

Amazon Data Services Ireland Limited

IE Licence Application

Attachment 4-7-4 BREF Large Combustion Plants

Reference:

Issue | 2 July 2025

Document Verification

Project title

Document title

Job number

Document ref

File reference

IE Licence Application

Attachment 4-7-4 BREF Large Combustion Plants

305131

Revision	Date	Filename
		Description
		<div><div>Prepared by</div><div>Checked by</div><div>Approved by</div></div>
		<div><div>Name</div><div>Signature</div></div>
		Filename
		Description
		<div><div>Prepared by</div><div>Checked by</div><div>Approved by</div></div>
		<div><div>Name</div><div>Signature</div></div>
		Filename

Description

Prepared by		Checked by	Approved by
Name			
Signature			

Issue Document Verification with Document



Contents

Attachment 4-7-4 BREF Large Combustion Plants	1
---	---

Tables

Table 1: Energy Efficiency BATs	2
---------------------------------	---

Attachment 4-7-4 BREF Large Combustion Plants

Conclusions on BAT from the Large Combustion Plants BAT Reference Document (extracts)

The full and complete Large Combustion Plants BAT reference document (2017) is available at the EIPPC Bureau website: <http://eippcb.jrc.ec.europa.eu/reference/>

SCOPE OF BEST AVAILABLE TECHNIQUES (BAT)

This BREF (BAT Reference Document) for Large Combustion Plants concerns the following activities specified in Annex I to Directive 2010/75/EU:

1.1: 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.

The fuels considered in this document are any solid, liquid and/or gaseous combustible material including: gaseous fuels (e.g. natural gas, hydrogen-containing gas and syngas).

The relevant requirement for an Industrial Emissions (IE) Licence is outlined within the First Schedule of the EPA Act 1992. Activity ‘Class 2.1 Combustion of fuels in installations with a total rated thermal input of 50 MW or more’ specifically relates to the Installation.

The Installation once fully operational will have installed a total of 14 no. 7.73 MW_{th} critical emergency generators, 1 no. 2.50 MW_{th} house emergency generator and 2 no. 0.57 MW_{th} fire sprinkler pumps.

The combined thermal input of the Installation will be 111.9 MW_{th}, this exceeds the 50 MW_{th} threshold of Class 2.1 First Schedule of the EPA Act 1992. The applicant is applying to the Environmental Protection Agency (EPA) for an IE Licence principally relating to the operation of the emergency generators under Activity Class 2.1.

The BREF for Large Combustion Plants makes clear that “*These Best Available Techniques (BAT) conclusions do not address combustion of fuels in units with a rated thermal input of less than 15 MW*”. The thermal input of each of the individual combustion plant (generators as set out above) on site are less than 15 MW_{th}. Therefore, the Installation does not operate any large combustion plant.

Due to the Class of Activity being applied for it is the EPA’s expectation that an applicant has regard to the relevant sector Best Available Techniques (BAT). BAT related to the operation of the Installation are generally applicable; however, BAT related to the combustion unit will generally not be applicable.

Table 1: Large Combustion Plant BATs

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation
1. GENERAL BAT CONCLUSIONS			
1.1 Environmental management systems			
1	<p>BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:</p> <ul style="list-style-type: none"> i. commitment of the management, including senior management; ii. definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation; iii. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; iv. implementation of procedures paying particular attention to: <ul style="list-style-type: none"> a. structure and responsibility b. recruitment, training, awareness and competence c. communication d. employee involvement e. documentation f. effective process control g. planned regular maintenance programmes h. emergency preparedness and response i. safeguarding compliance with environmental legislation; v. checking performance and taking corrective action, paying particular attention to: <ul style="list-style-type: none"> a. monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions to air and water from IED-installations – ROM) b. corrective and preventive action 	<p>Applicable – ADSIL is an established operator of data storage facilities in Ireland and has a well-developed set of Standard Operating Procedures (SOPs) covering the management of its facilities including incident management, waste management, fuel delivery, and chemical storage and management.</p> <p>An Environmental Management System (EMS) has been developed for the ADSIL facilities and will be reviewed to ensure it includes the requirements of this BREF and the requirements of the Installation’s IE Licence, once granted.</p> <p>The EMS outlines the management of the Installation’s environmental program and is ISO14001 accredited.</p>	<p>EMS will be in place 12 months after commencement of IE Licence.</p> <p>SOPs are in place for the Installation.</p>

