

Permit with introductory note

The Environmental Permitting (England & Wales) Regulations 2010

Energy 10 Greenwich Limited
Morden Wharf Pyrolysis Facility
Morden Wharf
Tunnel Avenue
Greenwich
SE10 0NU

Permit number

EPR/UP3031VL

Morden Wharf Pyrolysis Facility

Permit number EPR/UP3031VL

Introductory note

This introductory note does not form a part of the permit

The main features of the permit are as follows.

This permit controls the operation of a waste pyrolysis plant located at Morden Wharf in Greenwich. The relevant listed activity is Section 1.2 Part A(1)(j)(iv). The thermal treatment of the waste will produce a fuel gas, known as syngas, which will be compressed into high pressure gas storage vessels for export off-site. A portion of the syngas will be consumed on-site for the generation of heat for the pyrolysis unit, and renewable electricity from the recovery of waste heat.

The site will process a maximum quantity of 100,000 tonnes of waste feedstock per annum via a single pyrolysis chamber with a maximum rate of 12 tonnes per hour.

Produced syngas will be purified to the extent that it will no longer be classed as a waste, and its combustion will result in emissions no higher than those resulting from the combustion of natural gas.

All feedstock will be delivered to site in pre-prepared format (sealed containers ~ bags / bales). Non-hazardous feedstocks will be stored externally in designated storage bays, whilst waste classed as hazardous will be stored internally within the process building. Waste will be colour coded in order to facilitate this:

- Black - non-hazardous refuse derived fuel (RDF).
- Green - non-hazardous biomass / waste wood
- Red - hazardous classified packaging (e.g. oil contaminated rags).

Feedstock will be selected from the site inventory and transferred to the inlet hopper (located within the process building) of the pyrolysis feed system. From here an internal ball mill and mixing chamber will provide further blending of the waste prior to being conveyed into the main storage hopper (day supply).

From the day hopper, feed will be conveyed into a surge hopper (15 minute supply) and then augured into the fuel feed system (a sealed vertical feed system equipped with nitrogen and carbon dioxide purge - for minimising ingress oxygen) prior to feed directly into the pyrolysis chamber.

Within the pyrolysis chamber, waste will be heated to ~ 850°C in the absence of oxygen (undergoing pyrolysis). During this process syngas will be formed by controlled rate (by regulation of waste feed vs chamber rotation). The pyrolysis retort will initially be heated by burning LPG.

After exiting the pyrolysis chamber the syngas will be reheated to 850°C to 1150°C to crack tar materials. The gas will then be cleaned using an inline eductor scrubber, venturi and packed tower scrubbers followed by an activated carbon filter. Most of the syngas will be compressed and exported off site for use as a fuel by other users, although a small portion of the cleaned gas will be burned instead of LPG to heat the pyrolysis chamber after start-up.

Gases resulting from LPG or syngas combustion will be passed through a waste heat recovery boiler to generate steam, which will then drive a steam turbine to generate electricity at up to 3MWe. Electricity from this will be exported to the National Grid.

Chapter IV of the Industrial Emissions Directive does not apply whereby article 42 (1) is achieved – deeming syngas as no longer a waste and that it can cause emissions no higher than combustion of natural gas. The applicant has demonstrated that emissions will be no higher than from combustion of natural gas at their sister plant in Huntingdon, and we are satisfied that this can be achieved at this site. An improvement condition is included within the permit to allow the analysis of syngas once operational in support of this.

In addition to the above, the applicant has not applied for 'end of waste opinion' on the syngas that will be exported from the site. Opinion has been provided for Huntingdon, however this site differs by authorisation of onsite combustion. A pre-operation condition is included within this permit requiring the operator to confirm 'certainty of use' by presenting documentation, such as sale contracts, prior to commencing operations.

