AD PLANT, CROMPTON ROAD, ILKESTON - BEST AVAILABLE TECHNIQUES ASSESSMENT

Stanton Energy Ltd

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1 Introduction

1.1 This document includes an assessment of Best Available Techniques (BAT), which has been undertaken against the relevant BAT measures contained within the following documents:

- Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 Establishing Best Available Techniques (BAT) Conclusions for Waste Treatment, Under Directive 2010/75/EU of the European Parliament and of the Council.[1]; and,
- How to Comply with your Environmental Permit: Additional Guidance for Anaerobic digestion. Reference LIT 8737, Version 1, November 2013.

1.2 This document has been prepared as part of the permit application for the proposed operation of an Anaerobic Digestion (AD) facility to be located near Ilkeston, Derbyshire. Throughout this document, reference has been made to other application documents, where relevant, which should be read in conjunction with this document.

[1] Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 Establishing Best Available Techniques (BAT) Conclusions for Waste Treatment, Under Directive 2010/75/EU of the European Parliament and of the Council.

2 BAT Assessment

2.1 Assessment of BAT Against Commission Implementing Decision (EU) 2018/1147

2.1.1 The following sections provide assessment of BAT compliance for the proposed plant against the EU BAT Conclusions Document.

BAT 1 – Environmental Management System

2.1.2 An EMS has been prepared for the operation, which has been submitted with this permit application, providing compliance with BAT 1.

BAT 2 – Improvement of Overall Performance of Plant

2.1.3 The EMS for the operation contains procedures and measures which provide compliance with BAT 2.

BAT 3 – Reduction of Emissions to Water and Air

2.1.4 The EMS and supporting management systems for the operation cover the requirements of BAT 3.

BAT 4 – Reducing Environmental Risk Associated with Storage of Waste

2.1.5 The site design has been optimised to prevent any unnecessary handling and transport of wastes on site. Food/grease wastes will not be stored on site and will be delivered to site within enclosed tankers, unloaded directly the process via enclosed line. Green wastes and silage wastes will be stored within a dedicated storage area located in close proximity to the feed hoppers, ensuring that feedstocks are transferred to the process over minimum possible distances. Double handling of feedstocks is also avoided since feedstocks are transferred straight to the process. Storage areas are clearly defined on the Site Layout Plan and maximum permitted storage quantities and duration of storage are defined within the

site EMS and management systems. Records of storage quantities will be assessed continuously against storage limits. Waste storage durations are clearly defined within the site EMS and continuously monitored. Storage arrangements have also been assessed as acceptable in terms of mitigating fire risk as part of the site EMS submitted as part of this permit application. A plant and machinery inventory is maintained within the site EMS and procedures are documented in the EMS for safe storage of drums and vessels.

BAT 5 – Reducing Environmental Risk Associated with Handling and Transfer of Waste

2.1.6 Waste storage and handling procedures are covered within the site EMS. Wastes will only be handled and transferred by members of staff who are suitably trained/qualified. Training procedures are documented within the site EMS. Spillage control procedures are included within the site EMS.

BAT 8 – Monitoring Emissions to Air

2.1.7 The EU BAT Conclusions Document outlines requirement for monitoring of channelled emissions of odour or ammonia. However, there is not anticipated to be any significant channelled emissions of odour or ammonia. The very nature of the AD process includes the breaking down of odour forming substances, maximised via a lengthy retention time. The main compound with potential for significant odour arising from the process is hydrogen sulphide (H_2S) which can be form during the digestion process and be present with the biogas. However, the biogas arising from the process will undergo desulphurisation via a scrubbing system and carbon filter which will remove residual contaminants, including H_2S. The operator estimates that residual H_2S within the gas may be present in quantities of between 0 and 200ppm (up to 0.02% of the biogas stream), following desulphurisation. Therefore, potential for channelled emissions of odour from the biogas upgrading system are negligible and it is not anticipated that monitoring will be required.

2.1.8 There will be no other channelled sources of odour emissions.

BAT 10 – Monitoring Odour Emissions

2.1.9 An Odour Management Plan (OMP) has been prepared for the operation which contains odour control and monitoring procedures, ensuring compliance with BAT 10.

