wastes, raw materials and 'end of waste' materials that you store on site. You must comply with the limits set in your environmental permit and with any additional regulatory requirements that may apply, for example, the: • Animal By-Products (Enforcement) (England) Regulations 2013 • COMAH regulations You must store all waste on an impermeable surface with contained drainage that meets the recommendations of CIRIA 736. Storage area drainage must: • contain all possible contaminated run off • prevent incompatible wastes coming into contact with each other • make sure that fire cannot spread • be designed to allow access for inspection and cleaning Where possible you must keep clean rainwater separate from wastes and waste waters to limit storage requirements. You must store waste in locations that minimise handling waste and have handling procedures in place. Only competent staff must handle waste. They must use appropriate equipment. Where possible, you must locate storage areas away from watercourses and sensitive perimeters (for example those close to public rights of way, housing or schools).	The proposed increase in annual waste acceptance will not exceed the existing maximum storage capacity within the building of 400 tonnes at any one time. There is no requirement to increase the size of the waste reception building which will remain at approximately 13,000m^3 based on a minimum of 3 air changes per hour. The processing hours at the front-end pretreatment stage will increase. The current 1140m^3 Raw Waste Buffer Tank (RWBT) will be replaced with a new tank of the same capacity. Total initial design Digester storage capacity of 12,620m^3 will remain unchanged, comprised of 4,560m^3 (2 x 2280m^3 digesters) to continue to serve the CHP engines and 8,060m^3 (2 x 2280m^3 and 1 x 3500m^3 digesters) for gas generation to the national grid. Digesters 1, 3, and 4 will be rebuilt to the current dimensions. The current Digester 2 will remain in use for CHP generation. A new digester 5 will have a diameter of 17 metres instead of 14 metres. Pasteuriser tanks 1 & 2 will be rebuilt to the same diameter but with an increased height from 7 to 8 metres high, which will increase the storage capacity of each tank from 140m^3 to 160m^3. The Westwood AD facility is certified and validated (reference 01/022/0052/02 ABP/CMP) with Animal and Plant Health Agency (APHA) to accept Category 3 and some Category 2 waste streams containing animal by-products in accordance with the Animal By-Products Regulations 2005. The amount of biogas and propane storage on site at any one time will exceed the lower trier threshold inventory in accordance with the COMAH 2015. An application to the HSE for COMAH validation is to be submitted and Gas to Grid operations will not commence until approval is granted.

	You must store all waste within the security protected area of your facility to prevent unauthorised access and vandalism. Your management system and odour management plan must clearly state the maximum storage capacity of the site and the designated storage areas. You must provide signage that clearly states the maximum quantity and types of waste that can be stored in an area. You must communicate these maximum capacities to site operatives. You must define capacity in clear terms, for example: • maximum tank or vessel capacities • tonnage • number of pallets or containers You must regularly monitor the quantity of waste stored on the site and in designated areas to check you do not exceed the maximum storage capacities. For in vessel composting and AD, available storage capacity and throughput will be influenced by the period of time the waste is in the treatment vessels. You must make sure you have sufficient capacity to store waste inputs and outputs, taking account of the loading rate and capacity for treatment. Information on determining capacity is available in Regulatory Guidance Note 2. You must store highly putrescible wastes, including odorous and ammonia-rich wastes and wastes containing animal by-products, in a contained or enclosed building. The building should be fitted with an appropriately engineered extraction and ventilation system, with the air extracted and directed to a suitable abatement system. You can install localised point source air extraction in buildings to minimise a source emission from that locality. For liquid wastes this is either:	All feedstocks will be deposited in the sealed waste reception building prior to pre-treatment served by impermeable surfacing and sealed drainage. Secondary containment for all process tanks is provided by an impermeable ground bearing concrete slab with concrete upstand perimeter walls and sealed construction joints, and an unlined earth (clay) base and surrounding embankment walls. The bund was originally designed in 2009 which is prior to the publication of CIRIA c736. A flood gate is provided for vehicle access and egress to the secondary containment area. The volume of the secondary containment bund at Westwood exceeds that required by C736 guidance, and it is constructed using appropriate materials. Subject to relatively minor repair and remedial works which will be completed prior to gas to Grid operations commence, the bund is considered to be satisfactory for a low risk / class 1 site. Unlined earth bunds are an allowable design for class 1 sites, with C736 specifying a minimum thickness of 1 metre of Clay with an impermeability lower than $1x\ 10^{-09}$ m/s. The bund at Westwood exceeds these minimum criteria, with a greater thickness of material with significantly lower permeability. The available containment volume for the bund is modelled as 14,008m^3 which exceeds the required volume of 10,875m^3. The Westwood AD facility was constructed in 2009 so predates the publication of CIRIA 736 which was published in mid-2014. A containment review was conducted by SLR Consultancy based on C736 as this represents current best practice. A Bund Ground Investigation was also completed to prepare a factual Ground Investigation Report.

	• a sealed tank fitted with an air control system which may include air circulation • local extraction to a gas recovery plant or engineered abatement system Your storage areas must be large enough to manage foreseeable changes in feedstock supply and your ability to despatch outputs without causing pollution. For example, during: • public holidays • periods of adverse weather • seasonal peak volumes of waste acceptance You must not over accumulate wastes. You must treat wastes or remove them from the site as soon as possible. You must prioritise the treatment or off-site transfer of waste based on: • its type • its age on arrival • date of arrival • duration of storage on site Storage area surfaces used for putrescible waste must be of a type and quality suitable for effective cleaning and or disinfection. You must put procedures in place and use them to make sure that surfaces are regularly cleaned or disinfected (or both). You must design your storage facilities and procedures to make sure there is no cross-contamination between inputs and outputs of the process, and during the treatment cycle (where applicable). For example, during the sanitisation and stabilisation of composting waste. For waste in storage, you must follow the first-in, first-out principle. You must also identify and prioritise dealing with wastes with a higher risk of causing odour, litter or pest	A permeability assessment was previously completed for the bund during 2009 as part of the original design and construction works. This assessment determined the site to be underlain by 20 metres of glacial clay with a permeability significantly less than $1x10^{-09}$m/sec which was classed as acceptable in accordance with the guidance at time (since superseded by C736). Dynamic sampling boreholes were drilled using a P60 slope climbing rig to a maximum depth of 6.20m bgl between the 6-7th August 2024. Boreholes were drilled to allow for logging, sampling and in situ testing of the underlying ground and groundwater conditions. Standard Penetration Tests were also undertaken to a maximum depth of 4.20 metres bgl to obtain information on the relative density of strata encountered. The Coefficient of Permeability values were found to be significantly lower than the required threshold of 1 x 10^{-9} m/s, demonstrating that the material complies with the permeability requirements outlined in C736. CIRA 736 guidance recommends that the secondary containment volume is the larger of 25% of the bund capacity or 110% of the largest tank which is determined as: • 25% of 43,500m^3 = 10,875m^3 • 110% of 9,700m^3 = 10,670m^3 In this case 25% of the total inventory dominates and the required secondary containment capacity is 10,875m^3. A topographical survey determined that the total secondary containment capacity provided by the existing bund of 14,008m^3 exceeds the required figure of 10,875m^3, and therefore the secondary containment bund has adequate volume (assuming that the low point identified is remediated prior to Gas to Grid operations). This low point identified by the survey is to be remediated as part of the Gas to Grid expansion proposals where the earth bund meets a concrete bund wall in the northwest corner of

	problems. You can do this by filling and emptying bays alternately or operating an all-in, all-out approach. You must make your on-site waste inventory readily available. Your site must have safe pedestrian and vehicular access (for example, for forklifts) (at all times) to storage areas so that you can retrieve waste safely. You must design bunkers, bays and pits so that waste and debris does not build-up in inaccessible areas such as corners. You must regularly clean bunkers, bays and pits. **7.1 Above ground tanks and bulk storage** You must locate all above ground tanks used for storing and treating waste on an impermeable surface with secondary containment. You must have a drainage plan. You must use tanks and associated equipment that are suitably designed, constructed and maintained. You must do a risk assessment to validate the design and operation of bulk storage systems. You must make sure any new tanks and equipment are leakproof and working correctly before using them. You must cover all bulk storage tanks. Where possible you must contain and vent tanks and vessels through suitable abatement, or direct emission to a gas recovery system. Storage systems must conform to the following CIRIA guidance:	bund. This will also include remediating the additional actions to address issues with the bund including works to a section of precast concrete wall within the bund and repair works to concrete joints (see Containment Spill Model. SLR Consultancy completed a C736 risk assessment for the site using the Anaerobic Digestion and Bioresources Association (ADBA) methodology. The risk assessment indicates that the site is considered to be 'low' risk and therefore requires a class 1 design. Unlined earth bunds are an allowable design for class 1 sites, with C736 specifying a minimum thickness of one metre of Clay with an impermeability lower than $1x\ 10^{-09}$ m/s. The bund at Westwood exceeds these minimum criteria, with a greater thickness of material with significantly lower permeability. A former 140m^3 FOG tank (to be renamed Water Tank) is utilised for the temporary storage of captured rainwater from within the bund. This is put through the treatment process and used at the front end to offset mains water consumption. This ensures rainwater is kept isolated from any process material to avoid contamination. All process and storage tanks are positioned within a secondary containment area with sealed drainage. The tanks are located as far away from an adjacent public rights of way (footpath) as practicable and are separated by an impermeable clay bund. Auxiliary equipment including the gas flares are positioned between the tanks and footpath also contained within the impermeable earth bund. The site perimeter is served by secure fencing and lockable gates with established hedgerows to prevent unauthorised entry with security doors and locks. A new CCTV system has been installed to provide full site coverage and is remotely accessible. The site is supervised during operating hours and is checked visually at weekends and public

	• C535 Above ground proprietary prefabricated oil storage tank systems (where relevant) • C736 Containment systems for the prevention of pollution You must locate bulk storage vessels on an impermeable surface which is resistant to the material being stored. The surface must have self-contained drainage to prevent any spillage entering the storage systems or escaping off site. Impermeable surfaces must have sealed construction joints. Secondary containment (bunds) must: • be constructed to CIRIA 736 Containment systems for the prevention of pollution • have regular visual inspections – you must pump out or otherwise remove any contents under manual control after checking for contamination • be fitted with a high-level probe and an alarm • have tanker connection points within the bund or provide adequate containment for spillages or leakage • have programmed engineering inspections (extending to water testing if structural integrity is in doubt) • be emptied of rainwater regularly to maintain the containment capacity You must be able to close all connections to vessels, tanks and secondary containment using suitable valves. You must fit a valve close to the tank if you have bottom outlets and have at least 2 isolation points in case of valve failure. You must direct overflow pipes to a contained drainage system (for example the relevant secondary containment) or to another vessel where suitable control measures are in place.	holidays. A lock up procedure is in place to ensure the site remains secure at all times including a site perimeter walkaround and updates to the wider business. Signage is in place for storage areas and vessels including a description of the stored material and the maximum storage capacity. Although the new replacement RWBT will have the same storage capacity as the existing tank, there will be an additional larger Digester 5 at 3500m^3. Even with the RWBT tank being rebuilt to the same capacity with a freeboard allowance of 10% maintained at all times, there will be more than adequate storage capacity with the tank to process an additional 45,000 tonnes per annum based on a typical Hydraulic Retention Time (HRT) of 2.4 days. Each Digester will be typically fed at 30-minute intervals on a sequence via a series of pumps, each Digester having its own designated pump. Under a varied annual tonnage increase to 110,000 tonnes per year, the typical daily feed rate within Digesters will increase to a maximum of 301 tonnes per day and based on total Gas to Grid digester capacity of 8,060m^3, the HRT will be approximately 36.3 days which exceeds the minimum BAT requirement. All feedstocks will be received on site in a sealed purposed designed waste reception building served by a negative air extraction system providing a minimum of three air changes per hour. Extracted air is channelled through to a carbon filter for treatment prior to emission to air via a stack to aid dispersion. A new engineered replacement ventilation, air extraction, carbon filter and emission stack will be installed as part of the Gas to Grid upgrade. Point source extraction hoods and vents will be installed positioned above the predominant odour sources including, but not limited to, the waste reception bays and the hammermills.

	7.2 Submerged or underground tanks All below-ground tanks (including those partially and fully submerged) used for storing and treating waste must be constructed with secondary containment and an engineered leak detection system. They must be constructed in accordance with CIRIA 736 or an alternative recognised standard. All tanks must have alarms and cut-out systems or an inspection process designed to prevent and detect over topping and leakage. All storage tanks that require additional management, including agitation, active gas collection or aeration, must be contained and the air collected and appropriately abated or recovered. **7.4 Storage in containers, IBCs and drums** You must store all waste containers, for example drums and IBCs in a way that allows safe access and inspection. Where practicable, you must store containerised waste under cover. Covered areas must have good ventilation. This applies to any container held in storage, reception (pending acceptance) or quarantine. Under cover storage provides better protection for containers than open air storage and minimises production of contaminated water. Covered storage also: • lowers temperature fluctuations that can cause a pressure build-up in containers • reduces container degradation through weathering All waste containers must be fit for purpose, that is:	Liquid wastes will be accepted via tanker from within the waste reception building discharged directly to the sealed RWBT following maceration. . Digestate screening will take place in a new purpose-built sealed screening room prior to discharge to the storage tanks as PAS110 digestate. The screening building will be served by negative air extraction providing a minimum of ten air changes per hour. Extracted air will be channelled through to a new acid scrubber for treatment prior to emission to air via a stack to aid dispersion. The acid scrubber is predominantly targeted at treating ammonia, hydrogen sulphide and other VOCs as well as odour concentration. The temporary storage of feedstock within the waste reception and processing building is for a minimum period and for no longer than 48 hours to comply with ABPR obligations. In the unlikely event of significant plant or equipment malfunction preventing feedstocks from being processed on site, feedstocks would be diverted elsewhere to one of Biogen's alternative AD sites. The closest sites being Twinwoods (8 miles) and Bygrave (34 miles). This includes during essential planned maintenance including de-gritting works, CHP third party servicing and Gas to Grid export restriction for example. All waste acceptance and pre-treatment is undertaken within a purpose-built enclosed building. All uncontaminated surface water captured within the fabric of the building is kept isolated and segregated from areas used for waste storage and treatment. Segregation in the Westwood process relates to the different stages of treatment where control measures are in place to ensure partially treated material cannot come into contact with fully treated material.