Land surrounding the Installation is predominantly industrial, with the nearest residential properties being approximately 400m away. The River Thames is immediately to the east of the installation. The Installation will be located on a minor aquifer but not within a source protection zone. Epping Forest is the nearest habitat site at ~8km away. There are no Sites of Special Scientific Interest within 2km. The closest other ecological site is the River Thames adjacent to the installation.

The Installation is located in an air quality management area declared for NO₂ and PM10

The operator will have an Environmental Management System.

The status log of the permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	Date	Comments
Application EPR/UP3031VL/A001	Duly made 02/10/2014	Application for pyrolysis plant.
Further Information by Schedule 5 Response	Notice dated 02/03/2015	Response received 26/05/2015
Additional information received	15/07/2015	Email providing clarification over storage of syngas product / any other flammable / hazardous materials onsite.
Permit determined EPR/UP3031VL (PAS Billing ref. UP3031VL)	25/09/2015	Permit issued to Energy 10 Greenwich Limited.

End of introductory note

Permit

The Environmental Permitting (England and Wales) Regulations 2010

Permit number

EPR/UP3031VL

The Environment Agency hereby authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2010

Energy 10 Greenwich Limited (“the operator”),

whose registered office is

**9 Lanark Square
London
E14 9RE**

company registration number 08410098

to operate an installation at

**Morden Wharf Pyrolysis Facility
Morden Wharf
Tunnel Avenue
Greenwich
SE10 0NU**

to the extent authorised by and subject to the conditions of this permit.

Name	Date
Philip Lamb	25/09/2015

Authorised on behalf of the Environment Agency

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

- (a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and
- (b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.2 Energy efficiency

1.2.1 The operator shall:

- (a) take appropriate measures to ensure that energy is used efficiently in the activities;
- (b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and
- (c) take any further appropriate measures identified by a review.

1.3 Efficient use of raw materials

1.3.1 The operator shall:

- (a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;
- (b) maintain records of raw materials and water used in the activities;
- (c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and
- (d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

1.4.1 The operator shall take appropriate measures to ensure that:

- (a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and
- (b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and
- (c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.

- 1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

- 2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the "activities").

2.2 The site

- 2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

- 2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.
- 2.3.2 If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan or other documentation ("plan") specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.
- 2.3.3 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.
- 2.3.4 Waste shall only be accepted if:
- (a) it is of a type and quantity listed in schedule 2 table S2.2; and
 - (b) it conforms to the description in the documentation supplied by the producer and holder.
- 2.3.5 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:
- (a) the nature of the process producing the waste;
 - (b) the composition of the waste;
 - (c) the handling requirements of the waste;
 - (d) the hazardous property associated with the waste, if applicable; and
 - (e) the waste code of the waste.
- 2.3.6 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.
- 2.3.7 Waste shall not be charged to the pyrolysis unit, if:
- (a) any process monitoring limit in schedule 3 table S3.3 is exceeded for any 2 consecutive samples. The pyrolysis unit shall not be brought back into operation until the cause for the exceedence is found and rectified.
 - (b) Syngas is being burned in the flare, except during start-up, shutdown or for emergency reasons.

2.4 Hazardous waste storage and treatment

- 2.4.1 Hazardous waste shall not be mixed, either with a different category of hazardous waste or with other waste, substances or materials, unless it is authorised by schedule 1 table S1.1 and appropriate measures are taken.

2.5 Improvement programme

- 2.5.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency.
- 2.5.2 Except in the case of an improvement which consists only of a submission to the Environment Agency, the operator shall notify the Environment Agency within 14 days of completion of each improvement.

2.6 Pre-operational conditions

- 2.6.1 The activities shall not be brought into operation until the measures specified in schedule 1 table S1.4 have been completed.