BAT 11 – Monitoring Annual Consumption of Water, Energy, Raw Materials and Annual Generation of Residues and Waste Water

2.1.10 The site operator will maintain records of water, energy and raw material consumption, in addition to generation of residues and water on at least an annual basis.

BAT 12 and 13 – Reducing Odour Emissions

2.1.11 An OMP has been prepared for the operation which contains odour control and monitoring procedures, ensuring compliance with BAT 12 and 13.

BAT 14 – Reducing Diffuse Emissions, Particularly Including Dust, Organic Compounds and Odour

2.1.12 Diffuse emissions will be controlled as far as is practically possible on-site. The site has been designed to minimise unnecessary transfer material transfer distances. Feedstocks which are stored on site, including green wastes and silage are to be located near to the point of introduction to the process. Food wastes and grease are to be introduced directly to process via enclosed line from sealed tanker. Manure will not be stored on site and unloaded straight to the feed hopper from tractor/trailer. Drop heights will be minimised when loading feedstocks to the feed hopper. Speed limits will be limited on site. Tanks and pipework will be appropriately protected from corrosion.

2.1.13 The AD process is an enclosed process and therefore there is limited potential for emissions to air. The biogas produced by the process will undergo scrubbing and carbon filtration to remove residual contaminants, minimising potential for odour emissions. The flare will be used for safety purposes to safely combust biogas during periods of maintenance or should an excess production of biogas arise. However, the flare will be subject to emission limits

and the use of high temperature combustion will provide a high level of thermal destruction of ant residual odourous compounds in the gas stream.

2.1.14 Given the nature of the feedstocks to be used, dust is not expected to be a significant issue. However, wet cleaning methods will be used and site damping down undertaken if required to prevent potential fugitive emissions of dust.

2.1.15 regular maintenance will be undertaken on-site to ensure all plant and machinery is in good working order, including tanks and pipework. Details of the maintenance schedules have been submitted as part of this permit application.

2.1.16 The OMP and EMS submitted as part of this application outline the environmental controls which will be in place in detail. A policy of cleanliness will be maintained on site at all times.

BAT 15 and 16 – Flaring

2.1.17 The flare will not be used routinely and is used for safety reasons in the event of excess gas. This may be during startup, maintenance of the gas upgrade unit, problem with exporting gas to the grid or other unforeseen issues.

2.1.18 An automated process control system will be used on site. The use of the flare is controlled by the gas buffer level within the secondary digester.

2.1.19 The composition of the gas entering the flare will be monitored and the number and duration of flaring events will be recorded.

BAT 17 and 18 – Preventing and Reducing Noise Emissions

2.1.20 An Environmental Noise Assessment and Noise Management Plan (NMP) has been submitted as part of this application, ensuring compliance with BAT 17 and 18.

BAT 19 – Optimising Water Consumption

2.1.21 Water use will be monitored and opportunities to reduce water used will be taken, if available. The operational area of the site will be appropriately bunded.

BAT 21 – Preventing or Limiting Environmental Consequences of Accidents and Incidents

2.1.22 An Accident Management Plan (AMP) has been submitted as part of this application which covers procedures which will be implemented to prevent/limit environmental consequences of accidents and incidents, providing compliance with BAT 21.

BAT 23 – Using Energy Efficiently

2.1.23 Energy use will be monitored regularly and the operator will review and record measures for improving energy efficiency on an annual basis and take any action deemed necessary by the review. A breakdown of energy consumption by type of source will be included as part of the review. Reference should be made to information submitted as part of this permit application for details of basic measures to be used to improve energy efficiency.

BAT 24 – Reducing Quantity of Waste Sent for Disposal

2.1.24 There will be no packaging associated with the wastes to be used as feedstock on the site. Wastes will be minimised as far as is practicably possible and disposed/recovered in accordance with the Waste Hierarchy. A full list of wastes and disposal/recovery route is included as part of this permit application.

BAT 33 – Reducing Odours and Improving Overall Environmental Performance Through Selection of Waste

2.1.25 Feedstocks will be selected through consideration of dry matter content and biogas potential, which are to be sourced from the local region to minimise carbon impacts and maximise sustainability.

