

# Permit with introductory note

## The Environmental Permitting (England & Wales) Regulations 2016

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Imperial College of Science, Technology and Medicine  
Imperial College London SK CHP  
Exhibition Road  
London  
SW7 2AZ

### **Permit number**

EPR/BP3832YU

# Imperial College London SK CHP

## Permit number EPR/BP3832YU

### Introductory note

#### **This introductory note does not form a part of the permit**

The main features of the permit are as follows:

The Energy Centre installation is located at Imperial College London South Kensington Campus in a predominantly urban area at approximate National Grid Reference TQ 26677 79392.

The Energy Centre will consist of:

- Two 10.4 MWth gas engines;
- Three 11.2 MWth natural gas steam raising boilers;
- Five 1.75 MWth natural gas/gasoil standby boilers located in the Sir Alexander Fleming SAF building;
- Two gas oil emergency generators 3 MWth located in the SAF building and 1.05 MWth located in the Flowers Building; and
- Twenty nine combustion units (<1 MW) located across the campus. These plant are aggregated under the 50 MWth threshold and managed under a <1 MWth operating procedure.

The Installation has aggregated thermal input of 76.4 MWth and will operate under schedule as a Section 1.1 Part A1(a) process - Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts.

As no plant is larger than 15 MWth, the activity falls under Chapter II of the IED. The Energy Centre plant are classed as medium combustion plant as part of a Chapter II installation. Medium Combustion Plant Directive (MCPD) requirements are fulfilled through compliance with Chapter II of Directive 2010/75/EU. The boilers and engines are classed at 'existing plant' under the MCPD.

The Energy Centre is equipped to provide Combined Heat and Power (CHP), providing steam and hot water, heating and electrical power to the campus via a district heating network.

The main emissions from the process are air emission releases from a combined stack serving the steam boilers and gas engines, a stack serving the standby boilers and a stack serving each of the emergency generators. The Energy Centre is constantly monitored via a Supervisory Control and Data Acquisition (SCADA) system.

There is also a consented effluent discharge point for boiler blow down.

Primary cooling for the gas engines is water cooling, the heat from which is used to pre-heat condensate return to the boilers. Dry air coolers are only used to remove unutilised heat. The gas engines are fitted with dry low NOx burners and a lean burn technology. Emissions from the gas engine will be controlled by automatic engine tuning for optimal combustion conditions. This will be supported by continual performance monitoring and maintenance in accordance with engine specifications.

Diesel tanks will be bunded with a capacity 110% of the capacity of the largest tank and 25% of total tank volume (whichever is the greater). Chemicals and hazardous waste will be stored in containers located in appropriately bunded areas to prevent loss of materials and control spills in the event of accidental release.

The installation is located within 50 m of human receptors, within 10 km of two Special Areas of Conservation (SAC), Richmond Park and Wimbledon Common and within 2 km of twenty six Local Wildlife Sites.

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

<b>Status log of the permit</b>		
<b>Description</b>	<b>Date</b>	<b>Comments</b>
Application EPR/BP3832YU/A001	Duly made 30/05/19	Application for Chapter II >50MW combustion plant.
Schedule 5 notice dated 26/06/2019	30/08/19	Confirmation of operating techniques primary abatement system, energy efficiency, water treatment, site plans, bulk storage and pipework.
Request for Additional information	03/09/19	Confirmation of number and location of combustion plant <1 MWth.
Schedule 5 notice dated 13/12/2019	06/03/20	Monitoring data and justification for emissions limits.
Additional information received	01/05/20	Confirmation that CHP bypass is inhibited with a spade piece.
Permit determined EPR/BP3832YU (PAS Billing ref. BP3832YU).	09/06/20	Permit issued to Imperial College of Science, Technology and Medicine.

