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MINING AND MINERAL PROCESSING
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WASTE RESOURCE MANAGEMENT



THORNFIELD 001 LIMITED

BARNES FARM ANAEROBIC DIGESTION FACILITY

NON-TECHNICAL SUMMARY

DECEMBER 2022

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THORNFIELD 001 LIMITED

BARNES FARM ANAEROBIC DIGESTION FACILITY

NON-TECHNICAL SUMMARY

NOVEMBER 2022

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DRAWINGS	TITLE	SCALE
ST19738-004	Permit Boundary Plan	1:1000 @ A3
ST19738-005	Amendments to Permit Boundary	1:100 @ A3

1 INTRODUCTION

- 1.1.1 Wardell Armstrong LLP has been commissioned by Thornfield 001 Ltd (“the operator”) to support its application to vary the environmental permit (EPR/VP3506PE) for its Barnes Farm Anaerobic Digestion Plant in Rowton, Telford.
- 1.1.2 The facility treats up to 90,000 tonnes of biodegradable wastes and is permitted as an installation falling under Section 5.4 (1)(b)(i) activity under the environmental Permitted Regulations. The site is also permitted for a number of directly associated activities (DAAs) which support the process. The site generates biomethane (gas) for the National Grid and produces a PAS 110 compliant digestate, which is sold for land improvement applications.
- 1.1.3 The proposed variation will allow for the addition of an oil separator to the plant, used separate bio-oil before pasteurisation, which can then be sent to an appropriate outlet for recycling.
- 1.1.4 Additionally, the operator proposes to replace two CHP biogas engines with a single natural gas CHP engine, resulting in cleaner emissions to air.
- 1.1.5 The variation will also allow for an additional waste code for glycerol to be accepted, as well as making a slight amendment to the permit boundary to accommodate the as-built layout.
- 1.1.6 This permit application has been prepared to demonstrate that the new activities will be operated in accordance with best available techniques (BAT), with stringent environmental protection measures in place to prevent risk to the environment and human health.

2 SITE SETTING

- 2.1.1 Barnes Farm is located approximately 1.2 kilometres east of the village of Rowton and approximately 1.8 kilometres west of Waters Upton within the county of Shropshire (National Grid Reference SJ 6234 1949).
- 2.1.2 The surrounding area generally comprises a mixture of arable and pastoral farmland. The nearest residential properties are Barnes Cottages (approximately 75m east), Barnes Farm House (approximately 390m north), and Melverley Farm (approximately 350m west). The River Tern runs to the east, approximately 450m from the site at its closest point.

- 2.1.3 There are no European Sites within 10km of the site and no other protected habitats within 2km of the site. The site is not in an air quality management area and it is not in a source protection zone.
- 2.1.4 The site boundary is shown on drawing reference ST16738-004, which includes a slight amendment from the previous site boundary as shown in drawing ST19738-005.

3 SITE ACTIVITIES

3.1 Current Permitted Activities

3.1.1 The facility is permitted to treat up to 90,000 tonnes per annum of non-hazardous biodegradable waste in the form of either slurry or liquid wastes. This activity falls under Section 5.4 (1)(b)(i) of EPR 2016, that is the 'Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion)' involving biological treatment.

3.1.2 The site's environmental permit also allows a number directly associated activities (DAAs) to support the main anaerobic digestion activity, namely:

- (i) Storage of waste pending recovery or disposal;
- (ii) Physical treatment of waste for the purpose of recycling;
- (iii) Steam and electrical power supply;
- (iv) Emergency flare operation;
- (v) Gas upgrading;
- (vi) Raw material storage;
- (vii) Gas storage; and
- (viii) Digestate storage.

3.1.3 The treatment process generates biogas, which the site is currently permitted to upgrade to biomethane and provide to the National Gas Grid for domestic energy use, and for use to generate electricity using two combined heat and power (CHP) gas engines for use on site or to supply to the national grid.

3.2 Proposed New Activities

3.2.1 The proposed variation will include the addition of a centrifuge oil separator fed from the heat exchanger feed line, which will remove bio-oil from the waste prior to

pasteurisation. This will classify as a new activity for the physical treatment of wastes, and will result in the production of natural oils which may then be recycled, for example into biofuel. A full description of the process is provided in the supporting Operating Techniques Addendum.

- 3.2.2 The operator also proposes to replace the two biogas CHP engines with a single natural gas engine which will provide heat and power to the site only. The new engine will have a rated thermal input of 2.4MWth and will class as a Medium Combustion Plant (MCP). This change will result in a cleaner fuel supply, therefore reducing the risk from emissions to air.
- 3.2.3 The operator further proposed to add additional waste type to the permitted list of wastes for acceptance. It is proposed that glycerol waste will be accepted under EWC 19 02 10 *combustible wastes other than those mentioned in 19 02 08 and 19 02 09*. This is very similar to other waste types accepted under the permit, therefore it is considered that there will be no additional risk or further environmental measures required to accept the new waste type.
- 3.2.4 The operator further proposes to make a very slight adjustment to the permit boundary to include the full extent of the site's external bund, accounting for the as-built layout of the plant. The new permit boundary is provided in Drawing ST19738-004.

