

Acceptance of non-waste crops

1.0 Introduction

The purpose of this document is to present a summary of Biogen's intention to accept non-waste crops for anaerobic digestion. This document is to provide additional information with regard to material acceptance, duty of care, feedstock management, housekeeping, pre-treatment and digestion of arable crops.

The acceptance of non-waste crops for anaerobic digestion is to supplement our continued acceptance of food waste and any other waste types as specified in the permitted waste lists contained within our environmental permit.

Although the acceptance of non-waste crops is unlikely to have any consequences for the environment, Biogen wished to provide prior notification of our intention to accept non-waste crops as a change in the nature or functioning of our activities which doesn't require an application for approval under the Regulations or our permit.

2.0 Material acceptance

All non-waste agricultural crops accepted at our facilities have been specifically grown for anaerobic digestion. As such, the acceptance of crops onto site as a raw material will be subject to the same material acceptance procedures as documented in our Feedstock Pre-Acceptance Procedure and Feedstock Agreement.

All incoming raw material delivered to site will go over the weighbridge and the quantity of all inbound material will be accurately recorded on our Wastemetrics system (see 3.0 below).

All vehicles delivering crops will then enter the waste reception and processing building to deposit each load within the designated reception bay for temporary storage pending pre-treatment. 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. They will also ensure they are booked in on the pre-agreed Commercial schedule.

The quantity of arable crops received on site will be dependent on the availability and variability of existing suitable waste feedstocks. The acceptance of crops is intended to supplement and not replace waste feedstock acceptance. Therefore, it is difficult to estimate at this time the percentage breakdown of crops to waste feedstocks as this is likely to be subject to variation. As a guide, typical crop acceptance quantities may include approximately 50 tonnes of maize and 25 tonnes of oil seed rape per week for example. However, the level and rate of acceptance will also be dependent on digester biology and biogas yield as monitored by site engineers in collaboration with Biogen's established Research Team. Our Research Team form part of the pre-waste acceptance team and provide feedback and advice on new feedstocks and process monitoring.

3.0 Duty of Care

Biogen's Integrated Management System (IMS) utilises an electronic management software system that stores all data relating to pre-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".

All incoming and outgoing waste and raw material movements are recorded and retained on the software system and are available for inspection on request. All appropriate measures will continue to take place to ensure that raw materials are used efficiently. This will include, where applicable, a review and record at least every four years and to take any further appropriate measures identified following a review.

The acceptance of raw materials in the form of non-waste crops will therefore not be subject to the waste duty of care obligations at the point of entry to site and deliveries will not be accompanied by a written description in the form of a Waste Transfer Note.

Incoming crops will be classified as waste from the point of tipping in the reception hall when directly stored, mixed and/or blended with waste and will therefore be subject to the waste regulatory regime and recorded as necessary. The quantities of waste generated as a result of pre-treatment activities will contribute to the sites maximum annual waste throughput and incorporated into the quarterly returns.

Waste crops such as maize and oil seed rape for example, will be recorded as EWC codes 02 01 03 plant-tissue waste or 02 03 04 materials unsuitable for consumption or processing. Both EWC codes are contained in the permitted waste list specified in the permit and no permit variation is required.

4.0 Feedstock management

The non-waste crops will be stored in clamps off site and will be brought in only as and when needed. As mentioned above, the incoming crop will be tipped in the reception hall thus using all of the same measures and controls that are in place for food waste.

Once tipped, incoming crops will be stored in sealed bays in the reception building served by negative air extraction (minimum of three air changes per hour) with all extracted air subject to odour abatement as required by the permit.

All feedstocks stored pending pre-treatment will be held within a fully enclosed building with impermeable surfacing and sealed drainage in accordance with the permit. No waste or crops will be stored outside of the building or in any clamps.

5.0 Housekeeping measures

Housekeeping measures will continue to take place in accordance with our documented Housekeeping Management Procedure. This will include, but not limited to, frequent jet washing to ensure all storage and pre-treatment areas are kept clean, safe and fit for purpose.

Pest control measures will continue to take place in accordance with our documented Pest Control Procedure and all records kept as required for inspection. This will include regular site attendance by an independent third-party pest control service.

6.0 Pre-treatment

Once tipped, the load is visually inspected for any non-conforming items, and once mixed and blended with other feedstocks, 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.

Once mixed and/or blended and loaded into the hopper all feedstocks will continue to be subject to the same pre-treatment activities. This includes shredding, screening, compaction, or maceration (de-packaging) to separate the organics from the contaminants.

Following pre-treatment, to achieve the optimum biological conditions, we agitate the contents of the Raw Waste Buffer Tank (RWBT) to ensure a homogenous mix. All incoming crops will be sourced to ensure as a feedstock they can be readily mixed to form 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.

7.0 Digestion

No new treatment activities or changes to the existing digestion process are to be introduced to site as a result of our decision to accept crop-based feedstocks and therefore no permit variation is required. All crop-based feedstocks will be subject to the exact same pre-treatment and digestion process as all other existing feedstocks. Our decision to accept crop-based feedstocks is to maintain healthy digester performance and to continue to generate high biogas yields when required to supplement current waste feedstocks.

Existing control measures will be 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.

Based on samples taken to date, the maize ranges from 337 to 435 kW/AD tonne with a biological methane production (BMP) of 286 – 297 l CH₄/kg VS for maize. The Oil Seed Rape (OSR) has shown an average of 1812 kW/AD tonne and 505 l CH₄/kg VS. It is important to note that there will be variation across the country as specific soil types will have a huge impact on the quality, for this reason samples will be taken by area and crop to obtain accurate data and guide feeding rates. It is important to note that Biogen already run agri-AD sites, so we have knowledge and operational experience of managing these feedstocks.