BAT 34– Reducing Channelled Emissions to Air of Dust, Organic Compounds and Odourous Compounds

2.1.26 The very nature of the AD process includes the breaking down of odour forming substances, maximised via a lengthy retention time. Biogas arising from the process will undergo desulphurisation via a scrubbing system and carbon filter which will remove residual contaminants, including H_2S and other organic contaminants.

2.1.27 The safety flare will combust biogas at temperatures in excess of 1,000C. Therefore, this will provide a high level of destruction of organic compounds. The flare will not be routinely operated for extended periods of time, anticipated to be used for <10% of each year cumulatively. However, emissions from the flare will be required to comply with strict emission limits for Carbon Monoxide (CO), Nitrogen Oxides (NO_x) and Total Volatile Organic Compounds (TVOC).

2.1.28 It is understood that the biomass boilers qualify for Renewable Heat Incentive (RHI). In order to qualify, the boilers are required to meet emission limits for NO_x and particulate matter.

2.2 Assessment of BAT Against EA AD Technical Guidance Note

2.2.1 The following sections provide assessment of BAT compliance for the proposed plant against the indicative BAT measures within EA AD Technical Guidance Note.

Waste Pre-Acceptance and Acceptance

2.2.2 The EMS includes waste stream pre-acceptance and characterisation procedures, meeting Indicative BAT. This ensures feedstock nutrients are balanced. The EMS also includes waste acceptance procedures to ensure compliance with pre-acceptance characterisation, meeting indicative BAT. This ensures that feedstock is directed to the correct reception/loading area on site.

Waste Reception and Storage

2.2.3 The site design has been optimised to prevent any unnecessary handling and transport of wastes on site. Food/grease wastes will not be stored on site and will be delivered to site within enclosed tankers, unloaded directly to the process via enclosed line. Green wastes, silage and other dry, solid feesstocks will be stored within a dedicated storage area located in close proximity to the feed hoppers, ensuring that feedstocks are transferred to the process over minimum possible distances. Double handling of feedstocks is also avoided since feedstocks are transferred straight to the process. Storage areas are clearly defined on the Site Layout Plan and maximum permitted storage quantities and duration of storage are defined within the site EMS and management systems. Records of storage quantities will be assessed continuously against storage limits. Waste storage durations are clearly defined within the site EMS and continuously monitored. Storage arrangements have also been assessed as acceptable in terms of mitigating fire risk as part of the site EMS, submitted as part of this permit application. A plant and machinery inventory will be maintained within the site.

2.2.4 No building has been considered necessary for waste reception. However, this does not present an odour issue, as demonstrated within the OMP. Liquid feedstocks are introduced directly to the enclosed process via enclosed line. Green wastes, silage and other dry solid feedstocks will only be stored in bays for a limited period of time (<7 days). Green wastes will be processed faster and in a more enclosed system compared to the existing situation, where such wastes are composted in the open. As such, the proposals will reduce odour potential from the site.

2.2.5 The entire operational area, include waste reception area, will contain impermeable surfaces and will be bunded with sealed drainage system, as shown by the site layout plan.

2.2.6 Waste rejection procedures will be in place, as detailed within the site EMS. Spillage control procedures will be place, as detailed within the site EMS.

2.2.7 Sufficient capacity is provided for digestate storage.

Treatment – General Principles

2.2.8 The plant has been designed in accordance with ATEX guidelines to prevent risk of explosion and a full HAZOP assessment is currently in progress.

2.2.9 Wastes will be delivered to site pre-processed to an agreed specification, suitable for direct introduction to the AD process. As such, no pre-treatment of wastes is required on-site. The site EMS outlines procedures for designation of quarantine area for rejected/unacceptable wastes.

2.2.10 The digester will include paddle mixers and submergible mixers, suitable for mixing feedstock with a high dry matter content. The mixing enables elimination of floating layers, elimination of sedimentation, elimination of temperature and density gradients, better release of gas and mixing of fresh substrate with existing substrates.

2.2.11 All tanks, pipework, valves, mechanical and electrical items will be chosen/selected to meet the design life of the plant. All wetted parts will encompass a design life of 20 years. Concrete tank headspace , of approximately 1 metre, will be chemically treated to protect it from the saturated biogas present. Gas pressure relief valves will be protected against environmental and climatic conditions through use of appropriate materials including Stainless Steel.