	• undamaged • not corroded, if metal • have well-fitting lids • suitable for the contents • with caps, valves and bungs in place and secure • within the manufacturers' use by date, particularly for plastic containers (this does not apply to certified compostable packaging destined for treatment) You must check on a daily basis any containers (and pallets they may be stored on) for leaks and spills. Containers and pallets must be made safe where there is evidence or risk of spills. You must label all containers during storage in the way they were labelled at acceptance. You must handle and store containers so that the label is readily visible and continues to be legible. You must not use containers, tanks and vessels beyond their specified design life. You must only use them for the purpose, or substances, they were designed for. To minimise emissions and reduce spills, you must maintain the integrity of waste packaging at all times, until it enters the treatment process. You must design and operate your facility in a way that minimises waste handling. All containers must have a lid, and the lid must be closed except when the container is being sampled, loaded or unloaded.	This is controlled through engineering, including both software control and hardwired controls as part of our HAZOP process. The current three large waste reception bays will be consolidated down to two to create one large bay and one existing bay. This will ensure adequate storage capacity is available at all times. The bay rotation system helps demonstrate the 'first in, first out' principle, ensuring the oldest feedstocks are processed first where possible. It is not within Biogen's best interests to allow feedstocks to deteriorate or to accept feedstocks subject to depreciation. This is because any deterioration in the quality and digestive nutritional value of feedstocks is likely to generate low gas yields and/or produce malodours. The waste reception bays are periodically cleared of all waste which can be demonstrated by CCTV footage. Due to the continuous nature of the anaerobic digestion process, feedstocks cannot remain in the reception hall for long periods, as continuous feeding of the digesters is essential for digester health and biogas production. Consequently, uninterrupted pre-treatment of feedstocks must take place. If necessary, liquid waste is added to form the required constituency before it is discharged into the RWBT. Biogen also recirculate from the RWBT or from the Digesters to the front end to achieve the optimum viscosity or utilise harvested rainwater to offset mains water consumption. There is clear segregation between pedestrian and vehicle movement areas including feedstock acceptance. Biogen has a Delivery Offloading Procedure. Vehicles are not allowed to discharge until instructed to do so by two banksmen. All new replacement tanks will be tested including pressure testing as part of the commissioning process. This will also include an LDAR survey once connected to the gas line.

	You must inspect storage areas, containers and infrastructure on a daily basis. You must deal with any issues immediately. You must keep written records of the inspections. You must rectify and log any waste spills. You must only move wastes between different locations on site (or load for removal off site) following written procedures. You must amend your waste tracking system to record these changes where necessary. You must not carry out activities with a clear fire risk within any storage area. Examples include: • grinding • welding or brazing metal • smoking • parking normal road vehicles, except while unloading • recharging forklift truck batteries If you need to carry out maintenance which may involve for example, grinding and welding, you must first remove all flammable materials. You must then carry out a detailed risk assessment following safe systems of work or permit to work. **7.5 Transfer of waste into and from sealed tankers and containers** You must transfer the waste from or to a tanker, or to a drum or tank, in a dedicated area. You must have a documented process and make sure staff are trained on how to complete checks and transfers. Your staff must supervise tanker discharges or transfers. You should book in tankers and allow the appropriate amount of time for safe transfer.	The new maximum total Digester storage capacity will be 12,620m^3 comprised of 4,560m^3 (2 x 2280m^3 Digesters 1 & 2) to continue to serve the CHP engines and 8,060m^3 (2 x 2280m^3 Digesters 3 & 4 and 1 x 3500m^3 Digester 5) for gas generation to be exported to the national grid. The existing diesel storage tank to provide fuel to the telehandlers is compliant with C535 Above ground proprietary prefabricated oil storage tank systems. The tank is self-contained and positioned away from vehicle movements and protected by crash barriers. The tank is positioned on impermeable surfacing served by sealed drainage and within CCTV coverage. Spill kits are positioned nearby in unlikely event of any leak or spillage. All process tanks at Westwood are fitted with high level detection probes continuously monitored and connected to SCADA. In addition to this they are hard-wired to automated valves and feed pumps. Pressure transducers automatically shut down all feeding into the digesters when activated. The high-level tank detection probes are subject to monthly testing. Tanker connection points for digestate outloads are within the secondary containment area and are subject to daily inspections including a shutdown and isolation procedure at the end of each working day. All connections to vessels, tanks and secondary containment are served by suitable automated and manual valves. A new replacement condensate sump will be installed, and the existing bund sump are cast within the impermeable concrete surfacing in the bund in the unlikely event of any leaks. Both sumps are equipped with level detection and flood probes connected to SCADA for monitoring which are subject to monthly recorded testing.

	You must have a system to prevent a vehicle pulling away whilst still coupled. You must have measures for making sure couplings are correctly fitted. This will prevent couplings from loosening or becoming detached. You must make sure that transfers from tankers only take place after you have completed waste acceptance checks and then only with the approval of a responsible person. You must record: • which batch or load of material is for transfer • the receiving storage vessel • the equipment required, including spillage control and recovery equipment • any special provisions relevant to that batch or load, including minimising fugitive emissions You must have measures for preventing over filling such as a shut-off valve. You must unload tankers containing animal by-products using a sealed pipe. You must do this in a building fitted with an appropriately designed and engineered air collection and abatement system. You must carry out routine maintenance checks on pump seals and filter pots. You must have emergency containment areas for leaking vehicles to prevent pollution. You should have a lockable isolating valve fitted to the loading connection. This is kept locked during periods when the unloading points are not supervised. If you use a delivery tanker to collect and transport digestate (from AD or TAD), you must make sure there is no risk of	All waste containers, for example drums and IBCs are stored on impermeable surfacing served by sealed drainage that allows safe access and inspection to take place. All waste containers including skips are fit for purpose and are inspected as part of the daily check's procedure. Any damaged or potentially leaks skips are returned to the supplier and replaced. All non-routine works such as hot works must take place under a Permit to Work procedure. This includes evidence that inspections have been undertaken by the issuer following commencement of the works including a fire risk check throughout and following completion of works. Hot works such as welding and grinding take place outside of DSEAR zones within the designated workshop. A documented Tanker Operations Procedure is in place for all tanker movements on site. All liquid feedstock within a sealed pipeline and digestate outloads are supervised at all times. Shut off valves are installed to prevent overfilling where required. All liquid feedstock deliveries take place in the sealed waste reception building served by negative air extraction channelled through to a carbon filter for treatment. Routine maintenance checks on pumps, pump sealed and filter pots take place as recorded on a Planned Preventative Maintenance System. Lockable isolating valves are fitted to the loading connection points which are kept locked during periods when the unloading points are not supervised and are checked as part of the daily shutdown procedure. Visual inspections of all site drainage channels, gulleys and drains are incorporated into the Daily Checks Procedure. Any debris or blockages are removed and cleared by jetting if required to ensure all channels

	cross-contamination, for example delivering mixed food waste and leaving with pasteurised digestate. You must retain spillages within the contained areas and collect those promptly using pumps or absorbents. You must record any spillages. You must pump liquids and sludges instead of using open movement. **7.6 Drainage** You must inspect on a weekly basis all drainage channels, aeration channels and collection sumps to identify blockages caused by debris and condensate. You must remove debris and clean the channels and sumps to prevent odour, pest infestations and maximise drainage and air flow through aeration channels. **7.7 Tank inspection and maintenance** You must monitor substrate levels in all storage tanks, vessels and lagoons used to hold liquids, sludge's and digestate. Storage vessels used for liquids, sludges and digestate must have a freeboard as recommended by the plant manufacturer. You must equip all storage tanks with an automatic level monitoring system and an associated alarm and cut-out out system to protect against over-filling. These systems must be sufficiently robust (for example, be able to work if sludge and foam are present) and regularly maintained.	are kept clear and free flowing. Drainage channels in the waste reception building are subject to at least weekly cleaning and jetting to prevent odour and contamination. All primary storage tanks and vessels are subject to independent expert examination following a full de-grit. De-grits take place in accordance with a documented degrit schedule typically every 5 years or as required in accordance with plant operations and performance. Biogen has an established Research Team continuously monitoring digestive health and provide feedback and advice on process monitoring. Biogen has a dedicated and experienced team who are fully versed in degritting of process and storage tanks having successfully completed these nationally for several years. Removed grits are sent to an appropriate permitted facility for recovery transported by a registered wate carrier. Should any defects or remedial works be identified following an independent examination of a storage vessel, required actions are recorded on our IMS and a deadline for completion is set to carry out any necessary repairs. A further inspection is conducted following the completion of remedial works if required and a LDAR survey is carried out. All process tanks at Westwood are fitted with high level detection probes continuously monitored and connected to SCADA. In addition to this they are hard-wired to automated valves and feed pumps. Pressure transducers automatically shut down all feeding into the digesters when activated. The high-level tank detection probes are subject to monthly testing. Storage tanks are maintained with a minimum freeboard of 10%. In addition to the above, Biogen has an established Non-Destructive Testing (NDT) regime in place to measure and monitor any

	A competent person must inspect tanks, pipework and fittings, following a written programme of inspection. A competent person must also determine the scope and frequency of the examination. You must work out how often to carry out these internal examinations using a risk assessment approach. This should be based on the: • design, specified design life and intended use of tank, pipework or fittings • age, maintenance and service history • known and potential damage mechanisms and their rates of occurrence • operational and thermal stresses • influence of cyclic and pressure loadings • bio-chemical influence of the substrate stored or carried You must act on the results of all inspections and carry out any necessary repairs to make sure the tanks remain fit for service. You must keep records of the results of inspection and any repairs. You must have systems in place to make sure that loading, unloading and storage are safe, considering any associated risks. This can include: • having pipework and instrumentation diagrams • using ticketing systems • using key locked coupling systems • having colour coded points, fittings and hoses • using specific coupling or hose sizes for certain waste transfers The following must be fit for purpose and resistant to the wastes being stored and carried: • pipes • hoses • connections	deterioration in the thickness of pipework and tanks utilising an ultrasonic Thickness Testing (UTT) device. This takes place at Westwood a minimum of four times a year. Any significant deterioration in infrastructure thickness is immediately recorded and remedial actions instigated to replace and/or repair the area of concern as well as determining the root cause of the deterioration to prevent reoccurrence.

	• couplings • transfer lines You must use a suitable pipework coding system (for example RAL European standard colour coding). You must monitor the transfer of liquids and sludges between tanks and this must be linked to an alarm or cut-out system. Your staff must supervise loading and unloading activities, either directly or using CCTV. You must work out how often to carry out external inspections using non-destructive testing (NDT) methods. You must schedule removing grit and sediment from storage tanks and lagoons at appropriate intervals, determined by a written programme of inspection. Grit and sediments removed from tanks and grit traps will be a waste when discarded and therefore subject to waste regulatory control. You must not deposit them into lagoons.	
8. Waste treatment	You must not receive waste if you do not have enough capacity to store and treat it in line with your design criteria. For all stages of the process, you must manage the waste to make sure the process is stable and to minimise the risk of: • over-heating • re-heating • foaming • uncontrolled biological activity • leachate breakout Waste treatment must have a clear and defined benefit and result in a fully recovered material. You must fully understand, monitor and optimise the waste treatment process to make sure that you treat waste effectively and	SCADA (Supervisory Control & Data Acquisition) provides a continuous automated process monitoring system for tank levels, gas levels, gas pressures, tank temperatures and gas to grid upgrade plant which is remotely accessible by all relevant staff including site managers and operations managers. Any process monitoring parameters not monitored with the use of SCADA are also recorded daily on the live Plant Monitoring Spreadsheet. Digester feed flow rate (OLR) is recorded with the use of a fixed meter with a HRT of between 30 and 40 days. Digester tank levels are monitored continuously and recorded in percentage on the Plant Monitoring Spreadsheet. Digesters are equipped with high level detection probes. In addition to this they are

	efficiently. The treated output must be suitable for its intended use. You must identify risks and characterise emissions from the process and take appropriate measures to control them at source or abate them. You must have accurate and up-to-date written details of your treatment activities and process controls. The complexity of the waste you treat and the processes on site will determine the level of detail. You should include: • information about the control system philosophy and how the control system incorporates environmental monitoring information • simple process flow sheets that show the origin of emissions • process instrumentation diagrams • process flow diagrams (schematics) for waste, water and air and gas flow • descriptions of process integrated techniques and waste water or waste gas treatment at source including their performances • an equipment inventory, detailing plant type and design parameters, for example, time, temperature, pressure • details of chemical reactions and the rate of reaction and energy balance • venting and emergency relief provisions • operating and maintenance procedures You must use material flow analysis to identify potential contaminants in waste inputs, outputs and emissions; in particular where you accept packaged or bespoke waste streams. You must not proceed with the treatment if your material flow analysis indicates that losses from a process will cause:	hard-wired to automated valves and feed pumps. Pressure transducers automatically shut down feeding into the tanks when activated. This is also the case for flood probes positioned throughout the secondary containment area which shutdown all feeding when activated. High level probe tank and flood probe detection tests are conducted monthly. Samples are taken from the homogenous mix within the RWBT weekly prior to discharge to the digesters. Digester samples are taken three times a week. This includes pH and alkalinity testing. Daily feed rates are recorded into the RWBT and to the Digesters. The concentration of VFA's and ammonia within the digesters and digestate are recorded. H_2S concentrations within the biogas are tested and recorded weekly. CH_4, CO_2 and O_2 are also recorded. Ferrous dosing takes place to control H_2S concentrations, and application rates are recorded on the Plant Monitoring Spreadsheet. SCADA also records the CHP gas flow rate, the flare flow rates, the flare operating hours and the gas to grid flow rates. Gas pressures are monitored on SCADA. Pipework is fitted with pressure alarms and flow meters, and Pressure Relief Valves (PRVs) are installed to all process tanks and gas holders. All process tanks are equipped with Emergency Relief Valves (ERV) which are inspected weekly. An Environmental Accident Management Plan for Westwood addresses the environmental controls in place to minimise the risk of an incident occurring on site. It assesses the different areas of the site or activities with the potential to cause harm and the overall risk of this occurring after considering the environmental controls in place.

