

Waste Treatment Procedure

EPR-OP03

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1.0 PURPOSE

This document aims to outline the procedure which must be followed by operatives at Charlton Park Biogas Limited (hereon referred to as “CPB”) for the treatment of liquid food waste, broiler manure and farm silage through the Anaerobic Digestion process, upgrading of the subsequent biogas and separation and storage of subsequent digestate.

2.0 PROCEDURE OVERVIEW

The defined procedures as described in section 1.0 have been dissected into their component parts for ease of reference by site operatives. Conditions to be applied when site operatives are following the procedure are also indicated below.

2.1 Reception and Storage

- 1) Once the waste load has been received at site, in line with OP02, if the load is classified as solid or liquid, then the load is directed to the Solid Waste Reception Area (silage clamps) or the Liquid Waste Reception Area (intake tanks). Solid waste (broiler manure) and materials (crop & grass silage) shall be tipped into one of two silage clamps, where it will be transported via a telehandler into a designated bay ahead of feeding into the digesters. Liquid waste shall be pumped directly from tankers into the intake tanks.
- 2) In addition to the sampling conducted at the waste acceptance stage, a daily sample of the liquid feedstock blend within the intake tanks or silos is taken and tested for pH, dry matter, chemical oxygen demand and sulphate levels. Once waste analysis has been carried out, the Site Manager/Technically Competent Manager shall use this information to create a batch for AD treatment. No feed material shall leave the intake tanks or silos until the testing demonstrates that the material is suitable for inclusion in the process.
- 3) Operatives shall undergo a pre-treatment of the solid materials stored within the silage clamps. This process shall typically include:
 - Removing non-biodegradable materials e.g. grit & metals which are not affected by digestion and take up necessary space by sedimentation.
 - Removing plastics that can cause long term operational problems by the formation of floating layers.
 - Removing materials which may decrease the quality of the digestate.
- 4) At no point shall any intake tank be utilised to feed the digestion system whilst it is being charged with material from a vehicular delivery.
- 5) APB and non-ABP wastes shall be kept separated and only stored in designated bays, ensuring there is no cross contamination of materials.
- 6) All waste shall be processed or removed within a six-month period following acceptance onto site.

2.2 Anaerobic Digestion

- 1) From the silage clamps, solid material shall be transported via telehandler and loaded directly into one of two solid feeder units, where the material will be transferred via screw conveyors into one of the two digesters. The solid feed can be mixed with blackwater or white-water to increase pumpability and the moisture content of the substrate if required.

- 2) From the intake tanks, the liquid food waste is pumped directly into one of the two digesters. In accordance with clause 4.8.3 of LIT 8737, APB material from the intake tanks may be heated prior to input into the digesters via the heated polyester silo.
- 3) Feedstocks shall be fed into the two digesters operating in parallel at a temperature of 38-42°C. The retention time for the material within the digesters will be ~50 days, however this may vary depending on the quantity of the input material. The material shall be continuously mixed during the digestion phase via three paddle mixers within each digester.
- 4) Following the AD process and release from the digesters, the digestate shall be pasteurised within a single pasteurisation tank at 72°C for 65 minutes (over one continuous hour).
- 5) Pasteurised digestate shall then be pumped to a separation unit, where the whole digestate is separated into liquid and solid fractions. The solid fibre shall be stored within a storage clamp, and the separated liquor shall be pumped to the digestate storage bagged lagoon.
- 6) Process Control Monitoring of the digestion process shall be provided by a SCADA system, which shall monitor the following on a continuous basis:
 - Alkalinity and pH
 - Temperature and temperature distribution
 - Hydraulic loading rate
 - Organic loading rate including total solids and volatile solids fractions
 - Concentration of VFA
 - Ammonia
 - C:N ratio and other nutrient and key feedstock data
 - Gas production and composition
 - Gas pressure
 - GSA H₂S concentration
- 7) Where critical limits for the above parameters are breached, corrective action shall be taken by the Site Manager/Technically Competent Manager. The corrective action implemented will vary depending on the extent and nature of the issue.

2.3 Biogas Treatment and Storage

- 1) Following the Anaerobic Digestion process, biogas is captured within the membrane at the top of each digester. All captured biogas shall be transferred to the biogas upgrading unit.
- 2) The biogas upgrading unit shall treat the raw biogas through the following activities:
 - Dewatering
 - Removal of H₂S (potentially corrosive to engines)
 - Removal of oxygen and nitrogen (where present)
 - Removal of ammonia

- Removal and particulates and
 - Removal of CO₂ (for upgrading to biomethane)
 - Propanation
- 3) The majority of the subsequent biomethane shall be fed to the grid-entry unit for use by the national gas grid. A portion of the biomethane shall be combusted within in the 499kW CHP unit to provide heat and power to the site. When required, the power generated from the CHP unit can be fed into a grid entry unit for use by the national electrical grid.

3.0 ROLES AND RESPONSIBILTIES

Site Operatives - Any site operatives handling the waste onsite shall be responsible for ensuring the waste treatment procedure is implemented appropriately for all waste arrivals.

Site Manager – The Site Manager is responsible for ensuring all operatives stationed at the key process areas are trained and educated with regards to the procedure in order to effectively enforce it and that all testing / reporting and compliance as described above is carried out.

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