2.2.12 The plant will be protected against extreme climatic conditions. When ambient temperatures are below zero degrees Celsius, the system is filled with antifreeze liquid (glycerol), which is suitable for the relevant minimum temperature.

2.2.13 The process will be continuously monitored using a Supervisory Control and Data Acquisition (SCADA) control system. This will include monitoring of the following:

- Alkalinity (maintained between 2,000 and 4,000mg/litre (as $CaCO_3$);
- pH (maintained between pH 6.5 and 8.0);
- Temperature and temperature distribution;
- Hydraulic Loading Rate;

- Organic Loading Rate including total solids and Volatile Solids Fractions (organic loading rate and hydraulic residence time managed to deliver a stable and sanitised digestate);
- Concentration of Volatile Fatty Acids;
- Ammonia;
- C:N ratio and other nutrient and key feedstock data;
- Gas production and composition;
- Gas pressure; and
- Gas H2S concentrations

2.2.14 In addition to the above, a FOS/TAC test is to be performed on a daily /weekly schedule. Planned preventative maintenance and inspection is to be undertaken on plant and machinery.

Biogas Treatment and Monitoring

2.2.15 The biogas will be upgraded for export to the grid. Biogas treatment and monitoring will include the following:

- Moisture removal by cooling and discharge to condensate;
- Removal of oxygen by desulphurisation;
- Removal of ammonia (bound in condensate);
- Removal of particulates using activated carbon filters;
- Removal of carbon dioxide (CO_2) using 3 stage membrane separation;
- Monitoring of principal biogas components including methane and CO_2;
- Monitoring of pressure and inclusion of associated alarms; and,
- Monitoring of H_2S before and after gas cleaning to enable monitoring of removal efficiency.

2.2.16 Besides the main components of the biogas, which includes CH4 and CO_2, the biogas contains H_2S. The amount of H_2S depends on the co-digestion materials that are fed to the digester. H_2S is primarily removed from the biogas by desulphurization bacteria. The bacteria convert the H_2S in the biogas to elemental sulphur. The elemental sulphur is

removed through the digestate (digested manure and residues). The desired amount of oxygen is supplied to the primary and secondary digester by an oxygen generator. The capacity of the oxygen generator is limited in capacity, so that an explosive mixture will not occur. The amount of oxygen to be dosed depends on the biogas production. The oxygen dosing will be manually adjusted to about 0.2% oxygen in the biogas before the gas upgrading. The amount of oxygen in the biogas is measured by a gas analyzer in the gas upgrading unit. Since oxygen is produced, no nitrogen will be added to the AD plant.

2.2.17 All equipment in contact with biogas will be ATEX certified.

Biogas Storage

2.2.18 Biogas will be collected from both the primary and after digester. Tanks will be fitted with pressure relief valves. Pressure sensors will be included with an alarm for immediate venting to be instigated if required. A safety flare will installed to safely combust biogas in the event of excess gas being produced. Negative pressures are prevented and controlled by the SCADA control system, which will include monitoring for pressure/vacuum with alarm conditions.

Energy Efficiency

2.2.19 Reference should be made to paragraph 2.1.23 above for details of energy efficiency measures.

Digestate Treatment and Storage

2.2.20 The separation of the solid fraction from the liquid fraction of the digestate will take place in a sealed decanter unit. The pressure gradient will increase from negative to positive towards the AD process and away from the solid / liquid outlets of the decanter thereby minimising the potential for the escape of odour from the process.

2.2.21 The sealed decanter unit will be equipped with an emergency shutoff switch and the solid and liquid outlets can be sealed in a rapid manner in order to prevent the egress of odourous gasses. As the unit is completely sealed containment within a building and abatement of

the surrounding air is not necessary as no separation will take place outside of the sealed decanter. The decanter will be placed on an impermeable concrete surface comprising a sealed drainage system.

2.2.22 All liquid and solid outputs from the AD process will be generated with the intention of complying with the requirements of PAS 110. Where individual batches of liquid or solid digestate are deemed not to comply with PAS 110 such material will be stored within sealed containers pending removal from site to a suitable permitted facility for further treatment.