End of introductory note

# Permit

## The Environmental Permitting (England and Wales) Regulations 2016

### Permit number

**EPR/BP3832YU**

The Environment Agency hereby authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2016

**Imperial College of Science, Technology and Medicine** (“the operator”),

whose registered office is

### Faculty Building

**Imperial College of Science, Technology and Medicine**

**Exhibition Road**

**London**

**SW7 2AZ**

company registration number RC000231

to operate an installation at

**Imperial College London SK CHP**

**Exhibition Road**

**London**

**SW7 2AZ**

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

Name	Date
David Griffiths	09/06/2020

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 red on the site plan at schedule 7 to this permit.

2.2.2 No plant less than 1 MWth shall be operated beyond the site of the grid reference specified for it in schedule 1, table S1.1 of the 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 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.

2.3.5 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.

### **2.4 Improvement programme**

2.4.1 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.

2.4.2 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.

## **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.

### **3.3 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 table S3.1
  - (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 table S3.1 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.

### 4.3 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.

## **4.4 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
AR1	Section 1.1 A(1) (a) Burning any fuel in an appliance with a rated thermal input of 50 megawatts or more.	<p>Operation of:</p> <ul style="list-style-type: none"> <li>2 x 10.4 MWth gas engines burning natural gas to produce electricity</li> <li>3 x 11.2 MWth boilers burning natural gas to produce heat</li> <li>5 x 1.75 MWth dual fuel gas/gasoil fuel stand-by boilers</li> <li>2 x gas oil emergency generators (3 MWth and 1.05 MWth)</li> </ul> <p>Total aggregated thermal input of 67.2 MWth</p> <hr/> <p>Operation of up to 29 combustion plant with individual capacities of &lt;1 MWth at the following national grid references</p> <ul style="list-style-type: none"> <li>2 x 0.500 MWth Boilers – TQ 26839 79439</li> <li>2 x 0.148 MWth Boilers – TQ 26851 79363</li> <li>1 x 0.040 MWth Boiler – TQ 26851 79363</li> <li>1 x 0.088 MWth Boiler – TQ 26724 79214</li> <li>6 x 0.275 MWth Boiler – TQ 26954 79321</li> <li>6 x 0.275 MWth Boiler – TQ 27035 79418</li> <li>2 x 0.063 MWth Boiler – TQ 26911 79302</li> <li>1 x 0.048 MWth Boiler – TQ 26737 79420</li> <li>4 x 0.750 MWth Boiler – TQ 26945 79497</li> <li>1 x 0.190 MWth Boiler - TQ 26864 79481</li> <li>1 x 0.088 MWth Boiler – TQ 26543 79410</li> <li>1 x 0.540 MWth Boiler - TQ 26613 79217</li> <li>1 x 0.5 MWth Boiler - TQ 26724 79214</li> </ul> <p>Total aggregated thermal input of 9.2 MWth</p>	<p>From receipt of natural gas to discharge of exhaust gases and wastes, despatch of hot water and steam and the generation of electricity.</p> <p>Generators shall only be operated for on-site emergencies and not for elective power generation.</p> <p>Generators shall not operate for more than 500 hours per calendar year in emergency use.</p>
<b>Directly Associated Activity</b>			
AR2	Directly Associated Activity	Storage of raw materials	From receipt of raw materials to use within the facility, including all associated pipe work, handling and transfer to and from storage tanks.

<b>Table S1.2 Operating techniques</b>		
<b>Description</b>	<b>Parts</b>	<b>Date Received</b>
Application	All Supporting Information Documents referenced in response to Part B2 and B3 of the Application Form. Environmental Permit Application for Imperial College London SK CHP (BP3832YU) – Technical Description and BAT Appraisal. Demonstration of Techniques, Standards and Best Available Techniques (BAT) – Scoping Exercise.	Duly Made 30/05/2019
Response to Schedule 5 Notice dated 26/06/2019	Response to questions 1 to 8 detailing operating techniques for secondary abatement system, primary abatement system, energy efficiency, water treatment, site plans, bulk storage and pipework.	30/08/2019
Additional information	Location and type of combustion plant <1 MWth.	03/09/2019
Additional information	Confirmation that CHP bypass is inhibited with a spade piece.	01/05/2020

