

Acorn Bioenergy Operations Limited, Three Maids AD Plant, Permitted Activities, March 2024

Table 1 details the proposed permitted waste types which align with the waste codes and restrictions in Standard Rules permit SR2021 No.8 On-farm anaerobic digestion facility using farm wastes only, including use of the resultant biogas – installations¹

Table 1 – Proposed Permitted Waste Types

Waste code	Description
02 Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing	
02 01 Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing	
02 01 01	Sludges from washing and cleaning – vegetables, fruit and other crops
02 01 03	Plant-tissue waste
02 01 06	Animal faeces, urine and manure (including spoiled fully biodegradable animal bedding)
02 01 99	Wastes not otherwise specified – spent mushroom compost from commercial mushroom growing only
02 05 Wastes from the dairy products industry	
02 05 01	Materials unsuitable for consumption or processing – biodegradable wastes derived from the processing of dairy products only
02 05 02	Sludges from on-site effluent treatment
16 Wastes not otherwise specified in the list	

¹<https://www.gov.uk/government/publications/sr2021-no-8-on-farm-anaerobic-digestion-facility-using-farm-wastes-only-including-use-of-the-resultant-biogas-installations/sr2021-no-8-on-farm-anaerobic-digestion-facility-using-farm-wastes-only-including-use-of-the-resultant-biogas-installations#operations> Accessed 19 February 2024

Waste code	Description
16 10	Aqueous liquid waste destined for off-site treatment
16 10 02	Untreated wash waters from cleaning fruit and vegetables on farm only
16 10 02	Sludges from washing and cleaning fruit and vegetables on farm only
16 10 02	Milk and dairy waste milk from agricultural premises only
16 10 02	Liquor or leachate from a composting or anaerobic process that accepts waste input types listed in these standard rules or composting and anaerobic digestion standard rules only, and in compliance with Animal By-Products Regulations
19 Wastes from waste management facilities, off-site wastewater treatment plants and preparation of water intended for human consumption/industrial use	
19 06 Waste from the anaerobic treatment of waste	
19 06 03	Liquor from anaerobic treatment of municipal waste (from a process that accepts wastes listed in these standard rules or anaerobic digestion standard rules only) and made up of previously pasteurised and stabilised batches only
19 06 04	Digestate from anaerobic treatment of source segregated biodegradable waste (from a process that treats wastes which are listed in these standard rules only and pasteurised)

Table 2 details the proposed Listed Activity and Directly Associated Activities at the Three Maids AD Plant.

Table 2 – Proposed Listed & Directly Associated Activities

Permitted Activities	Description of Activity	Limits of activity
<p>Listed Activity - Schedule 1 of the EPR under S5.4 A(1) (b) (i).</p>	<p>Recovery or a mix of recovery and disposal of non-hazardous waste with a treatment capacity exceeding 100 tonnes a day involving biological treatment.</p> <p>Under Waste Framework Directive (WFD) Annex II operations, the listed activity is R3 – recycling and reclaiming organic substances which are not used as solvents.</p>	<p>a) treatment of waste by anaerobic digestion, in accordance with waste types listed under Table 1.</p> <p>b) the maximum throughput of animal wastes* shall be no more than 10 tonnes each day.</p> <p>c) No hazardous waste will be accepted</p>
<p>Directly Associated Activity (DAA) - Storage of waste pending recovery or disposal</p>	<p>Under WFD Annex II operations, activity is R13 – storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced).</p>	<p>Storage of up to 400 tonnes of solid manure waste on an impermeable surface with sealed drainage (inside the Manure reception building with air handling and emissions abatement plant).</p> <p>Storage of liquid wastes, namely liquid slurry pending treatment in 1 No. 400 m³ Liquid feedstock tank within secondary containment system.</p> <p>Storage of silage liquor and dirty water pending treatment in 1 No. Silage leachate tank (50 m³) with leak detection and 2 No. Process water tanks (400 m³ each) within secondary containment system.</p>