2.2.23 All digestate will be stored in sealed tanks. No digestate will be stored in lagoons or any other open waterbody.

2.2.24 All solid digestate will be contained within sealed tanks throughout the process. Only PAS 110 compliant solid fraction material will be extracted from the sealed decanter. The PAS 110 compliant solid fraction material will be loaded directly from the decanter to trailers awaiting removal from site for sale elsewhere.

2.2.25 The thin fraction storage tanks will be sealed. Any gas generated in the thin fraction storage tanks will be routed back to the primary digesters in order to maximise the collection of additional biogas from the digestate after storage.

2.2.26 All digestate material will be stored in sealed containers or loaded directly onto trailers. The sealed containers and trailers will be situated on an impermeable surface comprising a sealed drainage system.

2.2.27 The operator will employ a specialist haulage contractor in order to remove all products of the AD process for sale elsewhere as soon as practicable. After storage tanks will allow for the temporary storage of fully treated liquids pending removal from site. The haulage contractor will be responsible for ensuring that there are sufficient tankers and trailers on the site in order to accommodate the solid and liquid products pending removal from the site.

2.2.28 All liquid digestate and product will be stored in sealed vessels and then transferred using sealed hoses to a sealed tanker for removal on site and sale elsewhere. All solid digestate

will be contained within sealed vessels prior to removal from the separator, after which it will be loaded onto a suitable trailer and hauled from site for sale elsewhere. Only fully treated PAS 110 compliant solid fraction compost type material will be removed from the decanter and transferred to a trailer. Any non-compliant material will be removed from the process without separation and transferred as a slurry directly to a sealed tanker pending removal to a suitably permitted facility. The fully treated PAS 110 compliant solid fraction will have a low odour generating potential hence its loading onto a trailer pending removal from site is unlikely to result in significant odour emissions. The fully treated PAS 110 compliant solid fraction is likely to have a very low concentration of leachable matter due to the length of time retained within the AD process hence is unlikely to pose a significant risk of pollution to controlled waters.

2.2.29 The fully treated PAS 110 compliant digestate will be exported from site for sale and use at a wide range of destinations, only some of which involve application to land in a nitrate vulnerable zone. The haulage contractor will nevertheless make available sufficient tankers in order to collect fully treated digestate during the winter months in order to meet the anticipated increase in demand following the winter no-spread period.

2.2.30 As discussed above any digestate which does not meet the requirements of PAS 110 will be removed from the site as a slurry in a sealed tanker and hauled off-site by a suitable authorised waste carrier to a suitably permitted facility for further treatment or disposal.

Point Source Emissions to Air

2.2.31 Records will be maintained of all air emissions monitoring, as detailed within the site EMS. Records will also be maintained for all periods of flare operation. The flare will be primarily used for safety purposes and biogas will not be routinely flared. Emissions from the flare will be required to comply with strict emission limits for CO, NO_x and TVOC and monitoring will be undertaken every 6 months to demonstrate compliance. The biomass boilers are required to comply with emission limits for NO_x and particulate matter, as part of RHI. Emissions from the biogas upgrading plant will be controlled, as detailed above. The biomass boilers will be served by elevated exhaust flues, which will aid dilution and dispersion of residual emissions. Similarly, the flare release will be at an elevated height to

provide dilution and dispersion of residual emissions. The dispersion modelling assessment undertaken as part of this application has demonstrated that potential impacts will not be significant. Spent pollution control residues, such as filters will be disposed of appropriately.

Fugitive Emissions to Air

2.2.32 See paragraph 2.1.12 above for details of fugitive emissions controls.

Odour Control

2.2.33 An OMP has been prepared for the operation which contains odour control and monitoring procedures.

Point Source Emissions to Surface Water and Sewer

2.2.34 Based on the anticipated composition of the waste streams accepted at the site it is unlikely that it will be necessary to add water to the incoming waste in order to effect its degradation within the process at the site. All solid wastes and products will be handled on an impermeable concrete surface comprising a sealed drainage system. All liquid wastes and products will be stored in sealed vessels situated on an impermeable concrete surface comprising a sealed drainage system in order to minimise the risk posed to controlled waters.