	• a breach of an Environmental Quality Standard or your permit • a breach of a benchmark • a significant environmental impact • an issue in using the end material beneficially You must clearly define the objectives and reaction (chemical, physical or biological) steps for each treatment process. You must define the end point to the process so that you can monitor and control the reaction. You must define the suitable inputs to the process, and the design must consider the likely variables expected within the waste stream. You must sample and analyse the waste to check that you have reached an adequate end point. You must manage the pre-treatment of waste and biological treatment activities in a way that minimises the risk of pollution from: • odour • bioaerosols • dusts • other emissions You must use plant and equipment that you can contain to minimise fugitive emissions. **8.1 Abnormal operating conditions** You must assess the likelihood of abnormal operating conditions. You must make sure you continue to comply with permit conditions by taking steps to prevent, alert and mitigate these events. Abnormal operating conditions include:	The Environmental Accident Management Plan addresses the environmental controls in place to minimise the risk of an incident occurring from the following key areas: • Spillages from vehicles/mechanical failure. • Spillage from process and storage tanks • Odour from waste acceptance – waste reception building • Plant equipment failure resulting in leaks • Release of contaminated water from sump • Flooding of site • Methane/gas release • Unauthorised entry/arson and/or vandalism causing a pollution incident • Catastrophic failure of process tanks • Explosion of gas or failure of gas storage holder during unmanned hours • Incompatible substances / Unexpected reactions • Wrong connections made in drains or other connections • Failure of Mains Service • Operator Error Following loading into the hoppers, the feedstock will continue to be passed through 1 of 2 process lines each comprised of a hammermill (de-packaging plant) and a macerator to process material down to a particle size of 12mm as a Critical Control Point (CCP) in accordance with Animal Byproducts Regulations. There will be 3 macerators in total to serve each of the process lines and the tanker point in the waste reception hall. The hammermills are subject to routine maintenance and Critical Control Point (CCP) checks take place for the macerators. Digestion is a continuous flow process whereby feedstock is delivered from the RWBT into the Digesters at regular intervals. Feeding rates into the digesters together with tank levels and temperatures will be

	• unexpected releases or loss of containment • start up • unplanned stoppages and breakdowns • shutdown **8.2 Pre-treatment** Pre-treatment may include one or more of the following: • hand-sorting • de-packaging • removing contaminants, for example using screening, separation, sifting, pressing or floatation • mixing and blending – to obtain correct carbon to nitrogen or substrate characteristic ratios • screening and thickening, for example adding polymers • using additives, for example trace elements • optimising particle size, for example using shredding or maceration You must make sure you carry out particle size reduction where required: • by the animal by-products regulations for sanitisation or pasteurisation • to optimise substrate characteristics for effective and efficient processing You must also: • apply the correct technology to pre-treat the waste to provide optimal substrate characteristics • retain the correct biological conditions to biodegrade the feedstock into an output that meets expectations and is suitable for its intended end use • comply with additional regulatory requirements, for example, animal by-products regulations	continuously monitored by SCADA and recorded daily on a Plant Monitoring Spreadsheet. All digesters are insulated with external metal cladding. The continuous nature of the AD process together with the engineering controls in place will ensure surplus tank storage and processing capacity is available at all times within the 5 Digesters to allow for an increase in feedstock acceptance. Following pasteurisation, digestate is fed through to a separator for screening to remove contaminates predominantly plastics down to <2mm particle size. After screening, Digestate is transferred to one of 3 digestate storage tanks at 9700m^3 capacity each. All pipework is enclosed to transfer the material to and from the screening process. In addition to this, there will be a standby separator in the screening room kept on site at all times in the event of malfunction or additional processing requirements. The separators will be maintained in a safe and controlled manner in accordance with the Standard Operating Procedure (SOP) SCADA (Supervisory Control & Data Acquisition) provides a continuous automated process monitoring system for tank levels, gas levels, gas pressures, tank temperatures and gas to grid upgrade plant which is remotely accessible by all relevant staff including site managers and operations managers. Any process monitoring parameters not monitored with the use of SCADA are also recorded daily on the live Plant Monitoring Spreadsheet. Daily visual inspections are completed through designated inspection ports in the digesters to check against tank level detection readings. In respect of flammability, UEL and LELs, the company has appointed specialist consultants to conduct DSEAR reviews and risk assessments, and they consider all aspects of the site's operations in

	You must carry out the pre-treatment of putrescible wastes in a suitably designed building. This must have an air ventilation and extraction system designed to make sure you comply with any associated emission limit in your permit. The ventilation and extraction system must be connected to an appropriately engineered air abatement system or gas recovery plant. Putrescible wastes include odorous wastes, ammonia-rich wastes and wastes containing animal by-products. A qualified and competent person must justify and verify the use of operating plant and equipment beyond its design life, to demonstrate there is no additional risk of failure. You must remove all non-compostable plastic and other contaminants in the feedstock or reduce them to levels that are as low as reasonably practicable. You must not rely solely on post-treatment technology to remove known contaminants. Where you use hammer mills to treat packaged waste you must take additional measures to make sure that you remove non-compostable or digestible plastics before or during the process. You must take measures to remove any remaining non-compostable or digestible contaminants from the final material. You must be able to demonstrate the removal technology is effective at removing contaminants. You must consider your pre-treatment requirements at the design stage. Pre-treatment methods must give you the flexibility you need to process the types of feedstock you plan to accept at the facility.	these reviews. Full DSEAR assessments take place under a Control of Change procedure in advance of any infrastructure changes. It is mandatory for all site staff to always wear a gas monitor. Fixed gas detection with an alert traffic light signal system is installed on the waste reception building and the separator room. In order to maintain essential nutrient balance for effective biological digestive health to achieve maximum biogas yields, a Trace Element Additive (TEA) will continue to be applied directly into the in-feed line to the RWBT on a periodic basis. The concentration and composition of TEA applied is dependent on current feedstocks and plant biology. Samples are routinely taken from the RWBT and sent for analysis by our established Research Team who determine the level of dosing required. Any additional so-called TEA 'hits' required to improve plant biology are dictated by our Research Team. To minimise the corrosive nature of H_2S throughout the anaerobic digestion process, ferrous dosing will take place directly into the RWBT. Ferrous will be securely stored in a new 30m^3 self-contained (double skinned) storage tank positioned within the secondary containment area. The daily quantities and dosing rates and associated data are recorded on a Plant Monitoring Spreadsheet. The decision to dose with ferrous is dictated by the H_2S concentration within the biogas which is tested with the use of RAE tubes and portable gas analysers at least 2 to 3 times per week. In the event of elevated gas pressures, the site has been designed and engineered that if all 3 CHP engines derated at the same time, the auxiliary gas flare would auto activate in order to burn any excess biogas prior to the Pressure Relief Valves (PRVs) releasing at 25mb. The ultimate fail-safe would be the release of the gas traps (condensate traps) at 32mb. The auxiliary gas flare would auto ignite when the capacity of the gas holder reaches a pre-set level or a pre-

	8.3 Process monitoring systems You must install and operate a manual or automatic monitoring system that supports effective operational management and minimises operational difficulties. For example by displaying (visually and audibly) early warning signals to prevent system failures. You must calibrate monitoring equipment and maintain your plant and equipment in line with manufacturers' recommendations and your maintenance and inspection programme. This includes, for example, doing daily and weekly inspection checks and holding records of completion. **8.4 Mechanical treatment** You must segregate and condition the waste inputs before biological treatment. This may include: • using shredders for opening bags • using metal separators to extract undesirable components that might obstruct later processes • using sieves or shredders to optimise particle size and segregate biodegradable fractions • using air separation to segregate high calorific materials such as textiles, plastics and paper • homogenising materials • sterilising waste in an autoclave – before mechanical treatment **8.9 AD plants treatment and process control** To reduce emissions to air and to improve the overall environmental performance, you must monitor manually or automatically to: • make sure digesters are stable • minimise operational difficulties	determined gas pressure to reduce the gas holder volume and pressure. Likewise, in the event biogas couldn't be upgraded and injected into the national grid, gas would be returned to Digesters 3, 4 and 5. Failing this, the new auxiliary flare would auto ignite when the gas holder reaches a pre-determined volume and/or gas pressure to reduce the gas holder volume. Pressure Release Valves (PRVs) will be installed on the RWBT, all 5 Digesters, both Pasteurisers, and both gas holders. All PRVs are equipped with pressure sensors connected to SCADA giving a remotely accessible audible and visual alert and feeding and mixing systems are inhibited. The Biogas Upgrade Plant (BUP) will be protected with flame arrestors and automated slam shut valves. In the event of complete loss of power to site, two backup generators will provide power to all main services known as protected supply equipment including all gas holder blowers, both auxiliary flares, SCADA, roller shutter doors and main electrical sockets. A new additional generator will be installed to serve the gas to grid infrastructure whilst the existing generator will remain for the CHP operations. Each generator will be tested monthly and subject to an annual service. Biogen has an established Leak Detection and Repair (LDAR) procedure which is subject to periodic review. The objective of the LDAR procedure is to ensure a systematic and consistent approach to the detection, monitoring and repair or replacement of leaking components and equipment across all of Biogen sites that have the potential to release fugitive emissions. The documented procedure has been produced to provide a clear and consistent approach regarding the detection, monitoring, repair and associated recording of any leaks identified. The procedure predominately covers releases of methane

	• provide sufficient early warning of system failures which may lead to containment failing and explosions To demonstrate digester stability, you must monitor and control the main waste and process parameters, including: • pH and alkalinity of the digester feed • temperature – continuously • digester operating temperature • hydraulic and organic loading rates of the digester feed • concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate • biogas quantity, composition and pressure – continuously • liquid and foam levels in the digester You must define the optimum operating temperature depending on the digester's biology and system design. You must keep the digester within the optimal operating temperatures and document this in your management system. You must maintain a stable temperature in the digester preventing overheating and cooling. You should consider insulating the digester. You must understand the process parameters and make changes in the feedstock and micro-nutrient dosing to: • maintain the digester to optimum performance • be able to demonstrate maximised efficiencies for volatile solids reduction or chemical oxygen demand (COD) reduction in the substrate	gas from the various plant operations using an infra-red gas detection camera and quantification software. Biogen has purchased a Opgal Eyecsite gas detection camera at considerable cost and members of the Biogen compliance team are trained to use the camera to assist with the Leak Detection and Repair (LDAR) programme across the business. Where a methane leak is detected, corrective actions are put in place. By having our own gas detection camera, we are in a position to not only fulfil the six monthly LDAR requirement of our permit, but to also address any potential concerns around methane slippage which can be investigated and resolved. Biogen has an appointed Technical Compliance Manager who oversees the LDAR schedule and monitoring schedule. The Opgal EyeCGas 2.0 Optical Gas Imager Camera uses a cooled (-263°C), highly sensitive MCT detector in the spectral range of 3.2 µm to 3.4µm. The combination of the sensitive, super-cooled detector and narrow spectral range means the camera is highly sensitive to detecting gas releases. The camera and associated tablet are both ATEX rated. The main benefit of modern optical infrared cameras is that a captured, real-time image in the visible and IR range can be displayed on a screen, allowing the operator to see the source of the leaks and perform quantification assessments. The Westwood AD Facility is subject to a full LDAR survey at least twice a year on an approximate six-monthly basis. Additional surveys are conducted if required following any repairs, alterations or changes to the gas system, for example, following new tank or PRV installations. The scope of the LDAR survey includes: 1. CHP engines and associated areas including gas inlet lines 2. Gas cleaning plant including CHP carbon tanks 3. Breather pipes

	You must install an alarm mechanism that is interlocked so that reactor feeding automatically stops when a gas pressure alarm condition occurs. You must use Supervisory Control and Data Acquisition Equipment (SCADA) to monitor, record and display data for continuously monitored parameters. You must carry out a daily visible inspection of your digesters using inspection ports. Feeding systems installed inside buildings must have a hazardous gas warning system. You must consider these areas as part of your HAZOP and DSEAR risk assessment. Preventing foaming and over topping tanks You must take all measures to prevent and detect foaming by: • actively managing the assessment and digester feeding rate • monitoring the digestate stability • fitting high level probes or sensors on tanks used for the treatment If you use chemical additions, you must have appropriate controls and procedures in place for chemical storage, handling and use. You must avoid decanting sacks or drums of chemicals directly into treatment tanks or vessels. You must monitor any reactions and make sure control mechanisms are in place to manage such reactions. You must equip vessels and tanks used for liquid-based waste treatment, for example anaerobic and TAD digesters, with continuous temperature and level monitoring capability.	4. All storage and process tanks 5. Pressure Release Valves (PRVs) 6. Tank inspection hatches 7. Roof covers and fixings 8. Pipe stub-ins and tank base and sides 9. Gas holders 10. Inspection covers, air inlets and membrane sniffer exits 11. All connecting gas lines including flanges, joints and knockout pots, 12. Gas blowers 13. Flare stack areas including pipes, valves, pilot lights and propane tanks 14. Compressors; and 15. Pits, sumps and wells. The existing CHP gas combustion stack is vertical and unimpeded by cowls or caps. Emissions from the CHP units are subject to annual MCerts testing by an independent specialist. The performance of each CHP is submitted to the Environment Agency as part of the annual reporting submission. Emissions stacks for releasing point source emissions from the new replacement carbon filter and acid scrubber will have an ‘effective stack height’ as predetermined by the air dispersion modelling results and following independent specialist advice. Emissions testing will continue to take place at least twice yearly in accordance with the ELVs specified in the permit and in accordance with BAT. The heat generated from the CHP engines will continue to be used back in the process to maintain the temperatures of the digesters and to heat both pasteurisers.