3 Emissions and monitoring

3.1 Emissions to water, air or land

- 3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1, and S3.2.
- 3.1.2 The limits given in schedule 3 shall not be exceeded.
- 3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

3.2 Emissions of substances not controlled by emission limits

- 3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.
- 3.2.2 The operator shall:
- (a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;
 - (b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.
- 3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Odour

- 3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used

appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.3.2 The operator shall:

- (a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;
- (b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.4 Noise and vibration

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.4.2 The operator shall:

- (a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;
- (b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.5 Monitoring

3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring specified in the following tables in schedule 3 to this permit:

- (a) point source emissions specified in tables S3.1 and S3.2;
- (b) process monitoring specified in table S3.3;

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the Environment Agency.

3.5.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1, S3.2 and S3.3 unless otherwise agreed in writing by the Environment Agency.

3.5.5 The monitoring frequency for total sulphur, hydrogen sulphide, total halogenated hydrocarbons, heavy metals and total aromatic hydrocarbons as referred to in Table S3.3 shall be:

- (a) Daily. After 7 successive daily samples in which the limit is not exceeded, monitoring frequency can be carried out as specified in 3.5.5 (b);
- (b) Weekly. After 4 successive weekly samples in which the limit is not exceeded, monitoring frequency can be carried out as specified in 3.5.5 (c). If a weekly sample exceeds the limit then monitoring shall be carried out as specified in 3.5.5 (a).

- (c) Monthly. After 3 monthly successive samples in which the limit is not exceeded, monitoring frequency can be carried out as specified in 3.5.5 (d). If a monthly sample exceeds the limit then monitoring shall be carried out as specified in 3.5.5 (b).
- (d) Quarterly. If a Quarterly sample exceeds the limit then monitoring shall be carried out as specified in 3.5.5 (b).

3.5.6 If any sample exceeds a limit in Table S3.3 then a further sample for that parameter shall be taken within 1 week or sooner if required by condition 3.5.5

3.6 Pests

3.6.1 The activities shall not give rise to the presence of pests which are likely to cause pollution, hazard or annoyance outside the boundary of the site. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved pests management plan, have been taken to prevent or where that is not practicable, to minimise the presence of pests on the site.

3.6.2 The operator shall:

- (a) if notified by the Environment Agency, submit to the Environment Agency for approval within the period specified, a pests management plan which identifies and minimises risks of pollution from pests;
- (b) implement the pests management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

- (a) be legible;
- (b) be made as soon as reasonably practicable;
- (c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and
- (d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:
 - (i) off-site environmental effects; and
 - (ii) matters which affect the condition of the land and groundwater.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

4.2 Reporting

4.2.1 The operator shall send all reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to the Environment Agency by 31 January (or other date agreed in writing by the Environment Agency) each year. The report(s) shall include as a minimum:

- (a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;
- (b) the annual production / treatment data set out in schedule 4 table S4.2; and
- (c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule.

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

- (a) in respect of the parameters and emission points specified in schedule 4 table S4.1;
- (b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.4 ; and
- (c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.2.5 Within 1 month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter, if during that quarter the total amount accepted exceeds 100 tonnes of non-hazardous waste or 10 tonnes of hazardous waste.

4.3 Notifications

4.3.1 In the event:

- (a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately -
 - (i) inform the Environment Agency,
 - (ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and
 - (iii) take the measures necessary to prevent further possible incidents or accidents;
- (b) of a breach of any permit condition the operator must immediately—
 - (i) inform the Environment Agency, and
 - (ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;
- (c) of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1 (a)(i), or 4.3.1 (b)(i) where the information relates to the breach of a limit specified in the permit, shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 Where the Environment Agency has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform the Environment Agency when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this

information to the Environment Agency at least 14 days before the date the monitoring is to be undertaken.

4.3.4 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

- (a) any change in the operator's trading name, registered name or registered office address; and
- (b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

- (a) any change in the operator's name or address; and
- (b) any steps taken with a view to the dissolution of the operator.

In any other case:

- (a) the death of any of the named operators (where the operator consists of more than one named individual);
- (b) any change in the operator's name(s) or address(es); and
- (c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

- (a) the Environment Agency shall be notified at least 14 days before making the change; and
- (b) the notification shall contain a description of the proposed change in operation.

