



Environmental Permit Variation Application for Coryton Power Station

Supporting Information Document

PREPARED FOR



Coryton Energy Company Limited

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Supporting Information Document

0752339



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ACRONYMS AND ABBREVIATIONS

Acronym	Description
AQIA	Air Quality Impact Assessment
BAT	Best Available Techniques
BAT-AEL	BAT Associated Emission Levels
BREF	BAT Reference Documents
CCGT	Combined Cycle Gas Turbine
CO	Carbon monoxide
EA	Environment Agency
ELV	Emission Limit Value

Acronym	Description
EMS	Environmental Management System
EP	Environmental Permit
EPR	Environmental Permitting Regulations
HRSG	Heat Recovery Steam Generator
IC	Improvement Condition
IED	Industrial Emission Directive
LCP	Large Combustion Plant
MCP	Medium Combustion Plant
MCPD	Medium Combustion Plant Directive
MWth	Megawatt thermal
MWe	Megawatt electric
NO _x	Nitrogen oxides
SID	Supporting Information Document
SO ₂	Sulphur dioxide
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

APPLICATION CHECKLIST

Requirement	Topic	Location in Report
Form A	Company Details	(in form)
Form A – Question 5c	Company Directors	Section 1.5 Company Directors
Form C2 – Question 1	About the permit	(in form)
Form C2 – Question 2a, 2c, 2d, 2e, 2f	About your proposed changes	(in form)
Form C2 – Question 2b, Table 1	About your proposed changes	Section 1 Introduction Section 3 Activities
Form C2 – Question 3a, 3c	Your ability as an operator	(in form)
Form C2 – Question 3d	Management Systems	Section 7 Environmental Management Systems
Form C2 – Question 4	Consultation	(in form) No consultation with the statutory consultees listed in form is anticipated as no changes are proposed relevant to these.
Form C2 – Question 5	Supporting Information – Site Plan	Figure 2
Form C2 – Question 5c	Supporting Information – Non-Technical Summary	Non-Technical Summary
Form C2 – Question 5b, 5d, 5f	Supporting Information	(in form)
Form C2 – Question 6	Environmental risk assessment	Section 12 and Appendix A Air Quality Impact Assessment Section 13 Environmental Risk Assessment
Form C2.5 – Question 1	About the permit you wish to vary	Section 1 Introduction
Form C2.5 – Question 2	Emissions to air	Section 5 Operating Techniques Section 12 and Appendix A Air Quality Impact Assessment Refer to Excel document 'InterGen MCP – generator – list'
Form C2.5 – Question 3	MCP/SG Emissions Monitoring	Non-Technical Summary Section 6 Monitoring emissions
Form C3 – Question 1	About your activities	Section 1.3 Medium Combustion Plant Section 1.4 Listed Activities, Section 1.5 Directly Associated Activities
Form C3 – Question 2	Emissions to air, water and land	Section 4 Emissions
Form C3 – Question 3a	Technical Standards	Section 5 Operating Techniques
Form C3 – Question 3b	General requirements	Section 11 Noise

Requirement	Topic	Location in Report
Form C3 – Question 3c	Types and amounts of raw materials	Section 9 Raw Materials
Form C3 – Question 4a	Monitoring emissions	Section 6 Monitoring emissions
Form C3 – Question 4b	Monitoring emissions - Point source emissions to air only	(in form)
Form C3 – Question 5	Environmental Impact Assessment	(in form)
Form C3 – Question 6a, 6b, 6c	Resource efficiency and climate change	Section 10 Energy Efficiency
Form C3 – Question 6d	Justify reasons for the use of raw materials, substances and water onsite.	Section 9 Raw Materials
Form C3 – Question 6e	Waste generation and minimisation	Section 8 Waste Management
Form C3 – Appendix 1	Specific Questions for the combustion Sector	Appendix B and in form
Form F1	Charges and Declarations	(in form)

NON-TECHNICAL SUMMARY

Coryton Energy Company Limited (InterGen) operates the Coryton Power Station (the 'Site'), under an existing permit (EPR/EP3833LY/V003), most recently dated the 10th March 2020. The Site is located within a heavy industrial area at Standford-le-Hope, Coryton, Essex, SS17 9GN, adjacent to the former Coryton Refinery.

The Site is currently permitted as a combined cycle gas turbine (CCGT) power plant, comprising two gas turbines with a gross thermal input of 702 MW each. Other combustion plants operated on the installation include two gas fired auxiliary boilers (4 MWth input each), a gas oil (diesel) fired emergency generator (2 MWth input), and a gas oil fired firewater pump (0.56 MWth input).

InterGen is proposing to upgrade the two CCGTs which will involve the CCGTs being taken offline for refurbishment works. Once work is complete, they will be reinstated and recommissioned. After the upgrades, there will be an uplift of 84 MWth to the power input of the Site; each CCGT will be 744 MWth. The proposed upgrade works to the CCGTs will require a variation to the Site's current EP as a result of the increased thermal input capacity.

The two CCGTs are considered Large Combustion Plant (LCP), each having a thermal input greater than 50 MWth and are subject to Schedule 1 of the Environmental Permitting Regulations (EPR), under a Section 1.1 Part A(1) activity. Each CCGT is expected to operate between 890 to 980 hours per year and will therefore require compliance with the relevant BAT-AELs set out in the Large Combustion Plant (LCP) Best Available Techniques Conclusions (BATC) Document.

The upgraded CCGTs will continue to run on natural gas.

The CCGTs and auxiliary boilers are fitted with dry low NO_x burners. There will be no changes associated to abatement techniques used on site.

The proposed refurbishment works to the CCGTs will not cost more than 50% of buying new comparable units and will therefore remain to be considered 'existing plant.' This approach has also been confirmed through pre-application advice with the Environment Agency (EA), provided in **Appendix C**.

The auxiliary boilers and emergency generator meet the definition of Medium Combustion Plant (MCP) as defined in the Medium Combustion Plant Directive (MCPD). The MCPD specifies that by 1 January 2029, any MCP with a rated thermal input of less than or equal to 5 MW are required to be permitted. As part of this variation, it is proposed that the existing boilers and emergency back-up generator, currently listed on the permit, are permitted ongoing as existing MCP <5 MWth and that the varied EP includes the relevant ELVs and monitoring requirements for each of these MCPs.

The principal emissions from permitted operations at the Site will be point source emissions to air of nitrogen oxides (NO_x) from two dedicated 55 m stacks attached to each gas turbine. Detailed dispersion modelling has been undertaken, and an air quality impact assessment (AQIA) is provided as part of the application. This considers the potential impact of the annual operation routine the CCGTs, auxiliary boilers and emergency generator on nearby potential human and ecological receptors. The AQIA concluded that the refurbishment of the CCGTs will not result in any significant impacts to assessed receptors.

Noise modelling has not been undertaken as part of this application. The upgrade works do not materially change the noise emitting equipment, nor the currently installed structures that may affect/ attenuate noise emissions from the Site. For these reasons it is anticipated that noise

emissions will remain consistent with current levels, therefore, no increase in noise output is expected because of the refurbishment activities. On this basis, a noise impact assessment is not necessary for the proposed variation.

There are no other proposed changes to the Site other than the refurbishment of the two CCGTs. As a result of this, there will be no changes in emissions to water, land, groundwater, or sewer. The Site will not require any attentional land for these upgrades and will continue to operate within their current permit boundary, therefore a Site Condition Report (SCR) is not required.

This Supporting Information Document has been prepared by Environmental Resources Management Limited (ERM) on behalf of InterGen. The supporting information document is based on information provided by InterGen, publicly available environmental data and results of air quality dispersion modelling undertaken by ERM.

1. INTRODUCTION

The variation application and supporting information presented in this report for the Coryton Power Station hereafter referred to as the 'Site', has been prepared by Environmental Resources Management Limited (ERM) on behalf of Coryton Energy Company Ltd (InterGen). The supporting information document is based on the information provided by InterGen, publicly available environmental data and results of air quality dispersion modelling undertaken by ERM.

1.1 ENVIRONMENTAL PERMIT TO BE VARIED

The Site operates under an Environmental Permit (EP), EPR/EP3833LY/V003, issued by the Environment Agency (EA). The EP was originally issued on the 27th February 2007 and was last varied (V003) on the 10th March 2020, which was initiated by the EA, to implement the requirements of the latest LCP BATC Document (dated the 30th December 2021).