2.2.35 No discharge to controlled waters is proposed as part of the site operations. The sealed drainage system will discharge to foul sewer in accordance with a trade effluent agreement. Where possible, fully treated PAS 110 compliant liquid produced by the AD process will be removed from site for sale and use elsewhere. If immediate sale and use is not feasible, provision will be made in order to store any liquid digestate temporarily pending sale and use elsewhere. Fully treated liquid digestate will be discharged to foul sewer only as a last resort and only in accordance with the emissions concentration and volume limits set out in the trade effluent agreement and H1 Controlled Waters Risk Assessment submitted with the environmental permit application.

2.2.36 As stated above, the discharge of fully treated effluent to sewer will only occur as a last resort as it will result in a loss of saleable product from the AD process. Due to the discharge volume limits set out in the trade effluent agreement in respect of the site discharge to sewer, it is unlikely that fully treated effluent can be discharged at a time when sewer bypass is occurring, due to the volumes discharging from the sealed drainage system comprising the maximum permitted discharge rates. Any fully treated liquid effluent will be held within the AD process temporarily pending such time as the discharge from the surface water drainage system is low enough to allow for the discharge of effluent without exceeding the discharge volumes and rates set out in the trade effluent agreement.

2.2.37 As part of the daily site inspections a log will be kept of the volumes of fully treated digestate within the after storage tanks and in sealed tankers on site pending removal in order to effect the management of the liquid storage capacity on site. Monitoring provisions in respect of the quality and quantity of fully treated effluent discharged to sewer are set out in the H1 Controlled Waters Risk Assessment provided with the environmental permit application.

2.2.38 As part of the daily log in respect of the quantity of liquid digestate in the after-storage tanks a visual and olfactory inspection of the digestate will be made at the discharge point on days when fully treated digestate is being discharged. Observations will be made in respect of the colour, odour and turbidity of the fully treated digestate. Where in the opinion of the operator the digestate may pose a risk of non-compliance with the emissions limits set out in the trade effluent agreement, the discharge will be stopped pending further inspection and testing as necessary, and only resume when there is confidence that the discharge is compliant with the emissions limits.

2.2.39 The operator will sample the quality of the fully treated effluent in accordance with the requirements of the trade effluent agreement, verified as necessary by the Statutory Undertaker should discharge to foul sewer be necessary.

2.2.40 The operation of the decanter as well as the condition of the pipes discharging to and from the decanter will be the subject of daily inspections, details of which will be recorded on the daily inspection forms.

2.2.41 As discussed in the H1 Controlled Waters Risk Assessment the rotation of the Archimedes screw in the decanter can be calibrated in order to maximise the recovery of suspended solids to the solid fraction of the output, which will in turn minimise the potential for the silting up of the after-storage tanks in respect of the liquid digestate. Minimising the suspended solids load in the treated liquid digestate will optimise its quality both for re-use as PAS 110 compliant liquid or discharge if necessary to foul sewer. Adjustments will therefore be made to the speed of rotation of the Archimedes screw based on the daily observation of the treated liquid digestate as necessary in order to optimise the process.

2.2.42 Where there is evidence that the decanter is not effectively separating the solid and liquid fractions, the operator will shut down the decanter immediately in order to prevent the ingress of suspended solids to the liquid digester after-storage tanks. The digestate will therefore be held back within the AD process upstream of the decanter whilst the functionality of the separation process is restored and will only resume once laboratory testing has verified that the quality of the effluent is acceptable. An inspection will be made and samples will be taken of the liquid digestate in the after-storage tanks in order to verify that no contamination of the fully treated digestate has occurred. It is therefore considered that the digestate can be isolated where sampling and visual inspection has indicated a breach of specification.

Point Source Emissions to Groundwater

2.2.43 There will be no point source emissions to groundwater

Emissions of Substances Not Controlled by Emission Limits to Surface Water, Sewer and Groundwater

2.2.44 The proposed site layout is shown on Drawing No. 058-003-03 which was submitted with the application on which the routing of the surface water system is shown. All sub-surface pipes will be installed within trenches with impervious sidewall and basal polyethylene liners or other suitable impervious liners. Leak detection systems will be installed in any trenches containing underground pipes containing liquids in order to detect fluid accumulation at the base of the trenches. Any leaks or defects detected using the leak

detection system or suspected due to observations of levels or flows in above ground components of the AD process will be investigated and repaired immediately.