4.3.6 The Environment Agency shall be given at least 14 days notice before implementation of any part of the site closure plan.

4.3.7 Where the operator has entered into a climate change agreement with the Government, the Environment Agency shall be notified within one month of:

- (a) a decision by the Secretary of State not to re-certify the agreement;
- (b) a decision by either the operator or the Secretary of State to terminate the agreement; and
- (c) any subsequent decision by the Secretary of State to re-certify such an agreement.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "immediately" in which case it may be provided by telephone.

Schedule 1 – Operations

Table S1.1 activities			
Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity and waste types
A1	S1.2 A(1)(j)(iv)	Pyrolysis of waste	From the receipt of waste for charging into the pyrolysis system to the transfer of syngas off site. <i>Includes combustion with LPG or syngas to heat the pyrolysis unit.</i> Commissioning shall use LPG only. Only syngas which complies with table S3.3 of this permit [i.e. that which results in emissions no higher than those from the combustion of natural gas] shall be burned onsite, and only those waste types and quantities as specified in tables S2.2.
A2	5.6 A(1)(a)	Storage of hazardous waste prior to pyrolysis.	From receipt of waste to transfer to pyrolysis units. Storage inside the building. Waste types as specified in table S2.2.
Directly Associated Activity			
A3	Syngas purification	Syngas cleaning using thermal cracking, an inline eductor scrubber, venturi and packed tower scrubbers and activated carbon filter.	From receipt of raw syngas to transfer of purified syngas to the compression unit.
A4	Gas compression	Compression of syngas into high pressure gas storage vessels.	From receipt of purified syngas which complies with table S3.3 of this permit [i.e. that which results in emissions no higher than those from the combustion of natural gas] to the export of pressurised purified syngas off site.
A5	Electricity Generation	Generation of up to 3MWe by heat recovery boiler (waste heat from pyrolysis unit only) and steam turbine.	From receipt of waste heat to export of electricity to national grid.
A6	Emergency flare	Combustion of syngas in emergency flare.	From receipt of syngas to emission of combustion gases. For use at start up, shut down or for emergency reasons only.
A7	Char Treatment and Recovery	Char recovery and processing.	The receipt of char from main conversion chamber and thermal cracking processes, cooling, to storage in collection vessel pending offsite removal.

Table S1.2 Operating techniques		
Description	Parts	Date Received
Application	<ul style="list-style-type: none"> Volume 1: Section 3.3.1 (<i>excluding table 3.2, and sections 3.3.2 and 3.3.3</i>), Section 3.3.5, 3.3.6 (site maintenance) and 4.7; Volume 2: [Annex B, Annex D], and Application form B3. 	Duly Made 2/10/2014
Response to Schedule 5 Notice dated 02/03/2015	Response to questions 2, 7-11, 15, 20, 21, and annexes 1 and 6.	26/05/2015
Additional information	Email providing clarification over storage of syngas product / any other flammable / hazardous materials onsite.	15/07/2015