1.2 REASON FOR THE VARIATION APPLICATION

The Site is currently permitted as a combined cycle gas turbine (CCGT) power plant, comprising two gas turbines with a gross thermal input of 702 MW each. Other combustion plants operated on the installation include two gas fired auxiliary boilers (4 MWth input each), a gas oil fired emergency generator (2 MWth input), and a gas oil (diesel) fired firewater pump (0.56 MWth input).

InterGen is proposing to upgrade the two CCGTs which will involve the CCGTs being taken offline for refurbishment works, once work is complete, they will be reinstated and recommissioned. After the upgrades, there will be an uplift of 84 MWth input of the Site; each CCGT will have a new thermal input of 744 MWth, and the Site will have a new aggregated thermal input of 1,499 MW. The proposed upgrade works to the CCGTs result in changes to the emissions parameters and a new aggregated thermal input of the Site, thus requiring a substantial variation to the Site's current EP to implement the updates.

As part of this variation there are no proposed changes to the fuel type used on Site by the CCGTs (natural gas).

This Supporting Information Document (SID) provides further information on the above changes, to support the variation application.

1.3 MEDIUM COMBUSTION PLANT

The auxiliary boilers (rated 4 MWth input each) and emergency generator (rated 2 MWth input) meet the definition of Medium Combustion Plant (MCP) under the meaning in the Medium Combustion Plant Directive (MCPD) (2015/2193/EU), having a thermal input greater than 1 MWth and less than 50 MWth. The MCPD states:

Member States shall take the necessary measures to ensure that, as of 1 January 2029, no existing medium combustion plant with a rated thermal input of less than or equal to 5 MW is operated without a permit or without being registered.

The Environmental Permitting (England and Wales) Regulations 2018 (as amended) (EP Regulations) transpose the requirements of the MCPD into English law and provides the requirements for MCPs set out in Schedule 25A of the EP Regulations 2018 (as amended).

As part of this variation, it is proposed that the existing boilers and emergency back-up generator are added to the permit as existing MCP <5 MWth and that the varied EP includes the relevant ELVs and monitoring requirements for each of these MCPs (refer to **Section 5**).

1.4 UPDATES TO LISTED ACTIVITIES

Under this EP variation, the main commercial activity of the Coryton Power Station does not change and remains primarily power generation.

The primary activity permitted under the current EP is the combustion of fuel in an appliance(s) with an aggregated thermal input of more than 50 MWth.

The listed primary activity in Table S1.1 of the EP will remain unchanged by this variation; however, the activity description will need to be amended to refer to the updated thermal inputs of the refurbished CCGTs. Details are given in **Table 1**.

Additionally, Table S1.1 of the EP will need updating to include reference to the existing MCPs, which will require permitting under Schedule 25A of the EP Regulations 2018 (as amended).

Bold underlined text within the table below indicates proposed updates to Table S1.1 of the EP, as a result of this variation.

TABLE 1 LISTED ACTIVITIES

Listed Activities	Description of Specified Activity	Limits of Specified Activity
Schedule 1 Section 1.1 Part A(1)(a): Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts	Two gas fired combined cycle gas turbines (LCP74 & LCP75) (<u>744 MWth input / 292 MWe each</u>), fitted with dry low NOx burners	From receipt of natural gas to discharge of exhaust gases, and the generation of electricity
<u>Schedule 25A: Medium Combustion Plant</u>	<u>Two 'existing' auxiliary gas fired boilers fitted with low NOx burners (4 MWth input each)</u> <u>One 'existing' emergency generator fired on gas oil (2 MWth input)</u>	<u>From receipt of natural gas and gas oil to discharge of exhaust gases</u>
Directly Associated Activities		
<u>Directly associated activity</u>	<u>'Existing' emergency firewater pump fired on gas oil (<1 MWth input)</u>	<u>From receipt of gas oil to discharge of exhaust gases</u>

1.5 DETAILS OF COMPANY DIRECTORS

As required by Application form part A, the directors for Coryton Energy Company Ltd listed on Companies House at the time of this variation application are named below:

- David Peter MacDonald, Company Director
- Karel Nohejl, Company Director
- Paul Samsom, Company Director

2. SITE DESCRIPTION

2.1 SITE LOCATION

The Site is located at The Manorway, Stanford-le-Hope, Coryton, Essex, SS17 9GN. (574051, 182236).

The Site location and boundary is shown in **Figure 1**.

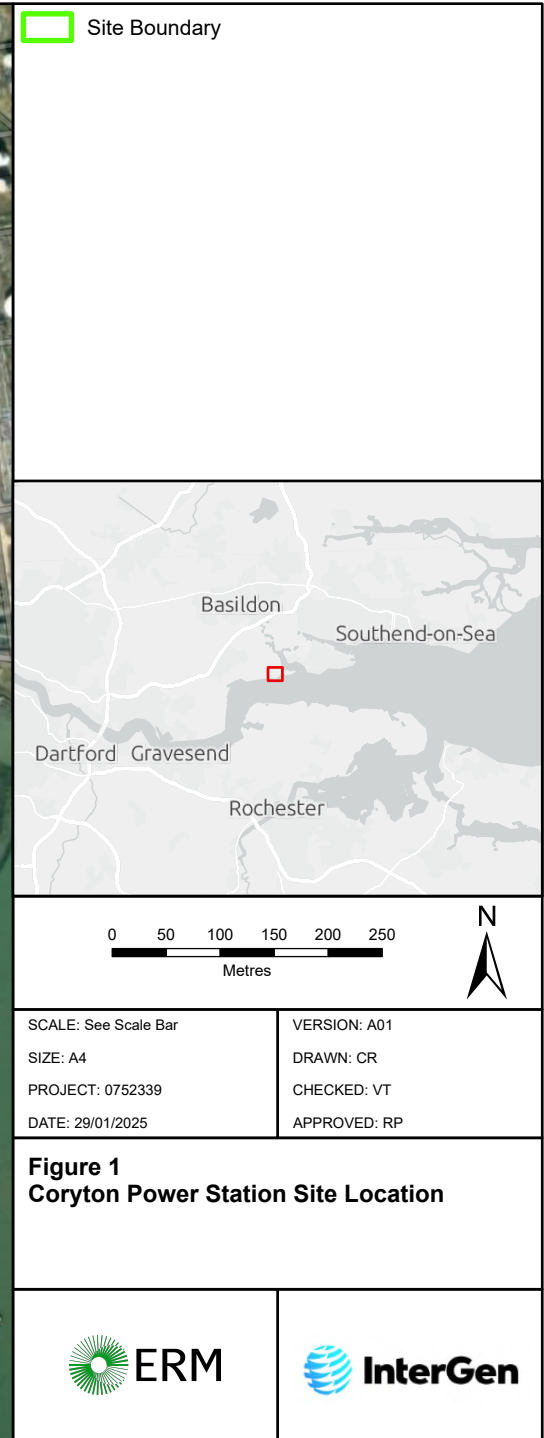
2.2 SITE CONTEXT

The Site is located within a heavily industrial area and occupies approximately seven hectares of land, approximately three miles east of Stanford-le-Hope town centre. The immediate surroundings of the Site comprise a distribution centre, storage facility and pump station to the north, another storage facility to the east, the Thames Haven to the south, and Thames Haven terminal and a trucking company to the west. Additionally, the Site is located approximately 600 m north of the River Thames.

The Site itself is not subject to any known environmentally sensitive designations. It is located approximately 8.5 km west of the Benfleet and Southend Marshes Special Protection Area (SPA), approximately 2.5 km north of the Thames Estuary and Marshes SPA and Ramsar Site, and approximately 1.5 km south of three Sites of Special Scientific Interest (SSSI); Vange and Fobbing Marshes, Holehaven Creek, and Canvey Wick.

No changes to the Site boundary are proposed as part of this application. Refer to **Figure 2 - Site Boundary and Emissions Points**¹.

¹ Emission points referred to in this application are based on emissions to air from stacks associated to the combustion units on site; A1, A2, A3, A4, A5 (as assessed by the updated AQIA) and water emission point only. For a full list of emission points from site refer to Table S3.1 in the current permit, EPR/EP3833LY.



PROJECTION: British National Grid



PROJECTION: British National Grid

3. ACTIVITIES

3.1 OVERVIEW

The overall commercial activity for Coryton Power Station remains unchanged as a power generation company.

The number and type of combustion units permitted under the current EP will not change because of the variation, only the MW thermal input of the CCGTs. Below is a description of the different units on site, noting updates will only be for the two CCGTs.

3.2 COMBINED-CYCLE GAS TURBINES

The Site is currently permitted for two gas-fired CCGTs, that each have a 702 MW thermal input. The gas turbine is the first stage of electricity generation in the CCGT system. In this stage, natural gas is mixed with air and combusted in a combustion chamber, producing high-temperature and high-pressure exhaust gases. These gases drive the turbine blades, which are connected to a generator that produces electricity.