	You must install pressure monitoring if there is a risk of pressurisation in the vessel. You must link all monitoring to an alarm system that you can monitor remotely. The alarm system must give you an audible and remote alarm notification in the event of over or under-heating and over-filling. You must install mixing systems to all liquid-based treatment vessels, these may include one (or a combination) of the following: • mechanical stirrers using agitators • hydraulic mixing using pumps that recirculate the substrate • pneumatic mixing by recirculation (for example biogas in AD digesters) Mixing or stirring mechanisms must be appropriate for the type of vessel used and the feedstock you are processing. This is to make sure there is: • efficient mixing • uniform heat transfer • sedimentation prevention You must know the mixing efficiency and sediment loading in your vessels. Sediment must not impede mixing, which may lead to pressurisation or plant failure. You can demonstrate this by, for example: • monitoring the agitation ampage of your mixing system • using lithium tracing • heat conduction thermal imaging Tank design must: • allow for sludge draw-off, debris and grit removal • account for routine and expected pressure variations	Pipework is fitted with pressure alarms and flow meters, and Pressure Relief Valves (PRVs) are installed to all process tanks and gas holders. In the event of elevated gas pressures, the site has been designed and engineered that if all 3 CHP engines derated at the same time, the auxiliary gas flare would auto activate in order to burn any excess biogas prior to the Pressure Relief Valves (PRVs) releasing at 25mb. The ultimate fail-safe would be the release of the gas traps (condensate traps) at 32mb. The auxiliary gas flare would auto ignite when the capacity of the gas holder reaches a pre-set level or a pre-determined gas pressure to reduce the gas holder volume and pressure. The existing auxiliary gas flare is designed to have a maximum design burn flow rate of 1750m^3/hr. Likewise, in the event biogas couldn't be upgraded and injected into the national grid, gas would be returned to Digesters 3, 4 and 5. Failing this, the new auxiliary flare would auto ignite when the gas holder reaches a pre-determined volume and/or gas pressure to reduce the gas holder volume. Pressure Release Valves (PRVs) will be replaced on the RWBT, all 5 Digesters, both Pasteurisers, and both gas holders by competent persons. All PRVs are equipped with pressure sensors connected to SCADA giving a remotely accessible audible and visual alert and feeding and mixing systems are inhibited. All PRVs will be equipped with isolation valves and spool pieces to be tested in situ and subject to independent bench test certification in accordance with recognised standards such as BS EN ISO 28300:2008 or API2000. All PRVs will subject to a weekly visual inspection which includes to ensure they are seated correctly. PRVs and gas pipe work are designed to cope with the anticipated maximum gas production volumes and pressures on site. This includes under the highest gas flow rate scenario, back pressure on tanks containing biogas will be less than the maximum allowable operating pressure and more than the minimum operating vacuum. The

	You must also install pressure monitoring if there is a risk of over or under pressurisation in the vessel. **8.10 Biogas production & management** You must manage gas production volumes within the processing constraints of the facility. You must have contingency measures in place and appropriately manage any excess gas produced, including when there is limited gas to grid availability during low demand periods. You must use measures such as decreasing loading rate and diverting feedstock if gas demand is compromised. You must protect your biogas upgrading and energy recovery plant with flame arrestors and slam shut valves. You must install a permanent back-up generator to power critical plant and equipment in the event of power failure. Critical plant and equipment would include, for example: • lighting • maintain the integrity of gas storage systems • flares for preventing plant failure and to manage health and safety risks You must implement a leak detection programme that identifies and controls methane slippage from all processes and storage on site. Your procedures must make sure propane and odorants (for example mercaptans) are handled safely. Combustion units	maximum operating pressures are set at no higher than the certified leak test pressure records and pipework dimensions. Each new replacement PVRV comes with a current functional test certificate based on BS EN ISO28300 or API2000 procedures for production testing. This certificate includes details of the retained pressure at specified flow rates. This figure exceeds 75% of the set point using calibrated and independent measurement technology. Gas produced through the digestion process within Digesters 3, 4 and 5 will pass through a new gas scrubber prior to be stored in a new gas holder. The gas holder will feed the Biogas Upgrade Plant (BUP) whereby the gas will first be subject to cooling where moisture and contaminates such as ammonia (NH_3) hydrogen sulphide (H_2S) will be filtered and removed. Additional filtration will then take place through activated carbon to remove further H_2S, ammonia and Volatile Organic Compounds (VOCs). The next treatment stage is compression of the gas to the required pressure prior to entering the membrane system. The heat of drying the biogas, from the compressor, and from the cooling can be recovered. The remaining gases include methane (CH_4) and carbon dioxide (CO_2). The CO_2 can be recovered and liquified. The separated biomethane has a typical concentration of >97% biomethane. Following treatment through the BUP, biomethane is continuously analysed and propane injection takes place to increase the calorific value and an odorant added called tetrahydrothiophene (THT) (C_4H_8S). Biomethane then enters the Gas Entry Unit (GEU) whereby biomethane passes through a gas chromatography unit to test for quality (purged with nitrogen or helium) pending entry into the pipeline for export to National Grid.

	You must inspect and maintain all gas utilisation plant and equipment, as a minimum, following manufacturers' recommendations. You must record all routine and non-routine inspection and maintenance. Gas combustion stacks must be vertical and unimpeded by cowls or caps. Stacks for releasing point source emissions must have an 'effective stack height' unless otherwise stated in your permit, for example, if you operate under a standard rules permit. You must monitor emissions following the requirements in your permit. You must submit a record of each combustion unit and fuel type yearly. You must consider whether you can use the heat from processing or combustion. Combustion plant – medium combustion plant, specified generators and boilers The guidance medium combustion plant and specified generators: environmental permits has more information about complying with the medium combustion plant directive and specified generator regulations. You must comply with the emission limits in your permit, and you must use the relevant monitoring standards. **8.11 Pressure & Vacuum relief control** You must install pressure relief and vacuum relief valves (PVRVs) on all tanks where there is a risk of over or under pressurisation.	Methane compression can take place to enable methane to be compressed to less than 1% of the volume it occupies at standard atmospheric pressure. This can be achieved via a screw compressor and can be stored in hard containers at a pressure of 20-25 megapascals in cylindrical or spherical shapes. In the event gas to grid connection via transfer pipeline to the national grid is temporarily unavailable, compressed methane can be transported via road tankers to be utilised elsewhere. To minimise the corrosive nature of H_2S throughout the anaerobic digestion process, ferrous dosing will take place directly into the RWBT. Ferrous will be securely stored in a new $30m^3$ self-contained (double skinned) storage tank positioned within the secondary containment area. The daily quantities and dosing rates and associated data are recorded on a Plant Monitoring Spreadsheet. The decision to dose with ferrous is dictated by the H_2S concentration within the biogas which is tested with the use of RAE tubes and portable gas analysers at least 2 to 3 times per week. The new gas holder will be specially designed and installed to the highest specification. The site is subject to periodic DSEAR conformance assessments. DSEAR plans will be available on site and electronically, which have been revised in advance of any infrastructural changes. The continuous nature of the process together with the engineered safety controls in place ensures additional storage capacity will be available within both gas holders at all times. As above, gas from Digesters 1 and 2 serving the CHP engines will be stored in a separate gas holder to the gas produced from Digesters 3, 4 and 5 which will be stored in a larger gas holder. A larger gas holder is to be installed to provide greater storage contingency and/or gas can be returned to Digesters 3, 4 and 5 in the event gas cannot be injected to the national

	An appropriate qualified engineer must design the PVRVs and gas pipework fitted to your biogas storage vessels. You must demonstrate that PVRVs are able to and can cope with the anticipated maximum gas production volumes and pressures to operate within the design of the plant. For all tanks, pipes and vessels where PRVs are fitted the plant manufacturer must provide design pressures. You must only use PVRVs designed, tested and manufactured in line with recognised standards such as BS EN ISO 28300:2008 or API2000. You must design and monitor gas production rates and organic loading so the excess pressure in the tank does not exceed the ISO28300 or AP12000 certified leak test rate of the PVRV. Pressure relief valves and gas pipe work must be able to cope with the anticipated maximum gas production volumes and pressures. Under the highest gas flow scenario, back pressure on tanks containing biogas must be less than the maximum allowable operating pressure and more than the minimum operating vacuum. When determining pressure set points you must consider: • that maximum operating pressure must be no higher than the certified leak test pressure • the pipework dimensions You must incorporate gas production rates in the calculated maximum flow rates for the following conditions: • changes in temperature • changes in atmospheric conditions • safety requirements.	grid. The gas holders will be maintained at an optimum gas pressure at all times. Gas pressures are continuously recorded on SCADA. Both flares are designed to achieve a minimum of 1,000°C with 0.3 seconds retention time at this temperature. Both auxiliary gas flares will be used during essential plant maintenance and/or in an emergency. Flare emissions monitoring would be instigated in the event either flare has been operational for more than 10% of a year (876 hours). Record of operating hours are recorded and submitted annually to the Environment Agency.

	Valves must be set so that they do not produce fugitive emissions during normal tank pressure fluctuations. You must fit pressure sensors to your digestion tanks and gas storage vessels. You must maintain safe operating pressure by managing gas production and directing biogas to: • gas storage • treatment • utilisation plant • flare You must specify a maximum pressure for each digester above which there is no further feed to the digesters. If excess gas pressure builds up in the tanks this must trigger an alarm which immediately instigates the venting systems. You should locate pressure relief and vacuum devices independently from gas off-take lines and install stand-by valves to allow for down time during maintenance. You must inspect, maintain and calibrate PRVs regularly and after foaming or over topping events. You must inspect and protect PVRVs against environmental and climatic conditions, for example by providing frost protection and barriers to prevent damage. You must incorporate isolating valves so you can remove PVRVs from a live system for maintenance without producing large fugitive emissions or compromising site safety. You must locate isolation valves before a fully bolted spool under PVRVs so they can be removed without affecting security of the isolating valve.	

	You must record the gas pressure. Data logging on SCADA must be in place to record release events within operational pressure ranges. You must record the date, time and duration of the release. You must not make modifications to the PVRV without manufacturer's approval or you will void the ATEX classification and you will not meet DSEAR Regulations. You must record gas pressure events that are out of the expected operating range, including the date, time and duration of the pressure relief events. PRVs inspection and calibration You must correctly calculate the safety set point of PRVs. You must review these when there are changes to the operating process. You must then do any required adjustments. A competent person must correctly set and fit each PVRV. All PVRVs must be correctly maintained and inspected, following manufacturers' recommendations. You must have an agreed, written scheme of examination in place for their inspection and maintenance. You must be able to demonstrate that a qualified engineer checks PRV function, and caries out testing and maintenance. You must give your personnel safe access to all PVRV's. The PRV manufacturer must provide the certified capacity flow curve of the PRV and demonstrate that the test was completed according to BS EN ISO28300 or API2000 on approved test apparatus.	

	Each PVRV must have a current functional test certificate based on BS EN ISO28300 or API2000 procedures for production testing. This certificate will include details of the retained pressure at specified flow rates. This figure must exceed 75% of the set point using calibrated and independent measurement technology. The test certificate is valid for 3 years from the date of production or the previous test. You will need to get an earlier revalidation and certification if the following is evident or has occurred: • maintenance inspections indicate that the contamination build up is excessive • corrosion • a foaming incident • tank overfill **8.12 Biogas treatment & storage** You must prevent the emission of uncontrolled release of biogas and biomethane. You must inspect, maintain, routinely test and keep a record of all gas storage and treatment plant and equipment following the manufacturers' recommendations or your inspection regime. You must identify the intended end use of the biogas to determine the appropriate treatment method. You must consider the following factors: • dewatering • removing hydrogen sulphide which may corrode gas engines • removing oxygen and nitrogen	

	• removing ammonia • removing siloxanes, particularly from digesting sewage sludge • removing particulates • removing carbon dioxide particularly when upgrading from biogas to biomethane • adding propane to improve calorific value for biomethane gas grid injection You must assess hydrogen sulphide levels in the biogas to determine the efficiency of the removal methods applied. You should do this by monitoring gas quality before and after using gas cleaning equipment. You must continuously monitor biogas flow, quality, pressure and composition. Monitoring systems must be interlocked where possible and have remote alarm capability. You must remove water (condensate) from the biogas to protect the collection system, energy recovery plant and auxiliary flare. Condensate must be discharged into a contained drainage system or recirculated back into a digester. Condensate storage must not produce odorous emissions. You must collect biogas from all digesters and all other treatment and storage vessels where methane is actively generated. Biogas storage facilities must be gas tight, pressure-resistant, weather proof, and resistant to ultraviolet light and fluctuations in temperature.	

	You must not allow biogas and air to mix unless it is used for desulphurisation. If you use oxygen to desulphurise biogas you must automatically monitor oxygen levels. You must also use high-level alarms which are set to automatically stop adding air before the lower explosive limit is reached. If you use carbon filters, for example to clean gas before combustion, you must use procedures that minimise the risk of exothermic reactions during their maintenance, for example, by purging with nitrogen. You must contain and treat purged gases. Flares or surplus gas burners You must install or have a gas flare available for use at all times. You must not routinely use flares or vent directly to the atmosphere. You should use enclosed (ground) design flares on all new plants. They should be capable of achieving a minimum of 1,000°C with 0.3 seconds retention time at this temperature. On existing sites where shrouded or open flare are installed you must make sure that gas can effectively combust to destroy trace elements. You must make sure that the finish on the exterior of the flare is weatherproof as well as heat-resistant. The structure of the flare must be designed to withstand wind stresses.	