2.2.45 Prior to their bringing into use all pipes, tanks and valves including their connections will be pressure tested in order to verify they can withstand their respective operating pressures plus appropriate factors of safety. There are no sub-surface storage vessels or sub-surface sumps proposed as part of the site layout.

2.2.46 All components of the AD plant including all tanks, pipes, membranes and fittings will be inspected visually on a daily basis. Any evidence of leakage will be investigated immediately and repairs made as necessary. All components of the AD plan will be tested and maintained in accordance with the instructions from and at the intervals specified the manufacturer.

2.2.47 As discussed above, no sumps will be installed within the impermeable surface at the site.

2.2.48 The concrete surface comprising the external containment area will be designed and constructed in accordance with the Construction Industry Research and Information Association guidance document titled CIRIA 736 – Containment systems for the prevention of pollution and associated standards. The thickness, chemical composition and reinforcement of the concrete surface will be CIRIA 736 complaint. The concrete surface will have a gradient of at least 1 vertical in 100 horizontal which will drain to a below ground drain, the entrance to which will be in the centre of the external containment area which will discharge to the foul sewer beneath Crompton Road to the south east. A Penstock valve will be fitted to the drain in the centre of the external containment area in order to prevent discharge to sewer in the event of a fire or leakage. There will be a further redundant Penstock valve adjacent to the site entrance should the Penstock valve in the centre of the external containment area be inaccessible.

2.2.49 The concrete surface will be inspected daily and any cracks or defects will be repaired immediately.

2.2.50 All above ground tanks will be contained within the external concrete surface will be surrounded on all sides with the exception of the entrance gates. The lower part of the

entrance gates will comprise sealable bunds which will form a seal across the gates to the concrete walls in the event of a containment breach. The largest tank on site is Digester 1 or 2 which holds approximately 3928 litres of digestate. Based on 110% of this vessel the site would require secondary Based on the above the site would require containment up 1.19m.

2.2.51 The sealable bunds across the gates will be at least 1.19m high. Therefore, the site has suitable containment in the event of tank failure resulting in the leakage of digestate. Due to the capacity and height of the tanks, it is not considered feasible to provide collar bunding, which is not considered necessary due to the lack of potential for jetting leakage as the tallest storage tanks will be situated in the centre of the external concrete surface.

2.2.52 Due to the size of the external concrete surface, it is not feasible to allow water to accumulate in a blind sump. It is therefore proposed to allow the consented discharge of surface water runoff from the site consistent with the trade effluent agreement, via 2 penstock valves between the lowest point of the external concrete surface and the discharge point to the foul sewer beneath Crompton Road. The penstock valves will be operable manually and electronically. It is therefore concluded that there is sufficient redundancy in the bunded containment system to allow operation of the site without an unacceptable risk of the discharge of untreated effluent to foul sewer.

Noise and Vibration

2.2.53 An Environmental Noise Assessment and Noise Management Plan has been submitted as part of this application.

Management Systems

2.2.54 An EMS has been prepared for the operation, which has been submitted with this permit application, providing compliance with this BAT measure.

Raw Materials Selection

2.2.55 Reference should be made to document ref: 058-003-O for details of raw materials selection.

Waste Minimisation

2.2.56 Reference should be made to document ref: 058-003-O for details of waste minimisation.

Water Use

2.2.57 Water use will be reviewed at least every four years and opportunities for reduction in water use identified by the review.

Waste Recovery or Disposal

2.2.58 Reference should be made to document ref: 058-003-O for details of recovery/disposal.

Accidents and Abnormal Operation

2.2.59 Reference should be made to document ref: 058-003-K for an Accident Management Plan which details accident prevention measures. Additionally, the operator will undertake a HAZOP study.

Emissions Monitoring

2.2.60 As outlined above, flare emissions will be monitored once every 6 months. Water emissions monitoring will be undertaken in accordance with the trade effluent agreement for the site by the operator and by the Statutory Sewerage Undertaker as necessary.

Requirements for Environmental Monitoring (Beyond AD Facility)

2.2.61 As the process will operate within a sealed and bunded drainage system which will be the subject of regular inspection and maintenance as necessary it is considered unnecessary to monitor for impacts on surface water quality and groundwater quality off-site.