The hot exhaust gases from the gas turbine are then directed into a Heat Recovery Steam Generator (HRSG). This component captures the residual heat from the gases and uses it to produce steam by transferring the heat to water in boiler tubes. By capturing the waste heat that would otherwise be released into the environment, the HRSG significantly enhances the system's overall efficiency and sustainability.

The steam generated in the HRSG is utilised in the secondary stage of electricity production, which involves one steam turbine. The high-pressure steam drives the blades of the steam turbine, generating additional electricity through a connected generator. After passing through the turbine, the steam is cooled and condensed back into water in a condenser. This water is then recirculated to the HRSG, completing the cycle and ensuring efficient reuse of resources.

InterGen is proposing to upgrade the two CCGTs which will involve the CCGTs being taken offline for refurbishment works, once work is complete, they will be reinstated and recommissioned. After the upgrades, there will be an uplift of 84 MWth input of the Site; each CCGT will have a new thermal input of 744 MWth, and the Site will have a new aggregated thermal input of 1,499 MW.

The CCGTs currently permitted in the EP are both General Electric GT26 AB models, neither of which will change as a result of the refurbishment works.

3.3 AUXILIARY BOILERS

The Site is currently permitted for two auxiliary gas fired boilers fitted with low NO_x burners. Each boiler is a Cochran Thermax IV and has a thermal input of 4 MW. There will be no changes made to the configuration of the boilers because of this variation.

The auxiliary boilers will be operational all year round, totaling 8,064 hours annually. These boilers are rated 1-5 MWth and were installed before the 20th December 2018 and are therefore considered 'existing MCPs' as per Schedule 25A of the Regulations. As such, they will be required to comply with the relevant ELVs outlined within the MCPD from the 1st January 2030 and periodic monitoring of emissions will need undertaking. Refer to **Section 5** for further details.

3.4 EMERGENCY DIESEL BACK-UP GENERATOR

The Site is currently permitted for one emergency generator fired on gas oil (Cummins 640DFHA), with a thermal input of 2 MW. There will be no changes made to the configuration of the back-up generator because of this variation.

Operation of the emergency diesel generator comprises:

- Planned operation of the engines for testing purposes (for <50 hours per year).
- Unscheduled testing following unplanned repairs (such operations are infrequent).
- Unplanned emergency operation for backup power provision in the event of failure of supply from the National Grid (such operations are infrequent).

The generator is rated 1-5 MWth and was installed before the 20th December 2018 and is therefore considered an 'existing MCP' as per Schedule 25A of the Regulations. Since the generator is only run in emergencies and for routine testing, it is exempt from ELV compliance as it will operate for less than 500 hours per year as a five-year rolling average. On this basis, the generator will be required to periodically monitor emissions from 1st January 2030, however, no ELV compliance will be required. Refer to **Section 5** and **Section 6** for anticipated emission monitoring requirements.

The generator is considered a 'Specified Generator' as per the definition within Schedule 25B of the Regulations. However, it is an emergency back-up generator that is not tested for more than 50 hours each year and does not provide a balancing service nor demand side response operations. As per the Regulations and the Environment Agency's online guidance on Specified Generator permitting², it is therefore excluded from the Specified Generator controls.

3.5 DRY LOW NO_x BURNERS

The Site's current permit documents the use of dry low NO_x burners fitted onto the two CCGTs and the two auxiliary boilers, which will not change because of the variation.

Dry low NO_x burners are designed to reduce NO_x emissions during the combustion process by controlling the fuel and air mixture within the unit, achieving a lower flame temperature, reducing the conditions that promote NO_x formation.

3.6 FUEL TYPE AND STORAGE

There will be no changes to fuel type used and storage arrangements on site because of this variation.

² [Specified generator: when you need a permit - GOV.UK](#)

4. EMISSIONS

4.1 INTRODUCTION

This section of the report considers expected changes in emissions resulting from the proposed variation, i.e. relating to the changes in the refurbishment of the two CCGTs and the new aggregated thermal input on site.

4.2 EMISSIONS TO AIR

4.2.1 POINT SOURCE EMISSIONS TO AIR

There are no proposed changes to point source emissions to air because of this variation. Point source emissions to air arise from the operation of the CCGTs and auxiliary boilers which run annually. Each CCGT is expected to operate between 890 to 980 hours, and the boilers for 8,064 hours, per year. Emergency operation of the backup generator and emergency fire water pump is expected to be infrequent, and during scheduled servicing and maintenance.

The Site is currently permitted for five combustion units above 1 MWth. The two CCGTs and backup generator are each served by their own individual stack, and the two boilers are served by a single combined stack.

The locations of each emission point are shown in **Figure 2**. Approximate grid references for each stack are provided in the Air Quality Impact Assessment in **Appendix A**.

The existing point source emissions to air are identified in **Table 2** below. This data has been taken from the current permit, EPR/EP3833LY/V003, Table S3.1.

Additionally, Table S3.1 of the EP will need updating to include reference to the existing MCPs, which will require permitting under Schedule 25A of the EP Regulations 2018 (as amended), resulting in new parameters which will need ongoing monitoring.

Bold underlined text within the table below indicates proposed updates to Table S3.1 of the EP, as a result of this variation.

TABLE 2 EXISTING POINT SOURCE EMISSIONS TO AIR

Emission point reference point and location ³	Source	Parameter	Limit - these limits do not apply during start up or start down
A1	LCP No. 74 Gas turbine fired on natural gas	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	50mg/m ³ 70% to base load ¹
A1	LCP No. 74 Gas turbine fired on natural gas	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	55mg/m ³ 70% to base load ¹ 60mg/m ³ MSUL/MSDL to base load ²
A1	LCP No. 74 Gas turbine fired on natural gas	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	100mg/m ³ 70% to base load ¹

Emission point reference point and location ³	Source	Parameter	Limit - these limits do not apply during start up or start down
A1	LCP No. 74 Gas turbine fired on natural gas	Carbon Monoxide	100mg/m ³ 70% to base load ¹
A1	LCP No. 74 Gas turbine fired on natural gas	Carbon Monoxide	100mg/m ³ 70% to base load ¹ 100mg/m ³ MSUL/MSDL to base load ²
A1	LCP No. 74 Gas turbine fired on natural gas	Carbon Monoxide	200mg/m ³ 70% to base load ¹
A1	LCP No. 74 Gas turbine fired on natural gas	Sulphur dioxide	n/a
A1	LCP No. 74 Gas turbine fired on natural gas	Oxygen	n/a
A1	LCP No. 74 Gas turbine fired on natural gas	Water Vapour	n/a
A1	LCP No. 74 Gas turbine fired on natural gas	Stack gas temperature	n/a
A1	LCP No. 74 Gas turbine fired on natural gas	Stack gas pressure	n/a
A1	LCP No. 74 Gas turbine fired on natural gas	As required by the Method Implementation Document for BS EN 15259	n/a
A2	LCP No. 75 Gas turbine fired on natural gas	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	50mg/m ³ 70% to base load ¹
A2	LCP No. 75 Gas turbine fired on natural gas	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	55mg/m ³ 70% to base load ¹ 60mg/m ³ MSUL/MSDL to base load ²
A2	LCP No. 75 Gas turbine fired on natural gas	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	100mg/m ³ 70% to base load ¹

Emission point reference point and location³	Source	Parameter	Limit - these limits do not apply during start up or start down
A2	LCP No. 75 Gas turbine fired on natural gas	Carbon Monoxide	100mg/m ³ 70% to base load ¹
A2	LCP No. 75 Gas turbine fired on natural gas	Carbon Monoxide	100mg/m ³ 70% to base load ¹ 100mg/m ³ MSUL/MSDL to base load ²
A2	LCP No. 75 Gas turbine fired on natural gas	Carbon Monoxide	200mg/m ³ 70% to base load ¹
A2	LCP No. 75 Gas turbine fired on natural gas	Sulphur dioxide	n/a
A2	LCP No. 75 Gas turbine fired on natural gas	Oxygen	n/a
A2	LCP No. 75 Gas turbine fired on natural gas	Water Vapour	n/a
A2	LCP No. 75 Gas turbine fired on natural gas	Stack gas temperature	n/a
A2	LCP No. 75 Gas turbine fired on natural gas	Stack gas pressure	n/a
A2	LCP No. 75 Gas turbine fired on natural gas	As required by the Method Implementation Document for BS EN 15259	n/a
<u>A3</u>	<u>Two auxiliary boilers fired on natural gas with low NOx burners</u>	<u>Oxides of nitrogen (NO and NO₂ expressed as NO₂)</u>	<u>250 mg/m³</u>
<u>A3</u>	<u>Two auxiliary boilers fired on natural gas with low NOx burners</u>	<u>Carbon monoxide</u>	<u>No limit set</u>
<u>A4</u>	<u>Emergency generator fired on gas oil</u>	<u>Oxides of nitrogen (NO and NO₂ expressed as NO₂)</u>	<u>No limit set</u>

Emission point reference point and location ³	Source	Parameter	Limit - these limits do not apply during start up or start down
A4	<u>Emergency generator fired on gas oil</u>	<u>Carbon monoxide</u>	<u>No limit set</u>
A5	Emergency fire water pump fired in gas oil	No parameters set	n/a

Note 1: This ELV applies whenever the load is >70% throughout the reference period.