	You must protect ancillary items such as control and instrumentation equipment, including cabling. Providing housing makes maintenance tasks easier, but you must consider any explosion hazards. You must minimise the operation of the flare and use it only for emergencies and during maintenance to protect the integrity of the plant (for example, during start-ups or shutdowns). You must specify measures in your procedures to minimise flare use during routine maintenance. This includes, for example, to: • reduce feed rates to lower gas production • increase the safe storage of gas where capacity is available • install stand-by gas utilisation plant You must monitor and record the use of your flare. Your records must include the date, duration and number of flaring events. Your SCADA systems must be able to continuously monitor gas flow and when the flare is activated. You must be able to quantify emissions if required and identify any potential improvements that would reduce flaring events. You must routinely measure other parameters, for example: • composition of gas flow • gas temperature	

	• ratio of assistance • velocity • purge gas flow rate You must routinely measure pollutant emissions, for example: • oxides of nitrogen (NOx) • carbon monoxide (CO) • VOCs Monitoring and interlocking must be linked to your SCADA system. Flares must be automatically activated when the quantity of biogas exceeds a set maximum limit and before venting of biogas occurs. During commissioning, you should consider lean burn flares where gas quality is poor to prevent venting and pollution. Flares can cause noise. This can come from the vents, the combustion process and smoke suppressant injection. You must design new flares to minimise noise emissions. Noise avoidance can include the following measures: • reducing or attenuating the high-frequency steam jet noise by using multi-port steam injectors – designing the orifice to cope with potential coke formation is essential • installing the injectors in a way that allows the jet stream to interact and reduce the mixing noise	

	• increasing the efficiency of the suppressant with better and more responsive forms of control • restricting the steam pressure to less than 0.7MPa gauge • using a silencer around the steam injector as an acoustic shield for the injectors • using enclosed ground flares	
9. Outputs	**9.1 Record keeping for treatment for outputs and residues** You must record in the waste tracking system: • that you have treated a waste • what output materials you have produced and their weight • what the treatment residues are and their weight You must keep records of recovered and certified 'non-waste' materials leaving the site, including the: • type of material • batch number • date of export off-site • tonnage exported off-site • area dispatched to **9.4 Output from anaerobic processes – digestate** You must test your digestate to confirm that it is stable and has minimal biogas potential to prevent fugitive emissions. You must separate digestate in a way that prevents or mitigates emissions. Where digestate is from food waste, you should treat it in a building with an appropriate air ventilation and extraction system. This must direct exhaust air to an abatement system	Biogen's Integrated Management System (IMS) utilises an electronic management software system (Activ) that stores all data relating to pre-waste acceptance (as described in detail above, including but not limited to ongoing analysis results). This same management system captures any issues with loads and the action taken via the "incident log" module and all outgoing movements and residues including packaging and separator wates. In addition to the electronic IMS, our weighbridge software captures all input and outputs to the site. This is done in accordance with the Wastemetrics Work Instruction for Weighbridge Staff, which also highlights where a load can be marked as "rejected". A procedure for Contingency arrangements for equipment or system failure is in place. This provides guidance on contingency in the event of system or equipment failure through part of the AD process or an incident/accident which could affect digestate quality. PAS 110 digestate is subject is representative sampling for Residual Biogas Potential (RBP) with the use of an independent laboratory. Following pasteurisation, digestate is fed through to a separator for screening to remove contaminates predominantly plastics down to <2mm particle size. After screening, Digestate is transferred to one of 3 digestate storage tanks at 9700m^3 capacity each. All pipework is enclosed to transfer the material to and from the screening process.

	or for recovery. You must design the extraction system so that: • it provides a safe working environment • air exchanges meet the recommended ventilation standards You must separate and process digestate on an impermeable surface with a contained drainage system that meets CIRIA 736. You must have contingency measures for managing any untreated or unscreened digestate in the event of technology failure. You must consider potential hazards (for example the release of residual biogas emissions and ammonia) and manage these in line with appropriate measures.	A new purpose built fully enclosed and sealed screening room located within the secondary containment area is to be constructed which will be served by a negative air extraction system providing a minimum of 10 air changes per hour. Air from the separator building will then be extracted and channelled through to a new purpose designed acid scrubber for treatment prior to emission to air via a 4 metre stack to aid dispersion. The acid scrubber will be subject to six monthly emissions testing. The acid scrubber is predominantly designed to target and reduce ammonia, hydrogen sulphide, VOCs and other liquid soluble compounds.
10. The Control of Major Accident Hazard (COMAH) Regulations 2025	COMAH related appropriate measures for biological waste treatment. The COMAH regulations apply to establishments holding dangerous substances above certain quantities, known as thresholds. The thresholds for dangerous substances at which the COMAH regulations apply can vary. It depends on the combination of quantities of dangerous substances you store on site. Examples of dangerous substances include: • diesel and other petroleum products • LPG (liquefied petroleum gas) including propane and butane • raw and treated biogas You must work out if the COMAH regulations apply to your activities. To do this, check the Health and Safety Executive	As part of this Gas to Grid upgrade of our Westwood AD facility, the amount of biogas and propane stored on site at any one time will exceed the lower tier threshold under the Control of Major Accident Hazard (COMAH) Regulations 2015. As such, Biogen will be submitting a COMAH notification application to the HSE for determination. A Hazardous Substance Consent application has already been submitted to the Local Authority for determination.

	(HSE) guidance on the COMAH regulations. This lists all the substances covered by the regulations. Contact HSE if you need more information on the COMAH regulations.	
11. Emissions control	You must review your activities to identify opportunities to minimise and where possible contain, treat and abate emissions. All air and emissions treatment (including gas clean-up) must be engineered, commissioned and validated by a chartered engineer. Equipment must be tested, operated and maintained following manufacturers recommendations, operational requirements and design criteria. When determining the complexity of the control measure you need to apply you must consider if you need to comply with mandatory AEL. Otherwise you can follow a risk based approach and must consider the: • inventory of emissions • type or composition of emissions, for example dust, bioaerosols, odour, organic compounds or litter • source of emissions • site location and proximity to sensitive receptors • the impact on any sensitive receptors • likelihood of release, taking account of seasonal and process variations • measures you can take that will break the source pathway receptor relationship **11.1 Emissions inventory** You must identify, characterise and control all emissions from your activities that may cause pollution. This	Biogen has a documented periodic monitoring and measurement schedule for emissions to air and water in accordance with the environmental permit for the site. There will be new point source emissions to air from new abatement plant treating air from the new purpose-built screening room, as well as the installation of gas boilers with an emission stack. The existing carbon filter treating air from the waste reception building will be replaced and upgraded. Currently, the screening of digestate takes place outside with no extraction or abatement. Constructing a sealed screening room with extracted air passing through a purpose design acid scrubber for treatment will significantly reduce localised odour. The new abatement systems are designed, engineered, commissioned and validated by independent chartered engineers in accordance with BAT and appropriate measures. Biogen have utilised independent odour abatement expertise at significant cost. The new extraction and carbon filtration system treating channelled air from the waste reception building will provide a minimum of three air changes per hour and will be subject to emissions testing at least twice a year to ensure emissions are within the ELVs specified in the permit variation and compliant with BAT. Air dispersion modelling has been produced for all point source emissions to air as part of this permit variation. All abatement plant will be tested, operated and maintained in accordance with the manufacturer's recommendations, operational

	includes all emissions to air and water (including emissions to sewer) from your facility. Your emissions inventory must include information about the relevant characteristics of the emission to air and water. **11.2 Emissions monitoring & limits** We may set emission limits and monitoring requirements in your permit, based upon your emissions inventory and environmental risk assessment. We may set additional limits and monitoring requirements for certain processes, for example dust and total volatile organic compounds. Where you are required to monitor emissions to comply with the requirements of your environmental permit you must follow our monitoring guidance. For relevant emissions to water or sewer identified by the emissions inventory, you must monitor key process parameters (for example, waste water flow, pH, temperature, conductivity, or BOD) at key locations. For example, these could either be at the: • inlet or outlet (or both) of the pre treatment • inlet to the final treatment • point where the emission leaves the facility boundary **11.3 Meteorological conditions** You must monitor and record meteorological conditions or have access to meteorological data for the site location. This is so you can forecast wind speed, air temperature and wind direction. You must put weather monitoring stations at appropriate locations on your site.	requirements, Odour Abatement Maintenance Procedure and design criteria. The emissions from the carbon filter stack, and the acid scrubber outlet are subject to periodic emissions testing against specified ELV's in the permit and against BAT. This includes for NH_3, H_2S, odour concentration and an emissions removal efficiency test. Annual CHP stack emissions testing takes place in accordance with the permit. Biogen uses an MCerts accredited laboratory to do the emissions testing analysis to the required standards. In order to minimise the number of potential diffuse emissions sources, the site layout has been designed and engineered with the intention of minimising pipe run lengths (where possible). The majority of piping is above ground stainless steel with welded fittings and pipes. Minimal piping is positioned below ground. Once processed into the RWBT, the material enters a sealed system of gas tight tanks and enclosed pipework, the integrity of the pipe work and tanks on site is checked daily in accordance with the Daily Checks Procedure. There is very low potential for odour from this part of the process. In addition to this, Biogen has purchased a Opgal Eyecsite gas detection camera at considerable cost and members of the Biogen compliance team are trained to use the camera to assist with the LDAR programme across the business. Where a methane leak is detected, corrective actions will be put in place. By having our own gas detection camera, we are in a position to not only fulfil the six monthly LDAR requirement, but to also address any potential concerns around

	You should calibrate meteorological monitoring equipment every 4 months or follow manufacturers' recommendations. **11.4 Bioaerosols** You must take measures to minimise the release of bioaerosols from your process. You must document potential bioaerosol emission sources and identify measures to minimise their release. Measures include, for example: • processing waste promptly and monitoring it according to defined processing conditions If your facility is within 250 metres of a sensitive receptor, you must: • write and implement a site specific bioaerosol risk assessment • monitor bioaerosols to make sure that the control methods you have stated are effective You must implement the control measures identified in your risk assessment. You must also consider the exposure of staff and visitors and take measures to avoid or reduce prolonged exposure to bioaerosols. **11.5 Emissions of odour** You must develop and implement an odour management plan. Where you expect odour pollution at a sensitive receptor, or it has been substantiated, you must monitor: • using dynamic olfactometry following EN 13725 to determine the odour concentration • to EN 16841 1 or 2 to determine the odour exposure	methane slippage which can be investigated and resolved. Biogen has an appointed Technical Compliance Manager who oversees the LDAR schedule and monitoring schedule. A full LDAR survey is conducted every six months and includes, but not limited to, all process and storage tanks, PRVs, CHP engines, gas holders, flares, Gas to grid infrastructure and pipework. The Odour Abatement Maintenance Procedure states the parameters routinely tested in accordance with the permit requirements and BAT which include, but not limited to, flow, temperature, and pH. This will be subject to periodic VOC/GCMS analysis, however the variability in the feedstock is limited and the cost and time to sample is high, therefore this will not be done as frequently as olfactory, but instead will be done if concerns are present on abatement performance. Due to the nature of the feedstocks and the wet AD process, dust is low risk in our process. Pre-acceptance also considers dusty feedstock, if dusty feedstocks were to be accepted going forward, independent occupational and environmental dust monitoring would be commissioned as required, it is the responsibility of the Compliance Team to commission additional testing as required. All captured rainwater from within the bund is to either be pumped to an above ground Water Tank (formerly FOG tank) prior to discharge to the onsite surface water attenuation pond following testing for ammonia or put through the treatment process. Rainwater collected in the attenuation pond is not released into the drainage ditch until after inspection. The valve remains shut at all times unless opened for release after inspection and testing. The attenuation pond is checked daily for levels and signs of contamination as part of the Daily Checks' Procedure. If the level in the pond is high and therefore requires a release through to the drainage ditch (reedbed) a

	• to an alternative ISO, national or other international standards You must review your odour management plan as part of your environmental management system. It must include all of the following elements: • actions and timelines to address any issues • a procedure for doing odour monitoring • a procedure for responding to identified odour incidents, for example, complaints • an odour prevention and reduction programme designed to identify the source(s), to characterise the contributions of the sources and to implement prevention and reduction measures **11.6 Point source emissions to air** The Environment Agency views all abatement and gas clean up systems as point source channelled emissions regardless of whether they are open or have a stack. To reduce point source emissions to air (for example ammonia, dust, organic compounds and odorous compounds) from your biological treatment process, you must use one or more of the relevant abatement techniques, such as: • scrubbing (for example wet or chemical) • adsorption, for example activated carbon You must assess the fate and impact of the substances emitted to air, following the Environment Agency's air emissions risk assessment methodology. To make sure the abatement system is effective in treating odorous and other emissions you must monitor and maintain your abatement to achieve optimum conditions at all times.	visual inspection of the water must be undertaken for signs of contamination and an ammonia test. Treated rainwater may only be pumped to the attenuation pond if there are no visual signs of contamination and following an ammonia test. All bund water test results and of the attenuation pond water (including the ammonia concentration) and the volume of water discharged to the pond must be recorded on the Plant Monitoring Spreadsheet. An onsite weather monitoring station is located in a suitable position which records the localised weather conditions at the time as well providing historical monitoring data which is remotely accessible. The monitoring station is calibrated once a year under a service calibration agreement. There is currently no specific bioaerosol monitoring requirement sin the current permit for Westwood. Potential bioaerosol emission sources and the measures in place to minimise their release include: • The waste reception and processing building is served by a negative air extraction system with extracted air channelled through a carbon filtration system for treatment. • Predominant sources of odour including the reception bays and the hammermills are served by point source extraction. • Feedstock is processed promptly within 48 hours. The close sensitive receptor is approximately 500 metres from site, and the near residential receptor is approximately 600 metres from site. A site-specific Odour Management Plan (OMP) is in place as part of our IMS which is either reviewed annually, following operational changes,

	To demonstrate effective control, monitoring and assessment may include the following parameters: • gas flow or loading rate • pH • acid growth (indicated by pH) • gas temperature • pollutant removal efficiency rate • chemical injection (redox potential – applies to chemical scrubbing and bio-oxidisation systems) • spent solutions (for waste recovery or disposal) • humidity or moisture content • back-pressure • thatching and compaction of media in biofilters (thatching is forming a natural barrier to prevent the ingress of additional water to the surface layer) • channelling (preferential pathways for gas flow) and vegetation growth in biofilters • ammonia, hydrogen sulphide and odour concentrations (in both input and exhaust gas streams) • energy requirements for providing adequate and continuous airflow You must observe trends and changes over time which could indicate that additional maintenance or replacement is needed. You must have: • procedures to deal with a loss in abatement efficiency due to toxic compounds • a program of filter media replacement which is informed by performance and condition • a program to replenish chemical reagents in abatement scrubbers	after a compliant is received or as requested by the Environment Agency. The abatement plant extraction fans will be subject to a six-monthly service and repair programme conducted by site staff to ensure the fans are maintained and continue to operate effectively. Critical spares are held by the company and shared within a defined geographical area in accordance with the Contingency arrangements for equipment failure procedure. This includes, but not limited to, replacement fans and associated parts. This would enable the malfunction of critical fans including the carbon filter and acid scrubber extraction fan to be repaired without incurring unreasonable delays. The abatement systems are maintained in accordance with the requirements of the permit, the Odour Management Plan (OMP) and the manufacturers recommendations. This includes, but not limited to, media replacements (as required). Six monthly emissions testing together with the process monitoring requirements including, but not limited to, weekly RAE tube testing for ammonia and hydrogen sulphide in place ensures any deterioration in the systems performance is detected and addressed in a timely manner. If the performance of the carbon filter deteriorates, a full assessment of the filter including the media would take place to look for evidence of deterioration saturation or any changes in the media's composition and structure and the need to replace or replenish the media accordingly. Likewise, the pH of the diluted acid scrubber solution will be continuously monitored and replenished as required. Emissions from the current carbon filter are subject to periodic testing against specified ELV's in the permit and in accordance with BAT. This includes for NH_3, H_2S, odour concentration and an emissions removal efficiency test. The Odour Abatement Maintenance Procedure specifies the parameters routinely tested.