<b>Table S1.3 Improvement programme requirements</b>		
<b>Reference</b>	<b>Requirement</b>	<b>Date</b>
IC1	The operator shall submit a report in writing to the Environment Agency for written approval. The report shall define and provide a justification for start-up and shut down definitions for the gas engines.	3 months from permit issue date or as per date agreed with the Environment Agency
IC2	The operator shall submit a written procedure to the Environment Agency for written approval covering the operation of all individual plant less than 1 MWth. The procedure must outline how the plant is operated in accordance with the manufacturer's instructions and how records are made and retained to demonstrate this.	4 months from permit issue date or as per date agreed with the Environment Agency
IC3	The operator shall submit a written report to the Environment Agency for written approval which reviews all oil and fuel tank containment infrastructure related to the site combustion plant. The review shall demonstrate that the tank containment infrastructure meets the requirements of CIRIA 736 guidance or equivalent and shall outline timescales for completion of any outstanding work required. The operator shall undertake the work outlined in the report, in line with the timescales as agreed with the Environment Agency.	2 months from permit issue date or as per date agreed with the Environment Agency
IC4	The operator shall submit a report to the Environment Agency for written approval which reviews and proposes a monitoring system for frequent reliable monitoring that will ensure compliance with ELVs is maintained in line with the requirements of the permit. The report must consider the following methods or an equivalent alternative: <ul style="list-style-type: none"> <li>• Permanent Continuous Emissions Monitoring (CEMS)</li> <li>• MCERT monitoring in line with M5 guidance</li> <li>• Temporary CEMs equipment for 12 months' worth of monitoring</li> </ul>	3 months from permit issue date or as per date agreed with the Environment Agency

<b>Table S1.3 Improvement programme requirements</b>		
<b>Reference</b>	<b>Requirement</b>	<b>Date</b>
	<p>The report must show how the chosen monitoring system is in line with the relevant standard outlined in monitoring guidance M1/M2 and/or M5 and M20 and propose a timescale for implementation.</p> <p>The operator shall implement the monitoring system in line with the timescale agreed in writing with the Environment Agency.</p>	
IC5	<p>The operator shall submit a report to the Environment Agency for written approval which reviews whether NOx emission limits have been consistently achieved and justify whether or not the monitoring frequency can be reduced.</p> <p>The operator shall propose revised frequencies based on the review in line with the requirements of our monitoring guidance M1/M2 and/or M5 and M20.</p> <p>The operator shall implement the monitoring frequencies in line with those agreed in writing with the Environment Agency.</p>	12 months after completion of IC4 or as per date agreed with the Environment Agency
IC6	<p>The operator shall collect operational hours and emissions data from the CHP engines 1 and 2 and boilers 1, 2 and 3.</p> <p>Using this monitored emission data, the operator shall submit to the Environment Agency a revised air dispersion modelling report.</p> <p>In order to address the issues in the previous modelling report surrounding over conservative modelling estimations as outlined in our permitting decision (reference EPR/BP3832YU/A001) issued 09/06/2020, the report must contain:</p> <ul style="list-style-type: none"> <li>• Evidence to demonstrate why the modelling input parameters are accurate and reliable.</li> <li>• Detailed sensitivity analysis on parameters used.</li> <li>• A full assessment of local wildlife sites including nutrient and acid deposition.</li> </ul> <p>The operator shall submit the air dispersion modelling report to the Environment Agency for review.</p>	6 months after permit issue date or as per date agreed with the Environment Agency
IC7	<p>The operator shall submit a written report to the Environment Agency for written approval which reviews the results of the revised air dispersion modelling report submitted under improvement condition IC6.</p> <p>The review shall consider the conclusions of the air dispersion modelling report and shall determine whether:</p> <ol style="list-style-type: none"> <li>a) The modelling report shows that the current ELVs are sufficient to prevent a significant impact on local air quality.</li> <li>or</li> <li>b) The modelling report shows the potential for a high predicted environment concentration (PEC) or air quality standard breaches, therefore further measures are required.</li> </ol>	3 months after completion of IC6 or as per date agreed with the Environment Agency
IC8	<p>In the event the review submitted under improvement condition IC7 concludes further emission reduction measures are required, the operator shall submit a written report to the Environment Agency for written approval.</p> <p>The report shall contain:</p> <ul style="list-style-type: none"> <li>• A review of options and the capability to reduce emissions to air including but not limited to: <ul style="list-style-type: none"> <li>➤ Restricting operational hours, including operating plant at the minimum achievable hours or ceasing operating individual plant.</li> </ul> </li> </ul>	3 months after completion of IC7 or as per date agreed with the Environment Agency