4 PERMIT VARIATION

4.1 Application Details

4.1.1 The following documents have been provided to support the proposed variation:

- Application forms A, C2, C3, and F1;
- Non-Technical Summary;
- An Operating Techniques Addendum;
- Environmental Risk Assessment; and
- Updated Odour Management Plan.
- Drawings
 - Updated site plan.

4.1.2 The documents demonstrate that the site will continue to be operated in accordance with Environment Agency guidance and relevant legislation, utilising the appropriate best available techniques.

4.2 Proposed Changes to Permit Conditions

4.2.1 The proposed variation will require a number of changes to the environmental permit, allowing operation of the new activities in accordance with relevant legislation. Table 1 below provides a summary of the specific changes to the permit conditions.

Table 1: Proposed Changes to Permit Conditions	
Permit Reference	Proposed Changes
Schedule 1, Table S1.1	Add new activity for the Physical Treatment of Waste for the purpose of recycling (R3: Recycling/ reclamation of organic substances which are not used as solvents). Treatment of waste (slurry from heat treatment) in an oil separation centrifuge.
Schedule 1, Table S1.1	Amend AR4 to refer to remove reference to 2x biogas CHP units. Replace with combustion of natural gas in a CHP engine with a rated thermal input of 2.4MWth
Schedule 1, Table S1.1	Add new activity to cover storage of recovered oils from oil separator
Schedule 1, Table S2.2	Additional waste code for the acceptance of waste glycerol: EWC 19 02 10 Glycerol not designated as hazardous – excludes 19 02 08.
Schedule 1, Table S3.1	Parameters and monitoring frequency for CHP engine 1 and CHP engine 2 will need to be replaced to reflect change to a single natural gas CHP engine. The new stack location is SJ 62216 19411 (the same as CHP 2 in the extant permit) As natural gas is a much cleaner fuel it should only be necessary to monitor oxides of nitrogen (NO _x), in compliance with Medium Combustion Plant Directive.
Schedule 1, Table S3.2 and S4.1	Updated to remove references to VOCs from gas engines due to the change in fuel from biogas to natural gas.
Annex 1 of MCP	Amend to reflect new MCP details
Schedule 7 Site Plan	Replace site plan with drawing ST19738

5 ENVIRONMENTAL RISK AND IMPACT

5.1.1 The site is operated to provide a high level of protection to the environment.

5.1.2 The bio-oil tank will be of appropriate construction and will be within a bund holding a minimum of 110% of the capacity of the tank with appropriate containment around the loading point.

5.1.3 There will be written procedures for filling of tanks protecting against spills and over filling.

- 5.1.4 Natural gas is a cleaner fuel than biogas, this change in fuel for the CHP will reduce potential emissions of sulphur dioxide and volatile organic compounds.
- 5.1.5 The CHP unit will operate in accordance with the Medium Combustion Plant Directive, controlling emissions to air.
- 5.1.6 The oil separation treatment is an enclosed process and the equipment will be within a bunded area so that any leaks will be fully contained.
- 5.1.7 The Site Condition Report submitted with the original application confirms the site and surrounding land has previously been used as farmland and has not been subject to industrial use. It is considered very unlikely that there is any significant contamination present on the site and no proposed emissions to land or water. Therefore, the amended permit boundary will not cause any evident environmental risk.
- 5.1.8 Overall, it is considered there will be no increased risk to the environment resulting from the proposed variations.

DRAWINGS



319600

362200

319500

PRESSURE REDUCTION SYSTEM

NATURAL GAS PIPELINE

Settling Pond

319400

Gas Production Site

OIL SEPARATION TANKER POINT

CHP

OIL SEPARATION TANK

OIL SEPARATOR

Tanks

319300

KEY

PERMIT BOUNDARY

A FIRST ISSUE 29-11-22 DR KH AC

REVISION DETAILS DATE DRN CHKD APPD

CLIENT THORNIELD 001 LTD

PROJECT BARNES FARM AD PLANT

DRAWING TITLE PERMIT BOUNDARY PLAN

DRG No. ST19738-004 REV A SUIT. CODE

DRG SIZE A3 SCALE 1:1000 DATE 10-10-22

DRAWN BY DR CHECKED BY KH APPROVED BY AC

0m 50m SCALE 1:200





319600

362200

319500

PRESSURE REDUCTION SYSTEM

NATURAL GAS PIPELINE

Settling Pond

319400

Gas Production Site
OIL SEPARATION TANKER POINT

CHP

OIL SEPARATION TANK

OIL SEPARATOR

Tanks

319300

0m 50m
SCALE 1:200

KEY

- ORIGINAL PERMIT BOUNDARY
- AMENDED PERMIT BOUNDARY

A	FIRST ISSUE	29-11-22	DR	KH	AC
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REVISION	DETAILS	DATE	DRN	CHK'D	APP'D
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CLIENT	THORNIELD 001 LTD
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PROJECT	BARNES FARM AD PLANT
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DRAWING TITLE	AMENDMENTS TO PERMIT BOUNDARY
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DRG No.	ST19738-005	REV	A	SUIT. CODE
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DRG SIZE	A3	SCALE	1:1000	DATE	10-10-22
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DRAWN BY	DR	CHECKED BY	KH	APPROVED BY	AC
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