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC1	The Operator shall submit a written report to the Environment Agency on the implementation of its Environmental Management System and the progress made in the certification of the system by an external body or if appropriate submit a schedule by which the EMS will be certified.	Within 12 months of the date on which waste is first pyrolysed.
IC2	The Operator shall submit a written report to the Environment Agency on the commissioning of the installation. The report shall summarise the environmental and operational performance of the plant as installed against the design parameters set out in the Application. The report shall also include a review of the performance of the facility against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions.	Within 4 months of the completion of commissioning.
IC3	<p>The Operator shall carry out checks to verify that the syngas composition is lower than the limits specified in Table 3.3 across a range of operating scenarios and waste feedstock mixes, and that it meets the End of Waste criteria.</p> <p>The Operator shall also carry out analysis of at least 3 samples of natural gas for the parameters specified in table S3.3.</p> <p>A written report shall be submitted to the Environment Agency containing the results of syngas testing and natural gas analysis, and shall include but not be limited to:</p> <ul style="list-style-type: none"> A comparison of data between syngas and natural gas for the parameters specified in table S3.3 Details of the waste types that were pyrolysed to generate the syngas which was sampled and analysed during this verification Details of process parameters which could be used as surrogate monitoring to provide assurance that syngas quality as specified in table S3.3 will be achieved Details of any other monitoring / analysis undertaken for quality control for the supply of compressed syngas A statement of action (including timescales for implementation) to be taken should syngas levels be shown to have higher pollutant levels than detected within the natural gas analysis. 	Within 2 months of the completion of commissioning
IC4	<p>The Operator shall undertake a noise assessment during normal operations in accordance with the procedures given in BS4142: 2014 and BS7445: 2003 or other methodology as agreed with the Environment Agency - in order to validate the assessment provided within the schedule 5 response dated 26/05/2015.</p> <p>The assessment shall include, but not be limited to:</p> <ul style="list-style-type: none"> A review of the noise sources from the facility. Where any noise source(s) are identified as exhibiting tonal contributions, they shall be quantified by means of frequency analysis. A review of noise levels from static plant. 	Within 6 months of the completion of commissioning

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
	<ul style="list-style-type: none"> • Considerations of on-site vehicle movements. <p>A report shall be provided to the Agency detailing the findings of the assessment.</p>	
IC5	The operator shall submit a report on the recovery of char produced from process. The report shall include analysis of the char as specified in Section 5.4 of the Application and confirmation of its suitability for available recovery outlets.	6 months following commissioning
IC6	The operator shall submit a report on the performance of syngas clean up techniques to demonstrate the removal of pollutants as detailed in the application. The report shall include analysis of representative samples of char, syngas and scrubber residues to demonstrate the removal efficiency of acid gases, dioxins, heavy metals and ammonia abatement.	3 months following commissioning

Table S1.4 Pre-operational measures		
Reference	Pre-operational measures	
PO1	Prior to the commencement of final commissioning, the Operator shall send a summary of the site Environment Management System (EMS) to the Environment Agency and make available for inspection all documents and procedures which form part of the EMS. The EMS shall be developed in line with the requirements set out in Section 1 of How to comply with your environmental permit – Getting the basics right. The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit.	
PO2	At least three months before final commissioning, the operator shall submit proof of agreement for the export and sale of syngas, including evidence that no further processing to the syngas is required prior to use (or any other appropriate documentation demonstrating certainty of use of syngas) for approval in writing by the Environment Agency.	
PO3	<p>At least 2 months before final commissioning; the Operator shall provide a written commissioning plan including timelines for completion, for approval by the Environment Agency. The commissioning plan shall include :-</p> <ul style="list-style-type: none"> • Specific operational parameters for the activities listed in Table S1.1 required to define “final commissioning”. • a written plan for sampling and analysis of the syngas against the parameters set out in table S3.3 of the permit, • the expected emissions to the environment during the different stages of commissioning and final commissioning, • the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. • details of emergency scenarios under which the flare will be used, and confirmation that this will meet the operational requirements of guidance LFTGN05.. <p>Commissioning shall be carried out in accordance with the commissioning plan as approved.</p>	
PO4	<p>At least 1 month before final commissioning the operator shall submit a Syngas Monitoring Methodology for approval in writing by the Environment Agency - detailing how representative sampling and analysis of syngas will occur to demonstrate that it meets the limits specified in table S3.3. The methodology shall include, but not be limited to;</p> <ul style="list-style-type: none"> • Sample point location and evidence of homogenous sample collection. • Details of sampling methods, including duration, for representative sampling across different operating loads and waste feedstock. • Sample analysis methods, limits of detection and availability of laboratory accreditation for methods. • Procedures for implementing the requirements of conditions 3.5.5 and 3.5.6, including details of sampling, courier, analysis and reporting responsibilities and timescales. <p>The methodology shall be implemented in accordance with the Environment Agency’s written approval.</p>	