<b>Table S1.3 Improvement programme requirements</b>		
<b>Reference</b>	<b>Requirement</b>	<b>Date</b>
	<ul style="list-style-type: none"> <li>➤ Secondary abatement measures including Selective Catalytic Reduction at different scales and treatment capacities.</li> <li>• A comparison of emission reduction measures through air dispersion modelling scenarios to compare the effectiveness of different emissions reduction measures on their own or in combination.</li> </ul> <p>The report shall put forward the most appropriate emission reduction measures or combination of measures and demonstrate why these measures represent BAT based on emissions reduction capability and cost.</p>	
IC9	<p>In the event the review submitted under improvement condition IC7 concludes further measures are required, the operator shall submit a written report to the Environment Agency for written approval which outlines the following:</p> <ul style="list-style-type: none"> <li>• Full details of the emissions reduction measures(s) to be implemented at the site based on the report submitted under IC8;</li> <li>• Proposals for revised emission limits values based on the capability of proposed emissions reduction measures and the result of the air dispersion modelling; and</li> <li>• Timescales for implementation</li> </ul> <p>The operator shall implement these emissions reduction measures and emission limit values in line with the timescales agreed with the Environment Agency.</p>	3 months after completion of IC8 or as per date agreed with the Environment Agency

## Schedule 2 – Waste types, raw materials and fuel

<b>Table S2.1 Raw materials and fuels</b>	
<b>Raw materials and fuel description</b>	<b>Specification</b>
Natural gas for gas turbine	-
Gas oil	<0.1% sulphur content

## Schedule 3 – Emissions and monitoring

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A1.1	Oxides of Nitrogen(NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	Gas Engine 1	95 mg/m <sup>3</sup> [1] [2] or as unless otherwise agreed under improvement condition IC9	-	Every 3 months from permit issue then continuous on completion of improvement condition IC4.	BS EN 14792
	Carbon Monoxide		No limit set	-	Annually	BS EN 15058
	Oxygen		No limit set	-	Periodic. As appropriate to reference	BS EN 14789
	Water Vapour		No limit set	-	Periodic. As appropriate to reference	BS EN 14790
	Sulphur Dioxide		No limit set	-	Annually	Concentration by calculation as agreed in writing with the Environment Agency
	As required by the Method Implementation Document for BS EN 15259	No limit set	-	Pre-operation and when there is a significant operational change	BS EN 15259	
A1.2	Oxides of Nitrogen(NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	Gas Engine 2	95 mg/m <sup>3</sup> [1] [2] or as unless otherwise agreed under improvement condition IC9	-	Every 3 months from permit issue then continuous on completion of improvement condition IC4.	BS EN 14792
	Carbon Monoxide		No limit set	-	Annually	BS EN 15058
	Oxygen		No limit set	-	Periodic. As appropriate to reference	BS EN 14789