Note 2: This ELV applies when the load varies between MSUL/MSDL and base load during the daily reference period. MSUL and MSDL are defined in Table S1.4 of permit.

Note 3: Emission points referred to in this table are based on emissions to air from stacks associated to the combustion units on site; A1, A2, A3, A4, A5 (as assessed by the updated AQIA). For a full list of emission points from site refer to Table S3.1 in the current permit, EPR/EP3833LY.

4.2.2 FUGITIVE EMISSIONS TO AIR

There are no expected changes to fugitive emissions to air because of the proposed variation.

4.3 EMISSIONS TO WATER

4.3.1 POINT SOURCE EMISSIONS TO WATER

There are no changes to point source emissions to water because of the proposed variation.

4.3.2 FUGITIVE EMISSIONS TO WATER

There are no changes to fugitive emissions to water because of the proposed variation.

4.4 EMISSIONS TO SEWER

There will be no discharges to sewer because of the proposed variation.

4.5 EMISSIONS TO LAND AND GROUNDWATER

There will be no emissions to land or groundwater because of the proposed variation.

5. OPERATING TECHNIQUES

5.1 APPLICABLE TECHNICAL STANDARDS

To demonstrate that the site will operate using Best Available Techniques (BAT) for the relevant permitted activities proposed at the site, a review of the European Commission's relevant BAT Reference Documents (BREFs) and relevant industry guidance has been carried out. The proposed variation has been assessed against the following technical standards and guidance:

- Medium Combustion Plant guidance, UK Government³
- Best Available Techniques (BAT) Reference Document (BREF) for Large Combustion (LCP) plants, 2017⁴

5.1.1 MCP GUIDANCE

The boilers and emergency generator meet the definition of Medium Combustion Plant (MCP) under the meaning in the Medium Combustion Plant Directive (MCPD) (2015/2193/EU)⁵, having a thermal input greater than 1 MWth and less than 50 MWth. The MCPD states:

From 1 January 2030, emissions into the air of SO₂, NO_x and dust from an existing medium combustion plant with a rated thermal input of less than or equal to 5 MW shall not exceed the emission limit values set out in Tables 1 and 3 of Part 1 of Annex II.

As part of this variation, it is proposed that the existing boilers on site (put into operation before December 2018) be added to the permit with this variation, at the ELVs set out in Table 1 of Annex II of the Directive and reproduced in **Table 3** below.

TABLE 3 MCP DIRECTIVE ELVS FOR EXISTING BOILERS BETWEEN 1-5 MWTH

Pollutant	Natural gas (mg/Nm ³)
SO ₂	n/a
NO _x	250
Dust	n/a
Temperature 273,15 K, Pressure 101,3 kPa, Oxygen 3%	

The MCPD also states:

(19) In order to take account of certain specific circumstances where the application of emission limit values would lead to disproportionately high costs compared to the environmental benefits, Member States should be able to exempt medium combustion plants used in cases of emergency and operated during limited time periods from compliance with the emission limit values set out in this Directive.

³ Medium combustion plant and specified generator regulations - GOV.UK (www.gov.uk)

⁴ https://eippcb.jrc.ec.europa.eu/sites/default/files/2019-11/JRC_107769_LCPBref_2017.pdf

⁵ [L_2015313EN.01000101.xml](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A2015313EN.01000101.xml)

The backup generator is operated during emergencies and for routine testing only and runs less than 500 hours per year (as a five-year rolling average). It is therefore exempt from meeting ELVs.

The following MCP guidance is relevant to the Site:

- [Medium combustion plant and specified generators: environmental permits - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/medium-combustion-plant-and-specified-generators-environmental-permits)
- [Medium combustion plant \(MCP\): comply with emission limit values - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/medium-combustion-plant-mcp-comply-with-emission-limit-values)
- [Medium combustion plant and specified generator permits: how to comply - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/medium-combustion-plant-and-specified-generator-permits-how-to-comply)
- [Specified generator: when you need a permit - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/specified-generator-when-you-need-a-permit)

Assessment of the variation against the MCP guidance is presented in **Table 4**.

The generator is considered a 'Specified Generator' as per the definition within Schedule 25B of the Regulations. However, it is an emergency back-up generator that is not tested for more than 50 hours each year and does not provide a balancing service nor demand side response operations. As per the Regulations and the Environment Agency's online guidance on Specified Generator permitting⁶, it is therefore excluded from the Specified Generator controls.

5.1.2 LCP BREF

The Site includes Large Combustion Plant (LCP) under the meaning in Chapter III of the Industrial Emissions Directive (2010/75/EU)⁷, which states:

This chapter shall apply to combustion plants, the total rated thermal input of which is equal to or greater than 50 MW, irrespective of the type of fuel used.

The LCP BAT conclusions concern the following activities specified in Annex I of the IED:

Combustion of fuels in installations with a total rated thermal input of 50 MW or more, only when this activity takes place in combustion plants with a total rated thermal input of 50 MW or more.

5.1.2.1 'NEW' VS 'EXISTING' PLANT

The two CCGTs currently have a rated thermal input of 702 MW each which will be uplifted to 744 MWth. The Site is refurbishing the gas turbines to achieve this power uplift and InterGen has confirmed with their supplier that the cost of these works are less than 50% of buying new comparable units.

Pre-application advice was sought from the Environment Agency and received from Richard Croll (Principal Permitting Officer, National Permitting Service), dated 25th November 2024. This correspondence confirmed that the CCGTs will be considered existing, based on part refurbishment, and therefore BAT-AELs for new plant will not need to be applied. Please refer to **Appendix C** for the EA's pre-application correspondence.

As a result of this variation the CCGTs will continue to be operated to achieve compliance with the relevant BAT-AELs for existing plant, as defined in the LCP BATCs document.

Assessment of the variation against the LCP BREF is presented in **Table 5**.

⁶ [Specified generator: when you need a permit - GOV.UK](https://www.gov.uk/guidance/specified-generator-when-you-need-a-permit)

⁷ [Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on Industrial Emissions \(Integrated Pollution Prevention and Control\)](https://eur-lex.europa.eu/eli/dir/2010/75/oj)

5.2 REVIEW OF OPERATING TECHNIQUES

The MCP guidance and LCP document considered above is presented in tabular format on the following pages. Best Available Techniques that are not considered applicable are greyed out.

TABLE 4 MEDIUM COMBUSTION PLANT AND SPECIFIED GENERATOR REGULATION GUIDANCE (SUMMARISED)