Permitted Activities	Description of Activity	Limits of activity
		<p>Storage of digestate liquor in 1 No. digestate storage bag (7,344 m³) within a lined containment bund and in Process water buffer tank (100 m³) within the secondary containment system.</p> <p>Storage of digestate fibre in covered fibre storage bay (maximum 302 tonnes at any one time / tonnage to be confirmed through modelling).</p>
DAA - Physical and chemical treatment of waste	Under WFD Annex II operations, activity is R3 – recycling and reclaiming organic substances which are not used as solvents.	<p>Pre-treatment of manures and slurries by maceration and screening prior to anaerobic digestion (all within enclosed systems).</p> <p>Heat treatment of digestate within 3 No. pasteurisation tanks (greater than 70°C for 1 hour).</p> <p>Separation of whole digestate in the 2 No. mechanical separators capable of separating up to 320 tonnes per day whole digestate each. The separators are within a Digestate separation bunker, a three-sided structure that incorporates a retractable top and front cover.</p> <p>Chemical addition for desulphurisation and trace element supplementation.</p>
DAA - Gas combustion to produce heat and power	Under WFD Annex II operations, activity is R1 – use principally as a fuel or other means to generate energy.	<p>Burning of biogas or natural gas in 2 No. combined heat and power engines (CHPs) with an aggregated net rated thermal input of 5,687 kWthi.</p> <p>Burning of biogas or natural gas in an emergency boiler with a net rated thermal input of 647 kWthi.</p>

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		Therefore, aggregated thermal input of appliances is 7,554 kWthi or 6.2 MWthi.
DAA – Treating biogas and biomethane	Under WFD Annex II operations, activity is R3 – recycling and reclaiming organic substances which are not used as solvents.	<p>Gas storage and drying.</p> <p>Gas cleaning and upgrading to biomethane by cooling, compression, scrubbing via carbon filters and filtration.</p> <p>Transportation off-site of biomethane via a virtual gas pipeline.</p>
DAA – Recovering, treating and storing carbon dioxide	Under WFD Annex II operations, activity is R3 – recycling and reclaiming organic substances which are not used as solvents.	<p>Gas cleaning and production of carbon dioxide (CO₂).</p> <p>Treatment of CO₂ via compression; drying, filtration and liquefaction.</p> <p>Storage of CO₂ in 2. No CO₂ storage tanks (50 m³ each) pending removal off site via a transfer filling station.</p>
DAA - Using an emergency flare	Under WFD Annex I operations, activity is D10 – incineration on land.	Use of the emergency flare to burn surplus biogas in emergency conditions or during extended maintenance activities.
DAA – Storage of raw material and waste generated on site	This activity relates to storing waste generated on site and raw materials.	<p>Raw materials will be stored securely, away from vehicle impact and with secondary containment as appropriate.</p> <p>Waste generated on-site will be stored securely pending collection and removal to an appropriate regulated facility.</p>

Permitted Activities	Description of Activity	Limits of activity
DAA - Surface water collection, storage and discharge	Collection and discharge of clean surface water.	<p>Collection of rainwater from building roofs and clean external concrete areas.</p> <p>Storage of water in rainwater harvesting tanks and underground cellular storage system.</p> <p>Treatment of surface water via a full retention separator where appropriate.</p> <p>Discharge of excess clean water to ground.</p>
DAA - Dirty water collection and storage	Collection and reuse of dirty water.	Collection and storage of dirty water from dirty areas including Manure reception building, silage clamps, secondary containment area and dirty yard areas to ancillary dirty water storage tanks prior to use in the anaerobic digestion process.
DAA - Air treatment and release	Collection and treatment of air to reduce emissions to air.	<p>Collection of air from the Manure reception building via an air handling system.</p> <p>Treatment of air in emissions abatement plant via sulphuric acid scrubber (to reduce ammonia), high intensity ultraviolet (UV) light treatment (to breakdown complex compounds and to produce ozone, which is used to oxidise Volatile Organic Compounds (VOCs)) and double layer carbon filter as a final polishing step.</p> <p>Release of treated air via a 15.5m stack.</p>

* 'animal waste' means any waste consisting of animal matter that has not been processed into food for human consumption. This does include, blood, feathers, uncooked butchers waste and any other animal waste that is not catering waste or former foodstuffs. This does not include faecal matter from animals.