**Table S3.1 Point source emissions to air from combustion plant – emissions limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
	Water Vapour		No limit set	-	Periodic. As appropriate to reference	BS EN 14790
	Sulphur Dioxide		No limit set	-	Annually	Concentration by calculation as agreed in writing with the Environment Agency
	As required by the Method Implementation Document for BS EN 15259		No limit set	-	Pre-operation and when there is a significant operational change	BS EN 15259
A2.1	Oxides of Nitrogen(NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	Natural gas fired boiler 1	200 mg/m <sup>3</sup> [1] [3] or as unless otherwise agreed under improvement condition IC9	-	Every 3 months from permit issue then continuous on completion of improvement condition IC4.	BS EN 14792
	Carbon Monoxide		No limit set	-	Annually	BS EN 15058
	Oxygen		No limit set	-	Periodic. As appropriate to reference	BS EN 14789
	Water Vapour		No limit set	-	Periodic. As appropriate to reference	BS EN 14790
	Sulphur Dioxide		No limit set	-	Annually	Concentration by calculation as agreed in writing with the Environment Agency
	As required by the Method Implementation Document for BS EN 15259		No limit set	-	Pre-operation and when there is a significant operational change	BS EN 15259
A2.2	Oxides of Nitrogen(NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	Natural gas fired boiler 2	200 mg/m <sup>3</sup> [1] [3] or as unless otherwise agreed	-	Every 3 months from permit issue then continuous on completion of	BS EN 14792

**Table S3.1 Point source emissions to air from combustion plant – emissions limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
			under improvement condition IC9		improvement condition IC4.	
	Carbon Monoxide		No limit set	-	Annually	BS EN 15058
	Oxygen		No limit set	-	Periodic. As appropriate to reference	BS EN 14789
	Water Vapour		No limit set	-	Periodic. As appropriate to reference	BS EN 14790
	Sulphur Dioxide		No limit set	-	Annually	Concentration by calculation as agreed in writing with the Environment Agency
	As required by the Method Implementation Document for BS EN 15259		No limit set	-	Pre-operation and when there is a significant operational change	BS EN 15259
A2.3	Oxides of Nitrogen(NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	Natural gas fired boiler 3	200 mg/m <sup>3</sup> [1] [3] or as unless otherwise agreed under improvement condition IC9	-	Every 3 months from permit issue then continuous on completion of improvement condition IC4.	BS EN 14792
	Carbon Monoxide		No limit set		Annually	BS EN 15058
	Oxygen		No limit set		Periodic. As appropriate to reference	BS EN 14789
	Water Vapour		No limit set		Periodic. As appropriate to reference	BS EN 14790
	Sulphur Dioxide		No limit set		Annually	Concentration by calculation as agreed in writing with the Environment Agency

**Table S3.1 Point source emissions to air from combustion plant – emissions limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
	As required by the Method Implementation Document for BS EN 15259		No limit set		Pre-operation and when there is a significant operational change	BS EN 15259
A3	-	Standby Boilers	-	-	-	-
A4	-	Emergency Generator	-	-	-	-
A5	-	34 Combustion Plant rated <1 MWth	-	-	-	-
Note [1]: This limit does not apply during start up and shut down. Note [2] at 15% oxygen Note [3] at 3% Oxygen						

**Table S3.3 Point source emissions to sewer, effluent treatment plant or other transfers off-site – emission limits and monitoring requirements**

Emission point ref. & location	Source	Parameter	Limit (incl. Unit)	Reference period	Monitoring frequency	Monitoring standard or method
E1 on site plan in schedule 7 emission to Thames Water effluent treatment plant Crossness Sewage Treatment Works	Boiler blow down	-	-	-	-	-

**Table S3.3 Process monitoring requirements**

Emission point reference or source or description of point of measurement	Parameter	Monitoring frequency	Monitoring standard or method	Other specifications
Natural gas engines and Natural gas steam boilers	Inlet Manifold pressures	As described in Application	In accordance with engine specification	Reference period to be agreed in writing with the Environment Agency.
	Cylinder temperature			
	Lube Oil temperature/pressure			