Key Definitions and Scope		Comments
Medium combustion plant and specified generators: environmental permits		
IED chapter 2 permits affected by the regulations	<p>MCP regulations do apply to a MCP on a chapter 2 IED installation. You must meet MCP requirements where it's a:</p> <ul style="list-style-type: none"> primary activity – where the total rated thermal input is more than 50 MWth on an installation, for example gas engines generating electricity directly associated activity – combustion to another Chapter 2 activity, for example combustion on a chemical manufacturing site <p>As a minimum, the MCP must meet the appropriate Medium Combustion Plant Directive (MCPD) emission limit value (ELV) by the required date.</p>	<p>The existing boilers, put into operation prior to 2018, each have a MWth input of 4 MW and will need to be permitted as existing MCP on the varied permit. The boilers will require compliance with the ELVs outlined in the MCPD by 1st January 2030 – refer to Table 3 for ELVs and anticipated emissions.</p> <p>The existing generator, put into operation prior to 2018, has a MWth input of 2 MW and will need to be permitted as an existing MCP on the permit. The generator is exempt from meeting ELVs due to its limited operating hours – see row below for further details.</p>
Medium combustion plant (MCP): comply with emission limit values		
Minimum ELVs your MCP must comply with	<p>The MCPD sets the minimum ELVs your MCP must comply with (unless exempt). See the <u>MCPD Annex 2 tables</u>. For:</p> <ul style="list-style-type: none"> a new MCP that is not an engine or gas turbine (GT) the ELVs are listed in part 2, table 1 a new MCP that is an engine or GT the ELVs are listed in part 2, table 2 an existing MCP that is not an engine or GT between more than 5 and less than 50 MWth the ELVs are listed in part 1, table 2 – it must meet these by 1 January 2025 an existing MCP that is not an engine or GT between greater than or equal to 1 and less than 5MWth the ELVs are listed in part 1, table 1 – it must meet these by 1 January 2030 an existing MCP between 1 and 50 MWth which is an engine or GT the ELVS are listed in part 1, table 3 – it will depend on its capacity as to what deadline applies. 	<p>The existing boilers will be operating all year round for approximately 8,064 hours annually, therefore it will be required to comply with the ELVs set out in Part 1 Table 1 of Annex II of the MCPD, reproduced in Table 3.</p> <p>Existing MCP operating less than 500 hours per year as a 5-year rolling average are exempt from meeting MCPD ELVs. The existing generator will be for emergency use only and will not be tested for more than 50 hours per year or operate for more than 500 hours per year.</p>
Dark smoke	The MCP must not persistently emit dark smoke.	Noted. Persistent or unusual smoking would be picked up by the operational team during their regular site inspections of the boilers

Key Definitions and Scope		Comments
		and generator and investigate. Any unexpected emissions of smoke would be reported, and maintenance/repairs carried out.
Stack arrangements	Vertical stacks that are not obstructed by caps and cowls allow for the greatest dispersion of air pollutants. You should use this design for: <ul style="list-style-type: none"> new MCP as required by the available standard rules permits existing MCP if their stack arrangements can be redesigned 	The existing MCPs currently have vertical stacks that are not obstructed by caps and cowls.
Monitoring requirements	For a new MCP you must start monitoring its emissions within 4 months of the permit being issued or the start of operation, whichever is the latest.	Not applicable to site, MCP are not new.
	You are required to do periodic monitoring for new and existing MCP at least every: <ul style="list-style-type: none"> Three years for a MCP less than or equal to 20 MWth One year for a MCP greater than 20MWth 1,500 hours of operation for limited operating hours MCP less than 20 MWth with a minimum frequency of once every 5 years 500 hours of operation for limited operating hours MCP greater than 20MWth with a minimum frequency of once every 5 years 	There are currently no monitoring requirements on the existing MCP boilers and backup generator. The monitoring requirements are being introduced as part of this variation to comply with the MCPD, which will require MCP that are <5 MWth to commence periodic emissions monitoring from the 1 st January 2030. <ul style="list-style-type: none"> Boilers – emissions monitoring of NO_x and CO every 3 years for a MCP less than or equal to 20 MWth. Generator – emissions monitoring of NO_x and CO every 1,500 hours of operation for limited operating hours MCP less than 20 MWth with a minimum frequency of once every 5 years.
Medium combustion plant and specified generator permits: how to comply		
General	You must be able to demonstrate your medium combustion plant (MCP), or specified generator emissions are protecting air quality.	The potential impact on air quality of the existing MCPs has been assessed in-combination with the CCGTs. See Section 12 and Appendix A .
Monitoring requirements	Operators must test emissions from each unit (unless the permit has a different condition) to demonstrate compliance with emission limits.	The existing boilers will be required to meet ELVs, whereas the backup generator will be exempt from meeting ELVs – see above line on 'Minimum ELVs your MCP must comply with'. Additionally, it is anticipated that a condition on the permit could potentially require NO _x and CO testing be completed for both the boiler and generator, which will be in line with web guide 'Monitoring stack

Key Definitions and Scope		Comments
		emissions: low risk MCPs and specified generators' Published 16 February 2021(formerly known as TGN M5).
Records and reporting	<p>You must keep records and report to the regulators as set out in the permit.</p> <p>When you first get a permit for your plant, you'll normally be required to send monitoring returns. These must show compliance with the emission limit values (ELVs). The frequency after this will be specified in the permit conditions.</p> <p>You must keep records of the plant operation for at least 6 years.</p>	Reporting requirements in current permit will be extended to cover the newly registered MCPs.
Specified generator: when you need a permit		
Emergency backup generators	From 1 January 2019, a backup generator only used to provide power at a site during an emergency is excluded. However, it is a MCP and requires a permit by the appropriate deadline.	The generator on Site is used to provide power during an emergency, therefore it is excluded from specified generator controls.
Number of hours you can test backup generators	<p>You must not carry out more than 50 hours testing a year for each backup generator. You must get agreement in writing from your regulator if you want to increase this limit. The regulator can exclude commissioning time within the written agreement.</p> <p>For each backup generator, you must record the number of hours you test during the year. This is to demonstrate that you meet the exclusion criteria.</p> <p>If you exceed the limit of 50 hours testing a year without written agreement the regulator will take appropriate enforcement action.</p>	<p>Testing operation will be limited to 50 hours per year per engine in the permit.</p> <p>The number of hours of operation will be recorded and reported annually to the EA.</p>
Data centres	Data centres that use an on-site emergency backup generator when the transmission frequency is unstable are excluded. This is provided the generator is not part of a formal agreement or contract.	Not applicable, the Site is not a data centre.

Key Definitions and Scope		Comments
How to test backup engines	<p>When you test backup engines you should:</p> <ul style="list-style-type: none"> • stagger the tests if you have multiple backup engines • keep testing times and frequency to the minimum – just enough to demonstrate reliability at the appropriate load • only test when you expect low ambient nitrogen oxides (NO_x) background, such as not during peak traffic periods • use the electricity generated from the test on your site • install backup generators away from sensitive receptors (not below windows or venting onto car parks) and terminate the exhaust flues vertically, making sure there are no obstructions 	<p>There will only be one backup generator on site.</p> <p>The period and frequency of testing is minimised, while being sufficient to demonstrate reliability.</p> <p>The Site does not sit within an AQMA, reducing the likelihood of elevated background NO_x triggering an air quality incident (e.g. during peak traffic periods).</p> <p>Engine exhaust stack terminates vertically without obstruction.</p>

TABLE 5 BEST AVAILABLE TECHNIQUES (BAT) REFERENCE DOCUMENT (BREF) FOR LARGE COMBUSTION (LCP) PLANTS, 2017

Section	Subsection	BAT #	BAT Text	Requirements	Comment
General BAT Conclusions	Environmental Management System EMS	BAT 1	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates the features presented in the BREF.	See BREF for detailed requirements	<p>The installation is operated under InterGen's own EMS. Details of the Site's EMS are presented in Section 7 of the report.</p> <p>The EMS includes an environmental policy and other relevant management documents. The site-specific procedures define the roles and responsibilities for applicable site personnel. The EMS incorporates all of the listed features under BAT 1 items and is currently in place.</p>
	Monitoring	BAT 2	BAT is to determine the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the gasification, IGCC and/or combustion units by carrying out a performance test at full load (1), according to EN standards, after the commissioning of the unit and after each modification that could significantly affect the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the unit. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	(1) In the case of CHP units, if for technical reasons the performance test cannot be carried out with the unit operated at full load for the heat supply, the test can be supplemented or substituted by a calculation using full load parameters	<p>Operational performance testing will be conducted according to recognised standards after the refurbishment of the CCGTs. This includes determination of the net total fuel utilisation. The CCGTs will require an increase in fuel used, resulting in an increase in thermal input and electrical output. New electrical output is expected to equal 77 MW, resulting in a 2% efficiency increase (approximate).</p> <p>Periodic Operational Performance tests measuring the load, fuel used, and power output will be undertaken in accordance with applicable EN standards.</p>

Section	Subsection	BAT #	BAT Text	Requirements	Comment
	Monitoring process parameters for emissions to air and water	BAT 3	BAT is to monitor key process parameters relevant for emissions to air and water.	<ul style="list-style-type: none"> Fuel gas Flow Oxygen content, temperature and Pressure Water vapour content Waste water from flue-gas treatment Waste water from cooling treatment and process wastewater 	<p>The Site/CCGTs are currently permitted and required to monitor the following, as seen in Table S3.1 of the current permit (EPR/EP3833LY/V002):</p> <ul style="list-style-type: none"> Oxygen, continuously according to BS EN 14181 Water vapour, continuously according to BS EN 14181 Stack gas temperature, continuously and traceable to national standards Stack gas pressure, continuously and traceable to national standards <p>Following this variation, it is not expected that these parameters will change.</p>
	Monitoring of emissions to air	BAT 4	BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	<ul style="list-style-type: none"> NH₃ NO₂ N₂O CO SO₂ SO₃ Gaseous chlorides HF Dust Metals and metalloids Hg TVOC Formaldehyde CH₄ PCDD/F 	<p>The following substances are currently monitored using MCERTS certified Continuous Emissions Monitoring System (CEMS) according to the relevant stated EN standards. This system continuously monitors the following, as seen in Table S3.1 of the current permit (EPR/EP3833LY/V002):</p> <ul style="list-style-type: none"> NO_x (continuous - BS EN 14181) CO (continuous - BS EN 14181) SO₂ (at least every 6 months, concentrations by calculation as agreed in writing by the EA) <p>Following this variation, it is not expected that these parameters will change.</p>