	• procedures for commissioning new filter media or abatement At least once a year, you must carry out an efficiency assessment of your abatement system. **Pre-treatment abatement scrubbers** You must select the most appropriate aqueous absorbing solutions for treating pollutants in the waste gas stream. Where you have identified a mix of pollutants you may require a multi-stage process. Flow rates must allow for sufficient gas residence time and minimise carry-over of scrubbing solution into the waste gas stream. You must monitor your abatement scrubber for the following: • gas temperature and flow rate, inlet and outlet • moisture content or humidity • back-pressure, for packing scrubbers • pH of scrubber solution • chemical injection rate (redox potential) You must continuously monitor the scrubber solution for: • flow rate • pressure • temperature • pH You should periodically measure the inlet and outlet of the scrubber for: • ammonia • hydrogen sulphide • odour.	All existing and new point source emission stacks will be at the required minimum height in accordance with the air dispersion modelling to ensure the treated emissions disperse well. The modelling demonstrates that treated emissions do not impact on sensitive receptors. The acid scrubber treating extracted air from the screening room will be approximately 4 metres in height and the gas boilers will have an emission stack height of approximately 8 metres. Suitable sampling and monitoring points will be installed for all point source emissions to enable representative samples to be obtained with means of safe access. Monitoring of emissions will be in accordance with Environment Agency guidance on monitoring stack emissions. Emissions testing will take place at least twice per year against the ELVs specified in the permit variation and in accordance with BAT-AELs. BAT 34 stipulates that either BAT-AEL for NH_3 or the BAT-AEL for the odour concentration applies. Likewise, BAT 8 stipulates that the monitoring of NH_3 and H_2S can be used as an alternative to the monitoring of the odour concentration or vice versa. Biogen uses an appointed MCerts accredited laboratory for testing. A schedule to allow for 6-monthly testing is in place with an MCerts accredited laboratory for Biogen's national network of AD plants. All feedstocks will continue to be delivered to site in sealed or enclosed vehicles designed to transport food waste. All feedstocks will be deposited inside sealed waste reception building served by negative air extraction providing a minimum of three air changes per hour with air channelled through to a carbon filter for treatment. Once processed into the RWBT, the material enters a sealed system of gas tight tanks and enclosed pipework, the integrity of the pipework

	Activated carbon You must monitor your activated carbon filter for the following parameters: • inlet and outlet gas temperature and flow rate by continuous monitoring • inlet moisture content or humidity • back-pressure • carbon bed temperature • ammonia • hydrogen sulphide • odour You must make sure you either replace or regenerate the carbon before saturation. You must make sure the concentrations of volatile organic compounds within the gas stream are below their lower explosive limit. You must make sure you follow the manufacturers' recommended maximum operating temperature. You must minimise particulates in the waste gases before they reach the carbon filter. You must not allow exothermic reactions when maintaining activated carbon filters. You must store activated carbon safely to prevent spontaneous combustion. You must store it following supplier or manufacturers' recommendations. **Stacks and vents**	and tanks on site is checked daily in accordance with the Daily Checks Procedure. The final stage of screening digestate will take place within a new purpose designed sealed screening room served by negative air extraction providing a minimum of 10 air changes per hour channelled through to an acid scrubber for treatment. New PRVs will be installed on all new tanks as part of this permit variation and Gas to Grid upgrade. This will include the RWBT, Digesters 1-5 and both pasteurisers. All PRVs will be designed and installed in accordance with the appropriate measures guidance and will include isolation valves and spool pieces for testing in situ. All PRVs will be subject to independent bench test certification. A documented General Maintenance Procedure ensures that work is undertaken on site in a manner that does not compromise safety and adversely impact colleagues, and other persons. Potentially leaking equipment on site may include for example the separator and macerators. Documented maintenance procedures are in place for key plant and equipment including, but not limited to: • Pump operations and maintenance procedures • Separator operation procedure; and • Macerator maintenance procedure. All critical control and processing equipment is subject to a routine inspection and maintenance programme. This includes daily checks for the depackaging plant and mobile plant for example. Site management maintain a Plant Equipment and Maintenance Checks Record to ensure all critical plant and equipment is maintained in accordance with the manufacturer's recommendations. This includes

	Stack or stack and vents must release at an appropriate height, temperature and velocity to make sure the emissions disperse well. You must use dispersion modelling to demonstrate the emissions do not impact on sensitive receptors. You must install a suitable monitoring point on stacks and vents with appropriate safe access. You must monitor emissions following the Environment Agency guidance on monitoring stack emissions. **Emission limits** The Environment Agency will set release limits in your permit considering: • your emissions inventory • the associated emission limits (AELs) set out in the Waste Treatment and Storage BAT Conclusions Unless there is a site-specific reason not to, we set emission limits in the permit at the upper limit of the BAT AEL range. Emission limit values may need to be stricter depending on: • the location of sensitive receptors (such as residential properties) • the stated design of the abatement plant For abatement plant designed to reduce odour emissions, BAT Conclusion 34 gives an option on AELs which the Environment Agency sets as an emission limit. We will usually set a limit for odour where the plant is designed for that purpose. But we may also set limits for ammonia if: • the location means there is a need to • the plant is designed to also reduce ammonia	minimising noise. The replacement of machinery and equipment with low noise substitutes will take precedence. Biogen has documented Contingency Arrangements for Equipment or System Failure to provide guidance on contingency measures in the event of system or equipment failure. Biogen utilises an electronic Planned Preventative Maintenance System for all plant and equipment. Should the seal and integrity of the building ever be questioned, a physical or virtual smoke test would take place to demonstrate the integrity of the building and the minimum number of required air changes. Housekeeping operations form part of the Daily Checks Procedure and are essential to maintain a safe and clean working environment. Effective documented housekeeping also helps to minimise odour and pests. Jet washers used on site currently rely on mains water supply. Jet washing is an essential part of maintaining good housekeeping and for ABP compliance. Biogen has an established Leak Detection and Repair (LDAR) procedure which is subject to periodic review. The objective of the LDAR procedure is to ensure a systematic and consistent approach to the detection, monitoring and repair or replacement of leaking components and equipment across all of Biogen sites that have the potential to release fugitive emissions. The documented procedure has been produced to provide a clear and consistent approach regarding the detection, monitoring, repair and associated recording of any leaks identified. The procedure predominately covers releases of methane gas from the various plant

	All abatement plants should be designed to reduce odours and, where required, ammonia. For new abatement plant, the limits are set based on plant design or the BAT AEL, whichever is less. Multiple emission limits may be required: • to maintain the effectiveness of abatement plant as designed • if the waste gas inventory or predicted inventory identifies odour and ammonia as relevant • to protect people and the environment When we set limits for both ammonia and odour, you should monitor these emissions periodically. This is to demonstrate that the abatement plant keeps performing as designed through its: • operation • maintenance For existing biowaste sites, we will regulate based on the operator's odour management plan (OMP). Operators should demonstrate the existing abatement plant is effective and does not present a risk of odour pollution. The OMP should set out: • a schedule for periodic monitoring of odour from the abatement plant to demonstrate it is operated and maintained as designed • the actions needed if performance of that plant drops **11.8 Fugitive (diffuse) emissions to air** You must use appropriate measures to prevent emissions of odour, ammonia, dust, bioaerosols and particulates, mud and litter. You must design, operate and maintain plant in a way that prevents or minimises fugitive emissions to air.	operations using an infra-red gas detection camera and quantification software. Biogen has purchased a Opgal Eyecsite gas detection camera at considerable cost and members of the Biogen compliance team are trained to use the camera to assist with the Leak Detection and Repair (LDAR) programme across the business. Where a methane leak is detected, corrective actions are put in place. By having our own gas detection camera, we are in a position to not only fulfil the six monthly LDAR requirement of our permit, but to also address any potential concerns around methane slippage which can be investigated and resolved. Biogen has an appointed Technical Compliance Manager who oversees the LDAR schedule and monitoring schedule. The Opgal EyeCGas 2.0 Optical Gas Imager Camera uses a cooled (-263°C), highly sensitive MCT detector in the spectral range of 3.2 µm to 3.4µm. The combination of the sensitive, super cooled detector and narrow spectral range means the camera is highly sensitive to detecting gas releases. The camera and associated tablet are both ATEX rated. The main benefit of modern optical infrared cameras is that a captured, real-time image in the visible and IR range can be displayed on a screen, allowing the operator to see the source of the leaks and perform quantification assessments. The Westwood AD Facility is subject to a full LDAR survey at least twice a year on an approximate six-monthly basis. Additional surveys are conducted if required following any repairs, alterations or changes to the gas system, for example, following new tank or PRV installations. The scope of the LDAR survey will include: • CHP engines and associated areas including gas inlet lines • Gas cleaning plant including CHP carbon tanks • Breather pipes Hoddesdon IC3 submission Assessment of Methane Slip • All storage and process tanks

	This also applies to associated equipment such as: • screeners • shredders • conveyors • skips or containers • building fabric, including doors and windows • pipework and ducting You must use high integrity components, for example seals or gaskets or leak test certificated PVRVs. You must have a programme of work that covers the maintenance of all plant and equipment. This must also include protective equipment such as curtains and fast action doors used to prevent and contain fugitive releases. You must identify the frequency of maintenance in your management system. As a minimum you must follow manufacturers' recommendations. To identify and manage wastes that could cause, or are causing fugitive emissions to air, you must do: • pre-acceptance checks • waste acceptance checks • site inspections When you identify any such wastes you must: • take appropriate risk-assessed measures to prevent and control emissions • prioritise their treatment or transfer Where necessary you must use a combination of one or more of the following measures: • cover any conveyers, hoppers, container that are outside	• Pressure Release Valves (PRVs) • Tank inspection hatches • Roof covers and fixings • Pipe stub-ins and tank base and sides • Gas holders • Inspection covers, air inlets and membrane sniffer exits • All connecting gas lines including flanges, joints and knockout pots, • Gas blowers • Flare stack areas including pipes, valves, pilot lights and propane tanks • Compressors; and • Pits, sumps and wells. Biogen operates all their AD plants including Westwoods in accordance with a documented Pest Control Procedure. This procedure documents the pest control programme in place to ensure compliance with the Animal By Product Regulations and to prevent ingress by birds, insects or vermin. Biogen have contracted Pest Control specialists to supply and install deterrents. The Pest Control specialists are members of the British Pest Control Association (BPCA) and highly trained to provide a comprehensive pest control programme. Bait boxes have been installed externally around the reception building and tanks, and internally within the reception building. Fly killer units have been installed in the reception hall and at strategic locations throughout the offices. Plans of the deterrents installed at each plant can be found in the 'Service Report Book' stored on-site. The contracted pest control specialist visits the site at least 8 times per year (approximately every 6 - 8 weeks) to routinely inspect the current deterrents and report on activity.

	• store and handle the waste within a suitably enclosed area (for example bays), a building or enclosed building • keep doors closed except when access is needed • use an appropriate abated air circulation or extraction system to keep enclosed buildings and equipment under adequate negative pressure, locating air extraction points close to potential emission sources • use fast-acting or 'airlock' doors that default to closed • use suitable covers (these can include textile sheeting, synthetic membranes and organic materials such as straw and woodchip) – the choice of cover depends on the risk to receptors You should install localised containment, for example air extraction over a waste shredder, to minimise and treat air. You should install ventilation to BS EN 13779:2007 or follow the HSE Exhaust Ventilation Guide. You must use suitably qualified engineers to design and install systems and make sure relevant standards are applied. The HSE provides guidance on selecting, using and maintaining local exhaust ventilation (LEV) correctly. You must review the integrity and containment effectiveness of any building, covers and contained air systems during commissioning. You must then do this periodically following manufacturers guidelines, or at least every 2 years. You must carry out assessments to recognised standards, for example BS EN ISO 9972:2015. You can use a smoke test to identify emission leaks from buildings. This may show where you need to make improvements before you carry out a more thorough survey.	A Service Report is completed and issued to the Site Manager with details of the findings of the inspection. Service reports will also detail any re-baiting which has been necessary and the preparations used within the bait. In addition to routine inspections undertaken by the contractor, the Site Manager must inspect the site daily for vermin, insect or bird activity as part of the site-specific Daily Check Procedure. Any identified activity must be noted down on the daily checks sheet and remedial action must be taken. In the event of vermin or insect activity being detected on site the Site Manager will contact the contracted pest control specialist and discuss their findings. The pest control specialist will advise the Site Manager on the most appropriate remedial action. If necessary, a site visit should be organised to introduce further deterrents on site. This site visit must be detailed on a Service Report and filed in the 'Service Report Book' with the routine inspection reports. All waste delivered to site is visually inspected by a trained Site Operative as it is discharged in the reception hall. In the event that there was evidence of birds, vermin or insects within the waste the Commercial Team must be informed immediately. The Commercial Team will contact the customer concerned and inform them of the pest problems experienced on site. The customer will be informed that if the pest control problems are not resolved Biogen may be unable to continue to process their waste. The Westwood site is located in a rural setting. The nearest residential receptor is located approximately 600 metres from the site boundary. All processing equipment is located within a sealed building with the shutter doors remaining closed when not in use. The site is also

	You must replace or repair damaged building, containers covers as soon as possible. You must stop using any vessel or tanks immediately if their integrity is compromised. You must regularly inspect and clean all waste storage and treatment areas and equipment, including conveyor belts. You must identify the frequency of inspection and cleaning in your management system. You must take measures to prevent plant and equipment, conveyors and pipes corroding. This includes using appropriate construction materials, corrosion inhibitors and regularly inspecting and maintaining plant. **11.9 Leak Detection & Repair (LDAR)** You must implement a leak detection and repair (LDAR) plan. It must link to your regular monitoring, maintenance and Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) plan. You must use it to quickly identify and carry out repairs, or to replace plant and equipment. The LDAR plan must include: • a map of the site and an inventory that identifies locations (point and area sources) for potential emissions • a method for locating unknown emission sources • estimates of the type and volume of release from each leak location • prioritised locations (from highest risk to lowest risk) based on the potential quantity of release, its environmental impact, and DSEAR	surrounded by an established vegetated clay lined earth embankment to minimise any visual impact which will also have noise attenuation properties. All front-end processing equipment and machinery is subject to ongoing documented maintenance to ensure it is operating effectively including with as low as possible noise generation. All critical control and processing equipment is subject to a routine inspection and maintenance programme. This includes daily checks for the depackaging plant and mobile plant for example. Site management maintain a Plant Equipment and Maintenance Checks Record to ensure all critical plant and equipment is maintained in accordance with the manufacturer's recommendations. This includes minimising noise. The replacement of machinery and equipment with low noise substitutes will take precedence. Biogen has documented Contingency Arrangements for Equipment or System Failure to provide guidance on contingency measures in the event of system or equipment failure. This would include any plant or equipment malfunction which could generate excessive noise or vibration. Where necessary, all motors, pumps and compressors are acoustically enclosed to reduce noise. The reception hall and process building is constructed from a concrete lower base and upper metal cladding frame. This provides effective noise abatement together with plant and equipment maintained to a high standard and the site being located approximately 600 metres from the nearest residential receptor, means the likelihood of noise disturbance being substantiated off site is negligible. Therefore, additional sound proofing of the building isn't necessary at this time.