## Schedule 4 – Reporting

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

<b>Table S4.1 Reporting of monitoring data</b>			
<b>Parameter</b>	<b>Emission or monitoring point/reference</b>	<b>Reporting period</b>	<b>Period begins</b>
Emissions to air Parameters as required by condition 3.5.1.	A1.1, A1.2, A2.1, A2.2, A2.3	Every 12 months	1 January

<b>Table S4.2 Annual production/treatment</b>	
<b>Parameter</b>	<b>Units</b>
Power generated	MWh

<b>Table S4.3 Performance parameters</b>		
<b>Parameter</b>	<b>Frequency of assessment</b>	<b>Units</b>
Water usage	Annually	tonnes
Energy usage	Annually	MWh
Total raw material used	Annually	tonnes
Oil changes	Every 6 months	Total number of changes and frequency

<b>Table S4.4 Reporting forms</b>		
<b>Media/parameter</b>	<b>Reporting format</b>	<b>Date of form</b>
Air	Form air 1 or other form as agreed in writing by the Environment Agency	09/06/2020
Water usage	Form water usage 1 or other form as agreed in writing by the Environment Agency	09/06/2020
Energy usage	Form energy 1 or other form as agreed in writing by the Environment Agency	09/06/2020
Other performance indicators	Form performance 1 or other form as agreed in writing by the Environment Agency	09/06/2020

# 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	
Name of operator	
Location of Facility	
Time and date of the detection	

<b>(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</b>	
<b>To be notified within 24 hours of detection</b>	
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>(b) Notification requirements for the breach of a limit</b>	
<b>To be notified within 24 hours of detection unless otherwise specified below</b>	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	

<b>(b) Notification requirements for the breach of a limit</b>	
<b>To be notified within 24 hours of detection unless otherwise specified below</b>	
Measures taken, or intended to be taken, to stop the emission	

<b>Time periods for notification following detection of a breach of a limit</b>	
<b>Parameter</b>	<b>Notification period</b>

<b>(c) Notification requirements for the detection of any significant adverse environmental effect</b>	
<b>To be notified within 24 hours of detection</b>	
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.

“combined heat and power” (CHP) or Cogeneration means the simultaneous generation in one process of thermal energy and electrical or mechanical energy.

“EA TGN M5” means the ‘Environment Agency Technical Guidance Note M5: Monitoring of stack gas emissions from medium combustion plants and specified generators’ guidance published on Gov.UK.

“EP Regulations” means The Environmental Permitting (England and Wales) Regulations SI 2016 No.1154 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 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.

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

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

“medium combustion plant” or “MCP” means a combustion plant with a rated thermal input equal to or greater than 1 MW but less than 50 MW.

“Medium Combustion Plant Directive” or “MCPD” means Directive 2015/2193/EU of the European Parliament and of the Council on the limitation of emissions of certain pollutants into the air from medium combustion plants.

“operating hours” means the time, expressed in hours, during which a combustion plant is operating and discharging emissions into the air, excluding start-up and shut-down periods.

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.