Section	Subsection	BAT #	BAT Text	Requirements	Comment
	Monitoring emissions to water from flue-gas treatment	BAT 5			No flue-gas gas treatment.
	General environmental and combustion performance	BAT 6	In order to improve the general environmental performance of combustion plants and to reduce emissions to air of CO and unburnt substances, BAT is to ensure optimised combustion and to use an appropriate combination of techniques.	Techniques: <ul style="list-style-type: none"> Fuel blending and mixing Maintenance of the combustion system Advanced control system Good design of the combustion equipment Fuel choice 	<p>a) The CCGT will continue to run on 100% natural gas.</p> <p>b) All plant and equipment at the Site are regularly maintained, including the CCGTs, by qualified staff or contractors, as per site maintenance and testing procedures and in line with Original Equipment Manufacturers' recommendations.</p> <p>c) The CCGTs use an advanced, bespoke control system to control combustion efficiency and reduce emissions. Operating conditions will also be monitored by suitably trained site personnel. Any non-conformance or deviation in normal operating parameters shall be identified by the control system currently in place to allow operators to take action to avoid breach of permitted emission levels.</p> <p>d) Combustion equipment has been sourced from reputable suppliers with experience in the design of combustion plant and has been operating on site since 2007.</p> <p>e) The purpose of the facility is to generate electricity from natural gas. The CCGTs will run on 100% natural gas from</p>

Section	Subsection	BAT #	BAT Text	Requirements	Comment
					the mains supply, to reduce CO emissions.
	General environmental and combustion performance	BAT 7	In order to reduce emissions of ammonia to air from the use of selective catalytic reduction (SCR) and/or selective non-catalytic reduction (SNCR) for the abatement of NOx emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NOx ratio, homogeneous reagent distribution and optimum size of the reagent drops).		<p>The Site does not utilise an SCR system on any combustion plant and instead implements primary controls to reduce NOx emissions from the CCGTs (i.e. dry low NOx burners).</p> <p>The Site has considered installation of SCR systems, however, the feasibility of retrofit of SCR systems on the existing plant is considered low due to space constraints and access to the equipment. The CCGTs will continue to be operated to achieve compliance with the relevant BAT AELs for NO_x.</p>
		BAT 8	In order to prevent or reduce emissions to air during normal operating conditions, BAT is to ensure, by appropriate design, operation and maintenance, that the emission abatement systems are used at optimal capacity and availability.	(No requirements specified)	<p>The installation uses dry low NOx burners for abatement of NOx emissions from combustion (for the CCGTs and boilers only).</p> <p>Maintenance procedures and schedules will be developed in line with supplier recommendations to ensure that planned maintenance is carried out, and a maintenance system will be used for reporting defects and tracking that repairs are carried out in good time.</p>
		BAT 9	In order to improve the general environmental performance of combustion and/or gasification plants and to reduce emissions to air, BAT is to include the following elements in the quality assurance/quality	<ul style="list-style-type: none"> Initial full characterisation of the fuel used to include at least the parameters listed below and in accordance with EN standards. ISO, national or other international standards may be used provided they 	The fuel being used by the CCGTs is natural gas from the national grid supply, which will not change as a result of this variation. Current quality assurance/quality control programs as part of the Site's existing EMS will not be impacted as a result of this

Section	Subsection	BAT #	BAT Text	Requirements	Comment
			control programmes for all the fuels used, as part of the environmental management system (see BAT 1):	<p>ensure the provision of data of an equivalent scientific quality.</p> <ul style="list-style-type: none"> Regular testing of the fuel quality to check that it is consistent with the initial characterisation and according to the plant design specifications. The frequency of testing and the parameters chosen from the table below are based on the variability of the fuel and an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed). Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system (see description in Section 10.8.1)). 	variation. All elements listed are included within the Site's EMS, refer to BAT 1.
		BAT 10	In order to reduce emissions to air and/or to water during other than normal operating conditions (OTNOC), BAT is to set up and implement a management plan as part of the environmental management system (see BAT 1), commensurate with the relevance of potential pollutant releases, that includes the following elements:	<ul style="list-style-type: none"> Appropriate design of the systems considered relevant in causing OTNOC that may have an impact on emissions to air, water and/or soil (e.g. low-load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines) Set-up and implementation of a specific preventive 	The existing plant and associated control systems have been designed to minimise the potential for OTNOC events to occur. InterGen's existing EMS (BAT 1) incorporates a management plan which details the relevant risks and actions that need to be taken during OTNOC events and unexpected pollutant releases.

Section	Subsection	BAT #	BAT Text	Requirements	Comment
				<p>maintenance plan for these relevant systems.</p> <ul style="list-style-type: none"> • Review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary. • Periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary 	
		BAT 11	BAT is to appropriately monitor emissions to air and/or to water during OTNOC	<p>The monitoring can be carried out by direct measurement of emissions or by monitoring of surrogate parameters if this proves to be of equal or better scientific quality than the direct measurement of emissions. Emissions during start-up and shutdown (SU/SD) may be assessed based on a detailed emission measurement carried out for a typical SU/SD procedure at least once every year and using the results of this measurement to estimate the emissions for each and every SU/SD throughout the year.</p>	<p>Emissions monitoring procedures are included in the EMS. The EMS covers monitoring requirements during OTNOC, not just steady operation. The flue gases from the Site will be monitored using CEMs, which will also monitor emissions during OTNOC.</p>

Section	Subsection	BAT #	BAT Text	Requirements	Comment
	Energy Efficiency	BAT 12	In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated $\geq 1\,500$ h/yr, BAT is to use an appropriate combination of techniques.	Techniques: <ul style="list-style-type: none"> • Combustion optimisation • Optimisation of the working medium conditions • Optimisation of the steam cycle • Minimisation of energy consumption • Preheating of combustion air • Fuel preheating • Advanced control system • Feed-water preheating using recovered heat • Heat recovery by cogeneration (CHP) • CHP readiness • Flue-gas condenser • Heat accumulation • Wet stack • Cooling tower discharge • Fuel pre-drying • Minimisation of heat losses • Advanced materials • Steam turbine upgrades • Supercritical and ultra-supercritical steam conditions 	The Site currently has an Energy Efficiency Plan in place, which was submitted in response to Improvement Condition (IC) 8 for their existing permit (EPR/EP3833LY) and has subsequently been approved. <ul style="list-style-type: none"> • Each CCGTs will operate for $<1,500$h/year. • The anticipated electrical efficiency of the CCGTs plant will be increased circa 2% at full load as a result of this variation. • All hot water is supplied by small local thermostatically controlled electric water heaters which saves heating large tanks and having long pipeline runs. • Building heating uses heat pumps as the heat source, which is more efficient than direct heating. • The boiler feed pump motors consume the most amount of electricity (out of all the pumps) and are only operated just before the start of the gas turbines and while the gas turbines are operating. This minimises consumption of electricity.
	Water usage and emissions to water	BAT 13	In order to reduce water usage and the volume of contaminated waste water discharged, BAT is to use one or both of the techniques listed.	Techniques: <ul style="list-style-type: none"> • Water recycling • Dry bottom ash handling 	There is no change to the Site's water usage and waste water discharge processes as a result of this variation.