Table S1.4 Pre-operational measures	
Reference	Pre-operational measures
PO5	Prior to the commencement of final commissioning the Operator shall submit details of the start up and shut down operating procedures to the Environment Agency for approval. The submission shall include the operational parameters which will be met to define start up and shut down and details of how syngas will be dealt with during these periods.
PO6	The Operator shall submit a 'Fire Prevention Plan' to the Environment Agency for approval in writing. The plan must satisfy the requirements of Environment Agency guidance 'Fire prevention plans, version 2, March 2015' and give detailed consideration for flammable and combustible materials (including syngas cylinders) used and stored within the Installation.
PO7	Prior to the commencement of final commissioning the operator shall submit procedures for the management of out of specification syngas to the Environment Agency for approval in writing. Procedures shall include details of syngas specification, how syngas recirculation processes operate and identify processes for the management of syngas where any limit in Schedule 3 Table 3.3 has been exceeded and/or the requirements of conditions 3.5.5 or 3.5.6 are being met.

Schedule 2 – Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	Specification
-	-

Table S2.2 Permitted waste types and quantities for pyrolysis.	
Maximum quantity	100,000 tonnes per annum
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 03	plant-tissue waste
02 01 04	waste plastics (except packaging)
02 01 07	wastes from forestry
03	WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD
03 01	wastes from wood processing and the production of panels and furniture
03 01 01	waste bark and cork
03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04
07	WASTES FROM ORGANIC CHEMICAL PROCESSES
07 02	wastes from the MFSU of plastics, synthetic rubber and man-made fibres
07 02 13	waste plastic
15	WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED
15 01	packaging (including separately collected municipal packaging waste)
15 01 06	mixed packaging
15 01 10*	packaging containing residues of or contaminated by hazardous substances
15 02	absorbents, filter materials, wiping cloths and protective clothing
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02
16	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
16 01	end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08)
16 01 07*	oil filters
16 01 19	plastic
16 07	wastes from transport tank, storage tank and barrel cleaning (except 05 and 13)
16 07 08*	wastes containing oil (contaminated packaging only)
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)
17 02	wood, glass and plastic
17 02 01	wood

Table S2.2 Permitted waste types and quantities for pyrolysis.	
Maximum quantity	100,000 tonnes per annum
17 02 03	plastic
17 02 04*	glass, plastic and wood containing or contaminated with hazardous substances
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
19 02	wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
19 02 11*	other wastes containing hazardous substances
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 01	paper and cardboard
19 12 04	plastic and rubber
19 12 06*	wood containing hazardous substances
19 12 07	wood other than that mentioned in 19 12 06
19 12 08	textiles
19 12 10	combustible waste (refuse derived fuel)
19 12 11*	other wastes (including mixtures of materials) from mechanical treatment of waste containing hazardous substances
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS
20 01	separately collected fractions (except 15 01)
20 01 01	paper and cardboard
20 01 10	clothes
20 01 11	textiles
20 01 37*	wood containing hazardous substances
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	plastics

Schedule 3 – Emissions and monitoring

Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A1 [shown on drawing E10 03 in application EPR/UP3031VL/A001]	Pyrolysis heating unit	Oxides of Nitrogen	120 mg/m ³	Periodic over minimum 1-hour period	Bi-annual	BS EN 14792
		Carbon Monoxide	50 mg/m ³			BS EN 15058
A2 [shown on drawing E10 03 in application EPR/UP3031VL/A001]	Primary syngas flare	No Parameters set	No limit set	-	-	

Emission point ref. & location	Source	Parameter	Limit (incl. unit)	Reference Period	Monitoring frequency	Monitoring standard or method
S1 shown on drawing E10 03 in application EPR/UP3031/A001	No parameters set	Aqueous residues from water treatment plant and surface water run-off.	No limits set	-	-	-

