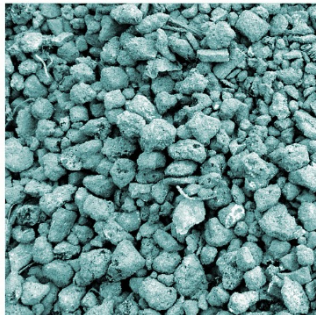
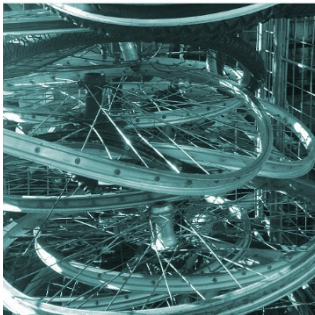
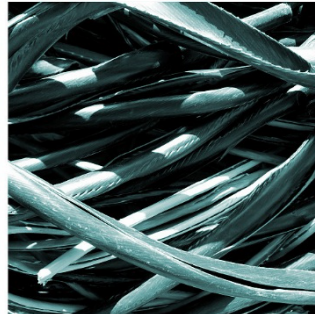


BIO DYNAMIC UK LIMITED

PERMIT VARIATION APPLICATION

Waste Reduction
April 2022



REPORT SCHEDULE

Operator: Bio Dynamic UK Limited

Client: Bio Dynamic UK Limited

Project Title: Bio Dynamic UK Limited Permit Variation Application

Document Title: Waste Reduction

Document Reference: HC1677-21

Report Status: Final 1.0

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APPROVED	
Joanna Holland	13 th August 2022

REVISION HISTORY	DATE	COMMENTS	APPROVED
Final Version 1.0	19 th August 2022	For Client Comment	Maxwell Bagnall

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1. INTRODUCTION

1.1. Introduction

- 1.1.1. The Bio Dynamic UK Limited AD facility is designed to process waste feedstocks to produce gas that is burnt in either a CHP engine to produce electricity or upgraded to biomethane for injection into the national gas grid network.
- 1.1.2. Most wastes arising from this process are recovered or reused. This document outlines the process by which this occurs.

2. WASTES PRODUCED AND FINAL USE

2.1. Recovery and Use of Wastes

- 2.1.1. The outputs of the Anaerobic Digestion process are digestate and biogas. These are both recovered for further use in the following way:
- 2.1.2. Biogas produced at the site is recovered when processed in the on-site CHP engines.
- 2.1.3. Biogas exported to the BD Gas Permits upgrading facility is upgraded to biomethane and recovered when injected into the national grid network.
- 2.1.4. Whole digestate is used on agricultural land as a biofertiliser.
- 2.1.5. Digestate produced from waste feedstocks will be considered to be a waste. This material can still be used as a biofertiliser on agricultural land but must be recovered in this way according to waste regulatory controls. The operator is PAS110 certified and so achieves end of waste status of the material according to the Quality Protocol for Production of Quality Digestate and PAS110 standard. Either way the digestate will be spread to land as a biofertiliser as a waste or non-waste and will be recovered in this way.
- 2.1.6. As part of the phase 2 refurbishment at the site, the operator will install a new digestate dewatering and filtrate treatment system and final effluent will be discharged to surface water.

2.2. Other Wastes

- 2.2.1. There are very few other waste streams arising from the operation at the Bio Dynamic UK Limited AD facility. Raw materials such as ferric chloride and trace elements are used up within the process.
- 2.2.2. Packaging removed from wastes will be dispatched as wastes from the site for energy recovery or landfill.
- 2.2.3. Small amounts of office/domestic waste are likely to arise, as will small amounts of waste oil, oil filters, and oily rags from servicing of the engines, and spent media from the carbon filters associated with carbon filters serving the engines and odour abatement system. These wastes will be consigned off site for recovery and reuse.
- 2.2.4. Condensate from the gas lines and BD Gas permits upgrading process will be collected and re-used within the anaerobic digestion process.
- 2.2.5. When unusual operational conditions occur, biogas that cannot be processed in the CHP or upgrading facility is burnt in an emergency flare or vented to atmosphere.
- 2.2.6. Domestic sewage is collected in a sealed cesspool and tankered offsite.
- 2.2.7. Surface water arising from roofs and roadways is discharged to ground or collected from concrete surfaces in a slump and pumped to a holding tank where it is used within the AD process.
- 2.2.8. Treated filtrate arising from the digestate dewatering and filtrate treatment system is released to surface water environment subject to satisfactory monitoring results of benchmark quality thresholds.