Section	Subsection	BAT #	BAT Text	Requirements	Comment
		BAT 14	In order to prevent the contamination of uncontaminated waste water and to reduce emissions to water, BAT is to segregate waste water streams and to treat them separately, depending on the pollutant content.		<p>The wastewater generated at the installation will not change as a result of this variation.</p> <p>The Site utilises a water treatment plant for effluent produced on site which is permitted to be discharged to the River Thames. This wastewater includes site drainage, domestic sewage, auxiliary cooling tower blowdown, filtration back flush, electro deionization reject, and reverse osmosis reject. Emissions are monitored according to limits outlined in the current permit under Table S3.2.</p>
		BAT 15	In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given [in the BREF document], and to use secondary techniques as close as possible to the source in order to avoid dilution.		Emissions to water are not impacted by the proposed variation.
	Waste Management	BAT 16	<p>In order to reduce the quantity of waste sent for disposal from the combustion and/or gasification process and abatement techniques, BAT is to organise operations so as to maximise, in order of priority and taking into account life cycle thinking:</p> <p>(a) waste prevention, e.g. maximise the proportion of</p>	<p>Techniques:</p> <ul style="list-style-type: none"> • Generation of gypsum as a by product • Recycling or recovery of residues in the construction sector • Energy recovery by using waste in the fuel mix • Preparation of spent catalyst for reuse 	<p>There are no changes to the types of wastes generated and stored at the Site as a result of the proposed variation.</p> <p>The facility generates minimal waste, which comprises a mixture of solid and liquid wastes. All wastes generated are segregated into different categories before being removed from site via a licensed contractor. Refer to Table 6 for waste types produced.</p>

Section	Subsection	BAT #	BAT Text	Requirements	Comment
			residues which arise as by-products; (b) waste preparation for reuse, e.g. according to the specific requested quality criteria; (c) waste recycling; (d) other waste recovery (e.g. energy recovery)		
	Noise Emissions Flaring	BAT 17	In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below.	Techniques <ul style="list-style-type: none"> • Operational measures • Low -noise equipment • Noise attenuation • Noise-control equipment • Appropriate location of equipment and buildings 	There will be no impacts/changes to noise as a result of this variation.
BAT conclusions for the combustion of solid fuels	BAT conclusions for the combustion of coal and/or lignite	BAT 18 – 23			Not applicable – no combustion of coal/lignite
	BAT Conclusions for the combustion of solid biomass and/or peat	BAT 24 – 27			Not applicable - no combustion of solid biomass/peat
BAT conclusions for the combustion	HFO- and/or gas-oil-fired boilers	BAT 28 – 30			Not applicable – no use of HFO/oil-fired boilers. Boilers are gas fired.

Section	Subsection	BAT #	BAT Text	Requirements	Comment
of liquid fuels	HFO- and/or gas-oil-fired engines	BAT 31 - 35			Not applicable – No use of HFO/oil-fired engines. Boilers are gas fired.
	Gas-oil-fired gas turbines	BAT 36 - 39			Not applicable – No use of gas oil-fired gas turbines. CCGTs are run on natural gas.
BAT conclusions for the combustion of gaseous fuel	Energy efficiency	BAT 40	In order to increase the energy efficiency of natural gas combustion, BAT is to use an appropriate combination of the techniques given in BAT 12 and below.	Refer to BAT 12. • Combined cycle Refer to BREF for BAT-AELs	The CCGTs are existing plant which do not operate for more than 1,500 hours annually (each). Refer to BAT 12 row.
	NO _x , CO, NMVOC and CH ₄ , emissions to air	BAT 41	In order to prevent or reduce NO _x emissions to air from the combustion of natural gas in boilers, BAT is to use one or a combination of the techniques listed.	Techniques: • Air and/or fuel staging • Flue-gas recirculation • Low-NO _x burners • Advanced control system • Reduction of the combustion air temperature • Selective non-catalytic reduction (SNCR) • Selective catalytic reduction (SCR)	NO _x abatement on site has not changed as a result of the proposed variation. The two CCGTs will continue to be fitted with dry low-NO _x burners. By mixing air and fuel before combustion, a homogeneous temperature distribution and a lower flame temperature are achieved, resulting in lower NO _x emissions. An advanced control system is also implemented to regulate emissions. See BAT 7 row for commentary on SCR installation.
		BAT 42	In order to prevent or reduce NO _x emissions to air from the combustion of natural gas in gas turbines, BAT is to use one	a. Advance control system b. water/steam addition c. Dry low - NO _x burners d. Low -load design concept e. Low - NO _x burners	There will be no changes to the techniques used on site to prevent or reduce NO _x emissions to air as a result of the proposed variation. The following techniques will continue to be used:

Section	Subsection	BAT #	BAT Text	Requirements	Comment
			or a combination of the techniques given.	f. Selective catalytic reduction (SCR)	<p>a. Operation of the CCGTs will be controlled by trained site operators using an advanced, bespoke control system, which will be used to control the operation of the plant and also record data on the plant performance.</p> <p>c. Dry low NO_x burners are used as a primary technique used to minimise NO_x in the CCGTs</p> <p>See BAT 7 row for commentary on SCR installation.</p>
		BAT 43	In order to prevent or reduce NO _x emissions to air from the combustion of natural gas in engines, BAT is to use one or a combination of the techniques given.	<p>a. Advanced control system</p> <p>b. lean-burn concept</p> <p>c. advanced lean-burn concept</p> <p>d. SCR</p>	Not applicable – there are no gas engines on LCP on site.
		BAT 44	In order to prevent or reduce CO emissions to air from the combustion of natural gas, BAT is to ensure optimised combustion and/or to use oxidation catalysts.		Plant is designed for optimised combustion.
		BAT 45	In order to reduce non-methane volatile organic compounds (NMVOC) and methane (CH ₄) emissions to air from the combustion of natural gas in spark-ignited lean burn		Not applicable – These are gas turbines not engines.

Section	Subsection	BAT #	BAT Text	Requirements	Comment
			gas engines, BAT is to ensure optimised combustion and/or to use oxidation catalysts.		
BAT Conclusions for the combustion of iron and steel process gases		BAT 46 - 51			Not applicable – no combustion of iron and steel process gases.
BAT conclusions from the combustion of gaseous and/or liquid fuels on offshore platforms		BAT 52 - 54			Not applicable – no combustion on offshore platforms.
BAT conclusions for multi-fuel-fired plants		BAT 55 - 59			Not applicable.
BAT conclusions for the co-incineration of waste		BAT 60 - 75			Not applicable.

6. MONITORING

6.1 EMISSIONS TO AIR

No changes in monitoring emissions to air are proposed for the two CCGTs. They will continue to be monitored in accordance with BS EN 15259 standards.

It is proposed that as part of this EP variation, the two boilers and emergency backup generator, which are considered existing MCP <5 MWth, have MCPD aligned monitoring stipulated in Table S3.1 of the EP from their relevant permitting date and ELV compliance dates, which are the 1st January 2029 and 1st January 2030, respectively.

The existing two boilers will be operated consistently throughout the year and are required to comply with MCPD ELVs as discussed in **Section 5**, which only requires compliance for NO_x emissions. It is anticipated that the permit variation will include the monitoring of both NO_x and CO as a condition of the permit.

The existing backup generator operating less than 500 hours per year is exempt from meeting MCPD ELVs, however as above, monitoring of both NO_x and CO is expected as a condition of the permit.

The boilers and generator will use the following monitoring standard to monitor their emissions:

- Monitoring stack emissions: low risk MCPs and specified generators'⁸ (formerly called TGN M5).

The current EP does not require NO_x or CO monitoring for the boilers or emergency generator. It is proposed that this requirement is introduced as part of this EP variation. Refer to **Table 6** for the updated monitoring requirement.

TABLE 6 EMISSION LIMITS AND MONITORING REQUIREMENTS

Source	Parameter	Limit	Reference Period	Monitoring Frequency	Monitoring standard of method
A1 LCP No. 74 CCGT	Refer to Section 3 – Emissions and monitoring, Table S3.1 in the current permit EPR/EP3833LY/V003 (10/03/2020).				
A2 LCP No. 75 CCGT	Refer to Section 3 – Emissions and monitoring, Table S3.1 in the current permit EPR/EP3833LY/V003 (10/03/2020).				
A3 Two auxiliary boilers	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	250 mg/Nm ³	In line with web guide: Monitoring stack emissions: low risk MCPs and specified generators	Emissions monitoring every 3 years for a MCP less than or equal to 20 MWth	Representative engine monitoring in line with web guide: Monitoring stack emissions: low risk MCPs and specified generators.
	Carbon Monoxide	No limit set			
A4 Emergency diesel fired backup generator	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	No limit set	In line with web guide: Monitoring stack emissions: low	Every 1,500 hours of operation for limited operating hours MCP less	

⁸ <https://www.gov.uk/government/publications/monitoring-stack-emissions-low-risk-mcps-and-specified-generators/monitoring-stack-emissions-low-risk-mcps-and-specified-generators>

Source	Parameter	Limit	Reference Period	Monitoring Frequency	Monitoring standard of method
	Carbon Monoxide	No limit set	risk MCPs and specified generators	than 20 MWth with a minimum frequency of once every 5 years	

7. ENVIRONMENTAL MANAGEMENT SYSTEMS

7.1 SUMMARY OF EMS

InterGen operates their own management system; a combination of reporting and maintenance systems supported by internal policies developed from best practice. The company Greenspace UK Limited is engaged to externally audit their systems.