Location or description of point of measurement	Parameter	Limit (incl. unit) The following calculation shall be used to show compliance with the limits in this table [syngas monitoring result / syngas calorific value) x 37]	Monitoring frequency	Monitoring standard or method	Other specifications
P1 Syngas, post gas cleaning line and pre combustion. Sampling points to be agreed through PO4.	Total sulphur	50 mg/m ³	As specified in condition 3.5.5	Method based on USEPA Method 8	
	Hydrogen sulphide	5 mg/m ³		Method based on USEPA Method 11	
	Total halogenated hydrocarbons	1.5 mg/m ³		Method based on BS EN 13649	
	Heavy metals Hg, Cd, Tl, Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.03 mg/m ³		Method based on BS EN 14385	
	Total aromatic hydrocarbons expressed as Xylene	100 mg/m ³		Semi continuous GC or DOAS or method based on BS EN 13649	
	Calorific value	-		Continuous	

Schedule 4 – Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Emissions to air Parameters as required by condition 3.5.1.	A1	6 monthly	1 January, 1 July
Process monitoring Parameters as required by condition 3.5.1.	Syngas quality	Quarterly	1 January, 1 April, 1 July, and 1 October.

Parameter	Units
Waste pyrolysed	tonnes
Syngas produced	M ³

Parameter	Frequency of assessment	Units
Electrical energy exported, imported and used at the installation	Annually	MWh / tonne of waste pyrolysed
Water usage	Annually	m ³ / tonne of waste pyrolysed
LPG usage	Annually	MWh / tonne of waste pyrolysed
Syngas combusted	Annually	MWh / tonne of waste pyrolysed
Syngas exported	Annually	MWh / tonne of waste pyrolysed
Solid residues from pyrolysis unit	Annually	Kg / tonne of waste pyrolysed
Flare operation during start-up and shut down	Annually	Hours
Flare operation during emergency scenarios	Annually	Hours

Media/parameter	Reporting format	Date of form
Air	Form air1 or other form as agreed in writing by the Environment Agency	16/09/2015
Process monitoring	Form process1 or other form as agreed in writing by the Environment Agency	16/09/2015
Water usage	Form waterusage1 or other form as agreed in writing by the Environment Agency	16/09/2015
Other performance indicators	Form performance1 or other form as agreed in writing by the Environment Agency	16/09/2015

Schedule 5 – Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	EPR/UP3031VL
Name of operator	Energy 10 Greenwich Limited
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution	
To be notified within 24 hours of detection	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	Notification period

(c) Notification requirements for the detection of any significant adverse environmental effect	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B – to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

“*accident*” means an accident that may result in pollution.

“*application*” means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

“*authorised officer*” means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

“*bi-annual*” means twice per year with at least five months between tests;

“*CEM*” Continuous emission monitor

“*CEN*” means Comité Européen de Normalisation

“*daily*” means once in each day.

“*disposal*” means any of the operations provided for in Annex I to Directive 2008/98/EC of the European Parliament and of the Council on waste.

“*emissions to land*” includes emissions to groundwater.

“*end of Waste*” means syngas that is no longer considered to be a waste and cannot cause emissions higher than those resulting from the burning of natural gas.

“*EP Regulations*” means The Environmental Permitting (England and Wales) Regulations SI 2010 No.675 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

“*emissions of substances not controlled by emission limits*” means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit.

“*groundwater*” means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

“*hazardous property*” has the meaning given in Schedule 3 of the Hazardous Waste (England and Wales) Regulations 2005 No.894 and the Hazardous Waste (Wales) Regulations 2005 No. 1806 (W.138).

“*Industrial Emissions Directive*” means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions

“*LPG*” means liquefied petroleum gas.

“*MCERTS*” means the Environment Agency’s Monitoring Certification Scheme.

“*monthly*” means once in each month.