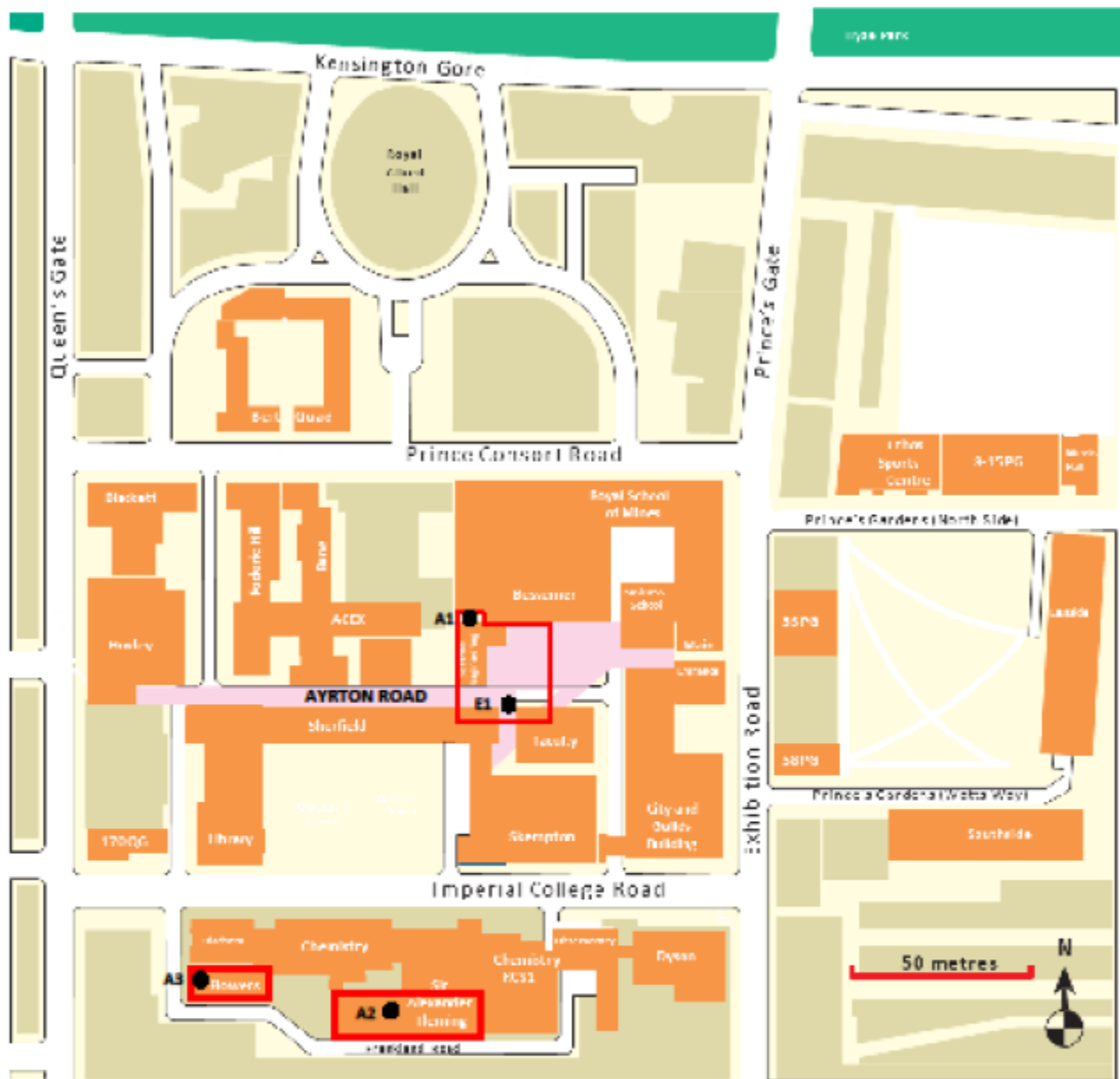
Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

- in relation to emissions from 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 gas engines or gas turbines, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 15% dry for liquid and gaseous 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

Figure 4: Principle Emissions Points



<b>INSTALLATION BOUNDARIES</b>	<p><b>Air emission release points:</b></p> <ul style="list-style-type: none"> <li>A1 - Energy Centre boiler and generator flue stack</li> <li>A2 - Sir Alexander Fleming (SAF) Building (standby boilers and emergency generator flue stack)</li> <li>A3 - Flowers Building (emergency generator flue)</li> </ul> <p><b>Effluent emission point:</b></p> <ul style="list-style-type: none"> <li>E1 – Energy Centre effluent discharge point</li> </ul>
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END OF PERMIT