	• your monitoring methods and frequency to quantify significant emissions • mitigation measures You must consider all potential sources of leakage within your LDAR plan, for example: • double membrane roofs (air blower vent) • roof and cover fixings • pressure relief valves and vents • feeding and digestate separation units • gas pipes • conveyors and presses • compressor • combined heat and power plant (methane slippage) • gas upgrading plant • grid injection • reception storage • digestate storage • pits and sumps, for example condensate pits • building containment You must identify and reduce emissions of volatile organic compounds and other substances to air. Methods for identifying leaks include: • sniffing using organic compound analysers and bag sampling, carried out to the requirements of EN15446 standards and the US Environmental Protection Agency (EPA) Protocol for Equipment Leak Emission Estimates referenced within this international standard • optical gas imaging (OGI) using hand-held cameras to enable visualisation of gas leaks Methods for quantifying emissions include:	Captured rainwater within the bund is to be stored in an above ground Water Tank (formerly FOG tank) contained within the bunded area and will either put back through the process or subject to treatment to reduce ammonia through aeration and with the addition of zeolite (if required) prior to being discharged to the onsite surface water attenuation pond. Any rainwater to be released into the pond, is subject to visual assessment and ammonia testing by the site manager / duty manager. Rainwater collected in the attenuation pond is not released into the adjacent drainage ditch (soakaway) until after an inspection. The penstock valve remains shut at all times unless opened for release following further inspection and testing. The surface water attenuation pond level is checked including for evidence of contamination as part of the daily checks' procedure. If the level in the pond is high and therefore requires a release through the drainage ditch system a visual inspection of the water must be undertaken for signs of contamination and an ammonia testing kit must be used for testing. The attenuation pond is also equipped with an aerator to improve water quality and prevent stagnation. All testing of the pond water (including the ammonia level) and releases from the pond into the drainage ditch system must be recorded on a Plant Monitoring Spreadsheet. The volume of rainwater collected within the bunded area and put into the treatment process is recorded daily on the Plant Monitoring Spreadsheet together with mains potable use. Internal water distribution rates are also recorded on the Plant Monitoring Spreadsheet.

	• solar occultation flux (SOF) • differential absorption light detection and ranging (DIAL) EN 17628 provides guidance on using multiple monitoring techniques for LDAR programmes. Details of the site where the LDAR survey was carried out, conditions at the time of the survey, and measurement objectives, including: • site name • operator name • permit number • site processes (under normal operating conditions) • date of the survey • site operation on the date of the survey (for example, operating at full capacity or reduced load due to X and Y) • weather conditions (including temperature, wind speed and wind direction) • measurement objectives (for example, targeted processes, site areas) Details of the detection equipment used for the survey, including: • make, model and serial number of the detection equipment used for the survey • methane detection limit of the detection equipment (for example, ≤60g/hr (OGI cameras), <10ppm (sniffer devices)) • if an OGI camera is used, the spectral range of the camera (µm) • certification or verification status of the OGI camera (for example, to US EPA OOOOa specifications) • calibration certificates for the equipment (if applicable)	Condensate traps are used to collect condensate from the gas line outlets. The condensate sump water is returned back into the process for treatment. All condensate is managed in accordance with the Condensate Management Procedure. The waste reception and processing building is entirely sealed and undercover. All drainage including runoff is contained within the building's sealed drainage system with the drainage gradient engineered to flow to gully drains connected to the below ground pit. The reception hall floor is designed to drain away from the entrance doors. Clean surface water from roofs, or from areas of the site that are not being used in connection with waste management activities can be discharged directly to the attenuation pond and/or to groundwater by seepage through the soil via soakaways. An Environmental Accident Management Plan addresses the environmental controls in place to minimise the risk of an incident occurring from the following key areas: • Spillages from vehicles/mechanical failure. • Spillage from process and storage tanks • Odour from waste acceptance – waste reception building • Plant equipment failure resulting in leaks • Release of contaminated water from sump • Flooding of site • Methane/gas release • Unauthorised entry/arson and/or vandalism causing a pollution incident • Catastrophic failure of process tanks • Explosion of gas or failure of gas storage holder during unmanned hours

	Details of the survey carried out, including: • areas of the site that were surveyed • areas of the site that were not surveyed – including a reason why those areas were not surveyed • leak definition used for the survey (for example, 500ppm, or detectable by the specified OGI camera at Xm) • distance from which components were surveyed • duration of measurements, at individual components and specified site areas Details of result monitoring, including: • list of leaks identified during the survey • annotated plan of site (or piping and instrumentation diagram) showing the precise locations of the identified leaks • time when each leak was identified • a description of each leaking component identified (for example, valve, flange and so on) – include the component reference number where available • a photograph of the leaking component showing the leak location • severity of the leak – the measured methane concentration or leak rate, or the risk posed due to the component type and location (or both) • emission estimate in kg/h for each component surveyed • total site emission rate in kg/h, including uncertainty • any non-conformities against the quality assurance or quality control procedures The repair schedule must include a proposed timescale for repairing the identified leaks, with justification (based on the severity of the leak or potential risk).	• Incompatible substances / Unexpected reactions • Wrong connections made in drains or other connections • Failure of Mains Service • Operator Error All staff attend a mandatory Emergency Preparedness and Response training every two years. Emergency spill kits are on site stored in appropriate locations and clearly labelled. These contain mats and booms as well as chemical absorbent. A detailed site drainage plan is available both electronically and on the site noticeboard. The Daily Checks Procedure ensures all drains, impermeable surfacing and containment are visually inspected and recorded. Any repairs or actions required are recorded and remediated accordingly.

	You must produce the LDAR plan using the techniques included in the following standards: • BS EN 15446:2008, Fugitive and diffuse emissions of common concern to industry sectors – Measurement of fugitive emission of vapours generating from equipment and piping leaks • BS EN 17628:2022, Fugitive and diffuse emissions of common concern to industry sectors – Standard method to determine diffuse emissions of volatile organic compounds into the atmosphere. • BS ISO 15259:2023, Air Quality – Measurement of stationary source emissions – Requirements for measurement sections and sites and for the measurement objective, plan and report. **11.10 Pests** You must manage waste in a way that prevents pests and vermin. You must make your pest and vermin management plan part of your environmental management system and it must include procedures for: • inspecting for pests and vermin and for controlling them • rejecting loads of infested waste • treating pest and vermin infestations promptly • storing, handling and using approved pest and vermin control products **Fly prevention and management** Making sure you implement fully all appropriate measures will proactively decrease the incident of flies on site.	

	You must have a process to count and record the number of flies on site. You must have a process to investigate and resolve fly infestation. You must reject maggot and fly infested waste. You must make sure you have effective cleaning and housekeeping. You must use fly treatment equipment and chemicals where approved and appropriate. The HSE require that anyone using pesticides professionally should have received adequate instruction, training, and guidance in their correct use. Under the COSHH Regulations (2002) you must document all activities involving pesticides (for example, storage, use and disposal). You must keep these records for a period of at least 3 years. You must use all knockdown sprays, pesticides and larvicides according to the manufacturer's instructions and licence. You may be required to submit a pest management plan for approval by the Environment Agency. **11.1 Emission of noise & vibration** You should locate potential sources of noise (including building exits and entrances) away from sensitive receptors and boundaries. You must locate buildings, walls, and embankments so they act as noise screens.	

	You must use measures to control noise, including: • maintaining plant or equipment parts which may become more noisy as they wear out (for example, bearings, air handling plant, the building fabric, and specific noise attenuation kit associated with plant or machinery) • closing doors and windows to prevent noise breakthrough • avoiding noisy activities at night or early in the morning • minimising drop heights and the movement of waste and containers • using white noise reversing alarms and enforcing the on site speed limit • using low noise rated equipment (for example, drive motors, fans, compressors, pumps) • adequately training and supervising staff • providing additional noise and vibration control equipment for specific noise sources (for example, noise reducers or attenuators, insulation or sound proof enclosures) You should have a noise and vibration management plan. This must be part of the environmental management system and must include: • actions and timelines to address any issues • a procedure for doing noise and vibration monitoring • a procedure for responding to identified noise and vibration events, for example, complaints For noise, a noise impact assessment using the BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' methodology must inform your plan.	

	For vibration, a vibration impact assessment using the BS 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting' methodology must inform your plan. **11.12 Point source emissions to land and water** You must reduce emissions to water (direct or indirect) using an appropriate combination of techniques. You must assess the fate and impact of the substances emitted to water following the Environment Agency's risk assessment guidance. Discharges to water must comply with the conditions of an environmental permit or trade effluent consent. Relevant sources of wastewater include: • process water • condensate collected from a treatment process • waste compactor run-off • vehicle washing • vehicle oil and fuel leaks • washing containers, tanks and vessels • spills and leaks in waste storage areas • loading and unloading areas If you need to treat wastewater before discharge or disposal. You must direct wash waters from cleaning vessels to foul sewer or a contained drainage system for offsite disposal or re-circulation. You may need to pre-treat the wash waters to meet any limits on the effluent discharge consent. The degree of recirculation will be limited by the water balance of your plant, the content	

	of impurities, or characteristics of the water streams, for example nutrients. Discharges to surface water or storm drains (except for clean, uncontaminated rainwater) are not permitted. You should use all of the following techniques: • segregate leachate seeping from compost piles and windrows from surface water • re-circulate process water streams – for example, from de-watering liquid digestate, or by using water streams like surface water run-off as much as possible • optimise the waste's moisture to minimise generating leachate **11.13 Fugitive emissions to land & water** You must have the following measures in place in operational areas: • an impermeable surface • spill containment kerbs • sealed construction joints • connection to a contained drainage system You must collect and treat separately each water stream generated at the facility, for example, surface run off water or process water. Base how you separate it on the pollutant content and the treatment needed. You must make sure that you segregate uncontaminated water streams from those that need treatment. You must use suitable drainage infrastructure to collect surface drainage from areas of the facility where you store, handle and treat waste. You must also collect wash waters and any spillages. Depending on the pollutant content, you	

	must either recirculate what you have collected or send it for further treatment. You must design the container wash to collect and contain all wash waters, including any spray. You must use trained staff to operate the container wash and you must inspect and maintain it regularly. You must have measures to prevent pollution from the on-site storage, handling and use of oil and fuel. You must produce and implement a spillage response plan and train staff to follow it and test it. You must have procedures and associated training in place to make sure that you deal with spillages immediately. You must locate spill kits close to areas where spillages could occur and make sure relevant staff know how to use them. You must replenish the kits after use. You must stop spillages from entering drains, channels, gullies, watercourses and unmade ground. You must have the following available, to use when needed: • proprietary sorbent materials • sand • booms or drain mats (or both) You must make sure your spillage response plan includes information about how to recover, handle and correctly dispose of all waste produced from a spillage. For subsurface structures, you must: • establish and record the routes of all site drains and subsurface pipework • identify all sub surface sumps and storage vessels	

	• engineer systems to minimise leaks from pipes and make sure you can detect them quickly if they do occur, particularly for hazardous substances • provide secondary containment and leakage detection for sub surface pipework, sumps and storage vessels • establish an inspection and maintenance programme for all subsurface structures, for example, pressure tests, leak tests, material thickness checks or CCTV You must design appropriate surfaces and containment or drainage facilities for all operational areas, taking into account: • collection capacities • surface thicknesses • strength and reinforcement • falls (of the land) • materials of construction • permeability • resistance to chemical attack • inspection and maintenance procedures • available relevant standards of construction You must have a documented inspection and maintenance programme to review the integrity of impermeable surfaces and water containment facilities. This must consider the plant and equipment manufacturers' recommended maintenance practices.	
12. Process Efficiency	You must monitor and review how much: • water, energy and raw materials you use each year • residue and wastewater you generate each year Residues include the waste and digestate produced.	Biogen are committed to energy efficiency as demonstrated in the company's environmental policy. This includes conducting periodic energy efficiency assessments across the business and are continuously looking at means of reducing energy consumption. This is

	12.1 Energy efficiency You must create and implement an energy efficiency plan at your facility in accordance with BAT reference document BAT 23. You must regularly review and update your energy efficiency plan as part of your facility's management system. You must have operating, maintenance and housekeeping measures in place to make sure you use energy efficiently. You must have basic, low-cost physical techniques in place to avoid gross energy inefficiencies. You must regularly review and update your energy balance record as part of your facility's management system, alongside the energy efficiency plan. **12.2 Raw materials** You must keep a list of the raw materials you use at your facility and their properties. This includes materials and other substances that could have an environmental impact. You must check if you can use raw materials new to the market that have less environmental impact. This must include, where possible, substituting raw materials with waste. You must justify why you continue to use any substance which has a beneficial alternative. You must have quality assurance procedures in place to control the content of raw materials.	predominantly aimed at increasing generation, reducing our environmental footprint and eliminating unnecessary costs. Biogen have an environmental policy which includes conducting periodic energy, water and raw material efficiency assessments and are continuously looking at means of reducing energy, water and raw material consumption. Biogen's Environmental Policy includes an objective to continually review operational practices and technologies employed. Biogen are registered members of the Renewable Energy Association (REA). Biogen are consulted and asked to represent industry in forums and in sector meetings. Again, with this membership we are party to conferences, webinars, forums, etc, where technology providers exhibit with emerging technologies and alternatives. A Plant Monitoring Spreadsheet is used to record daily electricity export and import (kWh) readings, the amount of electricity consumed by the facility and the volume of gas injected to the grid. Also recorded on SCADA includes the CHP generation meter, parasitic meter (CHP electricity consumption), CHP operating (run) hours, SCADA generation and biomethane generation meter. Payments under the Renewable Heat Index (RHI) enables Biogen to receive payment for utilising their own generated heat to heat their premises. RHI meters are recorded daily on the Plant Monitoring Spreadsheet. Recorded RHI meters include for the digesters, pasteurisers, CHP's, and for Building Services. Approximately 33% of the heat generated by the CHP engines is reused back in the process to maintain the temperatures of the relevant Digesters and the pasteurisation vessels. Surplus heat from the Pasteurisers is also used to heat the digesters.