The Site's EMS will not require any updates as a result of the proposed variation.

The following is a summary of the contents of InterGen's EMS:

1. Purpose
2. Scope
3. References
4. Definitions
5. Responsibilities
6. Requirements
 - 6.1 General Requirements
 - 6.2 Reporting Requirements & Frequencies of the Permit
 - 6.3 Quarterly Reports
 - 6.4 Bi-Annual / 6 Monthly Report
 - 6.5 Annual EA Report
 - 6.6 Annual Large Combustion Plant (LCP) Reports
 - 6.7 Annual Pollution Inventory
 - 6.8 Annual AST (or QAL 2)
 - 6.9 Four Yearly Report
 - 6.10 Quality Assurance & Data Validity
 - 6.11 Requirements for Notification
 - 6.12 Emergency Response
 - 6.13 Contact Telephone Numbers
7. Document History & Revision Logs
8. Appendices

- A. Emission to Air Limits and Action on Exceeding Limit
- B. Emission to Water Limits and Action on Exceeding Limit
- C. Quarterly Emissions to Air Report – NO_x & CO
- D. Quarterly Emissions to Air Report – Invalid CEMS Log
- E. Quarterly Emissions to Water Report
- F. 6 Monthly Emissions to Air Report – SO_x Calculation
- G. Annual Report – Resource Efficiency Metrics (REM)
- H. Annual Report – IED AR1 Form
- I. Annual Report – Pollution Inventory
- J. Example of ERP Compliance Assessment Report (CAR) Form
- K. Notification of a Permit Breach – Schedule 5 – Notification Form
- L. Emissions Compliance QA Check Sheet

8. WASTE MANAGEMENT

There are no changes to waste management proposed as part of this variation.

9. RAW MATERIALS

There are no changes to the raw materials used or kept on site as part of this variation.

10. ENERGY EFFICIENCY

10.1 ENERGY USAGE

The CCGTs will run on 100% natural gas from the mains supply. Emergency power will be generated by the one existing generator on site, which will consume diesel to produce electricity.

10.2 ENERGY EFFICIENCY

Energy efficiency is assured as far as possible through regular planned maintenance, monitoring and performance testing.

Following the refurbishment, it is anticipated that the Site's overall energy efficiency will increase approximately 2%.

The proposed refurbishment works to the CCGTs will not cost more than 50% of buying new comparable units and will therefore remain to be considered 'existing plant.' The refurbishment costs also do not satisfy the definition of a 'substantial refurbishment' therefore an updated cost benefit analysis is not required under Article 14 of the Energy Efficiency Directive.

An Energy efficiency plan was submitted to the EA in August 2008 in response to Improvement Condition (IC) 8 on the current permit EPR/EP3833LY.

10.3 CLIMATE CHANGE AGREEMENT

InterGen has not entered into a Climate Change Agreement and has no future plans to enter one.

11. NOISE

The proposed refurbishment of the CCGTs is focused on maintaining and upgrading existing equipment without introducing significant modifications to operations. It has been confirmed by the company undertaking the upgrade works, General Electric Company Ltd, that noise emissions will remain consistent with current levels, therefore, no increase in noise output is expected as a result of the refurbishment activities. On this basis, a noise impact assessment is not necessary for the proposed variation.

12. DETAILED AIR DISPERSION MODELLING

An AQIA has been undertaken to consider the potential impacts of the CCGT upgrade works to the local environment. The assessment considers the changes in emissions from the current to future designs including the change in emissions arising from the use of upgraded CCGTs, the higher operational capacity and changes to flue gas composition and exit characteristics resulting from the upgrades. Emissions from other combustion plants at the Site are also included in this assessment including two boilers, an emergency diesel generator and diesel fire pump. It aims to evaluate the significance of the potential combustion gases from the burning of natural gas on the ambient air quality. The pollutant of interest is oxides of nitrogen (NO_x) in relation to impacts on human health and ecological habitats.

Two scenarios were modelled using the ADMS to assess the potential emissions of NO_x on the ambient air quality from the Site's operation. The two scenarios are described below:

- Base Scenario: assessment of the currently permitted Site; and
- Future Scenario: assessment of the future proposed permitted Site design including uprated units.

The AQIA concluded that that no air quality standards or critical levels/loads are expected to be exceeded and that the potential impact at the identified human and ecological receptors is not considered significant. The full report is provided in **Appendix A**.

13. ENVIRONMENTAL RISK ASSESSMENT

It has been identified that the main change in risk to the environment from the proposed CCGT upgrades is the operation of the upgraded CCGTs and emissions to air released, which are assessed within the Air Quality Impact Assessment discussed in **Section 12** and is attached in **Appendix A**.

There are no other proposed changes to the Site's operation which would affect its existing impact on the surrounding environment, therefore an updated assessment of potential hazards on water, land/groundwater, odour, noise, and visual emissions has not been undertaken.

Screening of emissions to air using the H1 tool has not been completed. The EA advised that this was not required in their pre-application correspondence which is provided in **Appendix C**.



APPENDIX A AIR QUALITY IMPACT ASSESSMENT



APPENDIX B SPECIFIC QUESTIONS FOR THE COMBUSTION SECTOR

Question 1 – Type of fuel burned

Plant reference ID	Type of fuel	When used
A1 - CCGT LCP No. 74	Natural gas	When run as normal When started up When shut down
A2 – CCGT LCP No. 75	Natural gas	
A3 – Two auxiliary boilers	Natural gas	
A4 – Emergency backup generator	Diesel	

Question 2 – Fuel Composition range

Parameter	Unit	Fuel Type	
		Natural gas (A1, A2, A3)	Diesel (A4)
Methane	%	97	
Ethane	%	<1	
Propane	%	<1	
Butane	%	<1	
Carbon dioxide	%	<1	
Nitrogen	%	<1	
Aliphatic hydrocarbons (Paraffins - alkanes, and Naphthalene - cycloalkanes)	%		75
Aromatic Hydrocarbons (benzene, styrene)	%		25



Parameter	Unit	Fuel Type	
Hydrogen sulfide		<1	
Helium		<1	
Sulfur			<1
Nitrogen			<1
Oxygen			<1

Question 6 – Type of plant on your installation

Plant reference ID	Type of plant	Make / model
A1 - CCGT LCP No. 74	New-new	General Electric / GT26 AB
A2 – CCGT LCP No. 75	New-new	General Electric / GT26 AB
A3 – Two auxiliary boilers	New-new	Cochran / Thermax IV
A4 – Emergency backup generator	New-new	Cummins / 640DFHA

Question 9 – Existing LCP which have annual mass allowances under National Emission Reduction Plan (NERP), and those with ELVs under the LCPD

LCPs under NERP	LCPs with ELVs
A1 - CCGT LCP No. 74 - Mass CO ₂ disclosed in tonnes.	A1 - CCGT LCP No. 74
A2 – CCGT LCP No. 75 - Mass CO ₂ disclosed in tonnes.	A2 – CCGT LCP No. 75



APPENDIX C

PRE-APPLICATION CORRESPONDENCE FROM EA

EPR/EP3833LY/P001

From Croll, Rich <rich.croll@environment-agency.gov.uk>

Date Mon 25/11/2024 16:28

To Rahul Patel <Rahul.Patel@erm.com>

 4 attachments (258 KB)

Combustion (Part A) pre-app basic advice.docx; Installations pre-app basic advice.docx; Noise Impact Assessment (NIA) pre-app basic advice.docx; Noise Management Plan (NMP) Template.docx;

You don't often get email from rich.croll@environment-agency.gov.uk. [Learn why this is important](#)

EXTERNAL MESSAGE

Hello Rahul,

Your pre-app request has landed on my desk.

I have attached various documents. Based on the information provided, the variation would be substantial. The CCGTs will be considered existing, based on part refurbishment; i.e., BAT-AELs for new plants would not be applied.

I have attached guidance regarding air quality and noise. The combustion-specific application guidance provides information on BAT. If you are changing DAAs, you should detail these in the application.

If this has not answered your questions, could you let me know what specific information you require? If you want a face-to-face meeting, please provide an agenda and how much time you need. This information will enable me to provide a quote for enhanced pre-app.

Regards,

Rich Croll

Principal Permitting Officer, National Permitting Service - Installations

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