- 2.2.9. Air from the main reception shed, displaced air from site storage and process tanks, and displaced air from vacuum tankers collecting digestate is passed through odour abatement systems before being released to atmosphere from point source release points. These are subject to monitoring and assessment as outlined in the various management plans in the site EMS and according to the requirements of the site permit.

Annex 1 – Wastewater and Waste Gas Stream Inventory**Process Flow Showing Generation of Waste Streams is Presented as HC1677-14b**

Material Stream	Emission Point Associated	Characteristics of Waste Gas/Water Stream	Characteristics/variability of generation and nature of material	Final Fate of Gas/Water Stream
Biogas	A7 – A13. Emergency Pressure Relief Valves on Digesters	Biogas vented to atmosphere during emergency conditions to avoid over pressure situations.	Very infrequent release short term occurrence only during emergency operational conditions. Use is subject to monitoring/reporting as laid out in site permit.	Biogas vented to atmosphere during emergency operations.
Combustion Exhaust Gases	A1 – A6 and A14. 4x CHP Exhaust Vents, a backup diesel boiler vent, and Two Emergency Flares	Exhaust from CHP's and Flares which burn biogas, and boiler which burns diesel.	CHPs in regular use and subject to monitoring/ELV's on permit. Flares and boiler only used in emergency/backup situations and use is subject to monitoring and reporting as laid out in site permit.	Exhaust emissions vented to atmosphere.
Displaced air/gas from tank headspace	A15 and A16. Pasteurisers buffer tanks and pre-storage tanks displaced air vents. Air is diverted to odour abatement system associated with main reception shed and extracted/treated.	Odorous gases characteristic of the digestate and waste being stored or treated in the tank or pasteuriser.	Emissions abated through an odour abatement system.	Treated/abated emissions vented to atmosphere at A15 and A16.
Condensate	No emissions point	Arising from gas line and from gas conditioning prior to use in engines. Could be elevated in biogas components.	Produced in small quantities continuously while gas line in use and gas consumers.	Condensate is collected and re-circulated in the process.
Odour Abatement Unit Exhaust	A15 and A16. Abatement of air in reception shed and displaced air from	Extracted and treated gases from waste storage and handling areas and tanks. Potential for odour units, ammonia, and H ₂ S.	Odours characteristic of wastes accepted at the site. This will potentially vary according to different producers and seasons as outlined in the site odour	Treated air vents to atmosphere.

Material Stream	Emission Point Associated	Characteristics of Waste Gas/Water Stream	Characteristics/variability of generation and nature of material	Final Fate of Gas/Water Stream
	liquid storage and processing tanks.		management plan waste characterisation sections.	
Digestate Tanker Offtake Point	A18. Displaced air vented from vacuum tanker on filling	Digestate characteristic odour (ammonia based).	Waste gas stream produced intermittently for short bursts (c. 20 mins) when tankers are loading which may happen on a daily, weekly or monthly basis at different times of the year.	Vented to atmosphere following treatment through abatement unit.
Surface Water from Process Bund	No emission point – all surface water in bund is collected and re-used in the process.	Could be clean surface water or could be lightly contaminated with digestate.	Will depend on activities taking place at the site, and rainfall.	Surface water is retained and pumped into a holding tank prior to use in the process.
Final Digestate – PAS110 certified end of waste material	Not released except via tanker removal.	Ammonia and nutrient rich organic fertiliser	Produced to certified PAS110 standard and so limited variability within a given identified range.	Spread to land as a final product for use in agriculture as a biofertiliser.
Treated filtrate arising from the digestate dewatering and filtrate treatment system	W1 – Release point from site to river Trent	Anticipated parameters of final effluent are given in the site risk assessment H1 screening assessment.	Material should be consistent in its characteristics due to nature of process of generation and treatment.	Discharge to river Trent.
Displaced air from digestate dewatering and filtrate treatment system	A17 and A19. A17 is a displaced air vent from the filtrate holding tank and A19 a pressure relief valve on the MBR	Potentially digestate characteristics	PRV will be intermittent emergency only. Filtrate tank likely to be in continuous use with tank levels not fluctuating greatly but maintaining a steady state level.	Displaced air vented to atmosphere unabated. Subject to daily sniff test monitoring.



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