	12.3 Water use Whilst this is an IED requirement for installation operations, all operations should consider using potable and clean water efficiently and reducing its use. You must take measures to make sure you optimise water use to: • reduce the volume of waste water generated • prevent or, where that is not practicable, reduce emissions to soil and water You must carry out a review of water use (water efficiency audit) at least every 4 years. You must also: • produce flow diagrams and water mass balances for your activities • establish water efficiency objectives and identify constraints on reducing water use beyond a certain level (usually this will be site specific) • have a time-tabled improvement plan for implementing additional water reduction measures To reduce emissions to water, you must apply these general principles in sequence: • use water efficient techniques at source where possible • reuse water within the process, by treating it first if necessary – or if not practicable, use it in another part of the process or facility that has a lower water quality requirement • if you cannot use uncontaminated roof and surface water in the process, you must keep it separate from other discharge streams – at least until after you have	Mains water is used for hot washing to wash the plastic waste and rotor inside the mill. The volumes of water returned and recirculated back into the system are recorded on the Plant Monitoring Spreadsheet. Biogen are committed to reducing waste packaging and to reuse packaging where possible as demonstrated in the company's environmental policy. This includes conducting periodic raw material and waste efficiency assessments across the business and are continuously looking at means of reducing waste including packaging. This is predominantly aimed at reducing our environmental footprint and eliminating unnecessary costs. An inventory of raw materials used on site is kept and their properties. This includes materials and other substances such as ferrous and fuel for example that could have an environmental impact. Potential substitutes for raw materials new to the market are constantly being sought. This includes for example alternatives to ferrous chloride to other forms of ferrous in a solid form rather than liquid. Full MSDS sheets are available and COSSH risk assessments. All captured rainwater from within the bund is to either be pumped to an above ground Water Tank (formerly FOG tank) for treatment prior to discharge to the onsite surface water attenuation pond following testing or put through the treatment process. This would offset mains water consumption. Total water to returned to process is recorded daily on the Plant Monitoring Spreadsheet. A review of water efficiency, energy consumption and raw material use is carried out at least every 4 years.

	treated the contaminated streams in an effluent treatment system and have carried out final monitoring You should establish the water quality requirements for each activity and identify whether you can substitute water from recycled sources and where you can, include it in your improvement plan. Where there is scope for reuse (possibly after some form of treatment) you must keep less contaminated water streams, such as cooling waters, separate from more contaminated streams. You must directly measure freshwater use and record it regularly at every significant usage point – ideally on a daily basis. **12.4 Waste minimisation, recovery & disposal** You must create and implement a residues management plan that: • minimises residues generated from treating waste • optimises the reuse, regeneration, recovery, recycling or energy recovery of residues, including packaging • makes sure residues are disposed of properly if recovery is technically or economically impractical Where you must dispose of waste, you must carry out a detailed assessment identifying the best environmental options for waste disposal. You must review, on a regular basis, options for recovering and disposing the waste produced at the facility. You must do this as part of your management system. This is to make sure	Biogen are currently trialling packaging reduction technologies. This is aimed at reducing waste packaging from feedstocks going to landfill or incineration for disposal.

	you are still using the best environmental options and promoting the recovery of waste where technically and economically viable.	
13. Bespoke waste acceptance	Waste you accept must be suitable for biological treatment. This section applies to bespoke waste types which are more novel, for example chemical process waste and sets out inhibition values. **Inhibition values for aerobic and anaerobic values**	Biogen's Westwood's facility accepts source segregated food waste that was intended for consumption in accordance with the existing permitted waste list specified in the permit. This will remain unchanged as no new waste types or EWC codes are proposed as part of the permit variation. To achieve the optimum biological conditions, Biogen agitate the contents of the Raw Waste Buffer Tank (RWBT) to ensure a homogenous mix. The waste pre-acceptance process would rule out any incoming material that couldn't be mixed at the waste acceptance stage or in the RWBT, or at the very least, would identify maximum volumes that could be accepted at any one time/over a period. Biogen have an established Research Team who form part of the pre-waste acceptance team and provide feedback and advice on new feedstocks and process monitoring. When waste is tipped the load is visually inspected for any non-conforming items, and material is again visually assessed for any obvious contamination prior to loading into the hoppers. In the event contamination is identified, it is quarantined to one side, and photographs are taken and the relevant persons notified as per the Contaminated Feedstock Procedure. The team are familiar with the waste acceptance criteria for the site and the need to report deviation from this. Likewise, the team will raise any other hazards resulting from waste streams that could impact on process safety, occupational safety or the environment. Biogen undertake frequent occupational and environmental monitoring, the frequency of which may be reviewed if necessary following feedback on feedstocks. Contamination tends to be objects which could cause mechanical

Table A: general inhibitors for anaerobic processes

Determinant	Threshold
pH hydrolysis and fermentation acido and aceto genesis	Optimal pH 5 to 7
Methanogenesis	Optimal pH 7 to 8, Operational 6.5 to 8.5
Temperature below optimum (mesophillic optimum temperature 37°C, thermophillic optimum temperature 55°C)	The rate of activity will drop by approximately 50% for every 10 degrees below the respective optimum temperature (Caine, 1990).
Temperature above optimum (mesophillic optimum temperature 37°C)	Where the temperature is raised gradually above the mesophillic optimum, the cultures will adapt and thermophiles will become established. During this period performance will be reduced. Where temperature is raised suddenly by 10°C performance may reduce significantly.
Temperature above optimum (thermophilic optimum temperature 55°C)	Performance of thermophiles will drop if temperature is raised above the optimum values but will survive extreme increase up to 100°C
Ammonium inhibition	Ammonium build up may inhibit the anaerobic process.

Table D: specific inhibitors for anaerobic treatment
The following table contains guideline indicative inhibitive concentrations for a range of substances for anaerobic treatment processes. You must show that where you receive

damage to front end processing equipment as opposed to hazardous waste materials. However, to ensure this does not pose a risk, training is also provided to employees on hazardous waste, and this is also covered under the Disposal of Hazardous Waste Procedure.
Biogen has an established Feedstock Pre-acceptance Procedure, which demonstrates how Biogen meets the BAT requirements and those in sections 2.1.2. of Sector Guidance Note IPPC S5.06.

Incoming feedstocks tend to be contaminated with non-compostable or digestible contaminants, in particular plastic and litter which should be no more than 5% w/w. This is predominantly removed during pre-treatment and temporarily stored pending removal from site for disposal to landfill or incineration. Biogen continue to actively source potential outlets for the removed contaminates, however due to the nature and variability of this waste steam, suitable recovery outlets are difficult to acquire.

The procedure is directly linked to the Feedstock Pre- Acceptance Form (attached) which is completed prior to any of the waste being accepted. The form, in addition to the above, also ensures the relevant information stated as part of the guidance is obtained including, but not limited to:

- Information and contact details for the current holder of the waste.
- Description of the waste.
- Description of the process giving rise to the waste.
- Whether it is considered a high-risk feedstock, an example could be a liquid feedstock high in fat/oils or yeast which require careful management to preserve biology, or one where it is deemed a risk because of the nature in the way waste is collected. This requires additional sign-off at Director level.
- The EWC/LOW code assigned to the waste.
- The SIC code assigned to the producer of the waste.

	waste that falls within these inhibition ranges you can manage and maintain a stable process. The waste must be capable of being treated and recovered by the anaerobic process. This table does not list every substance which may be inhibitory to aerobic or anaerobic organisms. You must also consider the potential inhibitory effect of other substances used or generated at your facility.	• The physical form the waste is in, e.g. solid, liquid, sludge. • The anticipated quantities of waste. • Waste testing (this is primarily for liquid-based feedstocks). Biogen undertake an extensive sampling program and work with an external laboratory to cover the following determinands: Total Solids % w/w, Organic Dry Matter % w/w, Total Nitrogen % w/w, Ammonium Nitrogen (mg/kg), Total Phosphorus (P) (mg/kg), Total Potassium (K) (mg/kg), Total Magnesium (Mg), Total Copper (Cu), Total Zinc (Zn), Total Sulphur (S), Total Molybdenum (Mo), Total Lead (Pb), Total Cadmium (Cd), Total Mercury (Hg), Total Nickel (Ni), Total Chromium (Cr), Total Sodium (Na), pH, Chloride, Fluoride, Total Arsenic (As), Total Selenium (Se), Water Soluble Sodium, CLS Fat Test (g / 100g), Microbial inhibition at pH 6.0, Microbial inhibition at pH 7.2, Microbial inhibition at pH 7.4, Microbial inhibition at pH 8.0, Biological Methane Production (LCH4/kg VS), Electricity Production (kWh/ AD tonne), COD (g/L). Routine samples are taken prior to acceptance and then either on a 6-monthly or 12-monthly basis, this is decided on a risk basis *(example of results for a customer attached)*. In instances where there is cause of concern over variance, the research team will increase the frequency of testing for determinants of concern. Biogen have an agreed Feedstock Agreement; it stipulates that the customer must notify Biogen if there is a deviation from the feedstock described in their Agreement. This is a legally binding document that had input from legal advisors. It is signed by the customer. • Whether there are any special handling requirements with respect to H&S of personnel or in respect of the environment. • Any hazards associated with the waste.

Parameter	Anaerobic treatment threshold g/l
Acrylates	62 to 150 mg/l
Alcohols	22 to 43000 mg/l
Alkylbenzenes	160 to 580 mg/l
Aluminium (Al)	1 (2% inhibition of methane production after 59 days)
Amines	13000 1-methylpyrrolidine mg/l
Arsenic (As)	0.0016
Cadmium (Cd)	0.15 to 0.33
Calcium (Ca)	2.5 to 4
Chlorinated aliphatics	0.5 to 600 mg/l
Chromium (Cr) total	0.2
Copper (Cu)	0.009
Fluoride (F)	0.018
Halobenzenes	20 to 750 mg/l
Halogenated alcohols	0.3 to 630 mg/l
Halogenated carboxylic acids	< 0.001 to 0.01 mg/l
Halogenated phenols	2-300 for mono,-di and trichloros; 0.04 and 0.13 for penta and tetra mg/l
Ketones	6000 to 50000 mg/l
Lead (Pb)	3.2 to 8
Magnesium (Mg)	12
Nickel (Ni)	0.1 to 1.6
Nitriles	90 to 28000 Acrylonitrile and Acetonitrile respectively mg/l
Nitrobenzenes	13 nitrobenzene
Nitrophenols	4 to 12 mg/l
Phenol and alkylphenols	phenol 1850; o,m,and p-cresol 850, 925, 975 mg/l
Potassium (K)	2.8 to 14
Silver (Ag)	0.1
Sodium (Na)	5.6 to 53
Sulphate	Methane production is reduced by one mole for every mole of sulphate added due to sulphate reduction dominating over methanogenesis
Sulphide	100 to 800
Surfactants	For example, alkyl dimethylbenzylammonium chloride: 6.7; sodium alkyl ethersulfate: 11 mg/l
TiO2 (mg/gTS)	150
Total ammonia nitrogen	1.7 to 14
Zinc (Zn)m as ZnO nanno particles	0.03

(Inhibitory values are under review. Subject to that review, substances may be added or removed, or values amended).

Digester feed flow rate (OLR) is recorded with the use of a fixed meter with a HRT of between 30 and 40 days.

TEA dosing rates are recorded on the Plant Monitoring Spreadsheet.

Samples are taken from the homogenous mix within the RWBT weekly prior to discharge to the digesters. Digester samples are taken three times a week. This includes pH and alkalinity testing. Daily feed rates are recorded into the RWBT and to the Digesters. The concentration of VFA's and ammonia within the digesters and digestate are recorded.

H_2S concentrations within the biogas are tested and recorded weekly. CH_4, CO_2 and O_2 are also recorded. Ferrous chloride dosing takes place to control H_2S concentrations, and application rates are recorded on the Plant Monitoring Spreadsheet. SCADA also records the CHP gas flow rate, the flare flow rates, the flare operating hours and the gas to grid flow rates. Gas pressures are monitored on SCADA.

Digester temperatures are monitored with the use of fixed level temperature probes (recorded daily on a spreadsheet) which is calibrated by a weekly recorded handheld temperature reading.

Biogen have an established Research Team who form part of the pre-waste acceptance team and provide feedback and advice on new feedstocks and process monitoring.

The waste pre-acceptance requires a three-stage sign-off by a representative from the Operations, Compliance and Laboratory/Research team. Samples are requested and analysed where appropriate on a risk basis. The initial sampling is undertaken prior to waste acceptance due to the turnaround times; however periodic sampling thereafter is coordinated by Biogen's Research Team.

		Any proposed new feedstocks containing indicative inhibitive concentrations within the ranges would be managed accordingly through direct guidance of the Research Team in order to maintain a stable digestive process. Any wastes incapable of being treated and recovered by the anaerobic process would be declined or rejected. Protecting and maintaining a healthy plant biology is essential.