“*quarterly*” means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

“*recovery*” means any of the operations provided for in Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

“*RDF*” means refuse derived fuel.

“*shut down*” is any period where the plant is being returned to a non-operational state and there is no waste being fed to the pyrolysis unit or as agreed in writing with the Environment Agency.

“*start up*” is any period, where the plant has been non-operational, until waste has been fed to the pyrolysis unit to initiate steady-state conditions or as agreed in writing with the Environment Agency.

“*waste code*” means the six digit code referable to a type of waste in accordance with the List of Wastes (England) Regulations 2005, or List of Wastes (Wales) Regulations 2005, as appropriate, and in relation to hazardous waste, includes the asterisk.

“*Waste Framework Directive*” or “*WFD*” means Waste Framework Directive 2008/98/EC of the European Parliament and of the Council on waste

“*Weekly*” means once in each week.

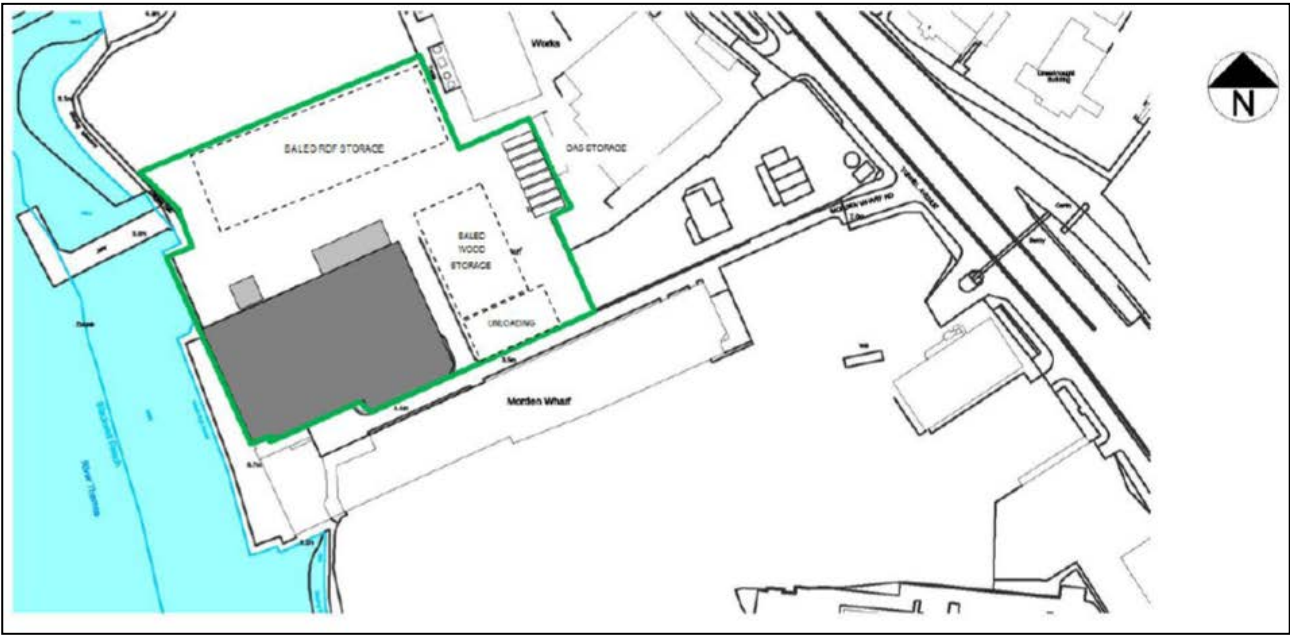
Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

- in relation to emissions from the LPG /syngas combustion unit, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry.
- in relation to emissions from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid and gaseous fuels, 6% dry for solid fuels; and/or
- in relation to emissions from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content.

“*year*” means calendar year ending 31 December.

Schedule 7 – Site plan



END OF PERMIT