Best Available Techniques (BAT)	Applicability assessment and description of the technique	Schedule for implementation
<ul style="list-style-type: none"> c. maintenance of records d. independent (where practicable) internal and external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; vi. review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness; vii. following the development of cleaner technologies; viii. consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life including; <ul style="list-style-type: none"> a. avoiding underground structures b. incorporating features that facilitate dismantling c. choosing surface finishes that are easily decontaminated d. using an equipment configuration that minimises trapped chemicals and facilitates drainage or cleaning e. designing flexible, self-contained equipment that enables phased closure f. using biodegradable and recyclable materials where possible; ix. application of sectoral benchmarking on a regular basis. Specifically, for this sector, it is also important to consider the following features of the EMS, described where appropriate in the relevant BAT: x. quality assurance/quality control programmes to ensure that the characteristics of all fuels are fully determined and controlled (see BAT 9); xi. a management plan in order to reduce emissions to air and/or to water during other than normal operating conditions, including start-up and shutdown periods (see BAT 10 and BAT 11); xii. a waste management plan to ensure that waste is avoided, prepared for reuse, recycled or otherwise recovered, including the use of techniques given in BAT 16; xiii. a systematic method to identify and deal with potential uncontrolled and/or unplanned emissions to the environment, in particular: <ul style="list-style-type: none"> a. emissions to soil and groundwater from the handling and storage of fuels, additives, by-products and wastes b. emissions associated with self-heating and/or self-ignition of fuel in the storage and c. handling activities; xiv. a dust management plan to prevent or, where that is not practicable, to reduce diffuse emissions from loading, unloading, storage and/or handling of fuels, residues and additives; 		

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation
	<p>xv. a noise management plan where a noise nuisance at sensitive receptors is expected or sustained, including;</p> <ul style="list-style-type: none"> a. a protocol for conducting noise monitoring at the plant boundary b. a noise reduction programme c. a protocol for response to noise incidents containing appropriate actions and timelines d. a review of historic noise incidents, corrective actions and dissemination of noise incident knowledge to the affected parties; <p>xvi. for the combustion, gasification or co-incineration of malodorous substances, an odour management plan including:</p> <ul style="list-style-type: none"> a. a protocol for conducting odour monitoring b. where necessary, an odour elimination programme to identify and eliminate or reduce the odour emissions c. a protocol to record odour incidents and the appropriate actions and timelines d. a review of historic odour incidents, corrective actions and the dissemination of odour incident knowledge to the affected parties. <p>Where an assessment shows that any of the elements listed under items x to xvi are not necessary, a record is made of the decision, including the reasons.</p> <p>Applicability</p> <p>The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non standardised) is generally related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have.</p>		
1.2 Monitoring			
2	<p>BAT 2.</p> <p>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.</p> <p>(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>	<p>Applicable – Energy auditing will be a key feature of the EMS and Energy Efficiency Management System (ENEMS).</p> <p>Performance testing of the combustion plants (at 90% to prevent the risk of overloading the generators) will be carried out during the commissioning phase, and after each modification that could significantly affect the net electrical efficiency, net total fuel utilisation, and/or net mechanical efficiency of the unit.</p> <p>On-site electricity usage will be minimised as far as possible within the constraints of the process optimisation.</p> <p>Key process monitoring will be carried out to monitor the plant performance including water usage, energy consumption (fuel and electricity), hours of operation and power generated. These performance parameters will be reported as part of the licence conditions.</p>	<p>The ENEMS will be in place 12 months after commencement of IE license.</p>

Best Available Techniques (BAT)				Applicability assessment and description of the technique		Schedule for implementation																	
				The plant performance and equipment will be continually monitored by on-board control systems and will alarm in the event of a fault.																			
3	BAT 3. BAT is to monitor key process parameters relevant for emissions to air and water including those given below. <table border="1"><thead><tr><th>Stream</th><th>Parameter(s)</th><th>Monitoring</th></tr></thead><tbody><tr><td rowspan="3">Flue-gas</td><td>Flow</td><td>Periodic or continuous determination</td></tr><tr><td>Oxygen content, temperature, and pressure</td><td rowspan="2">Periodic or continuous measurement</td></tr><tr><td>Water vapour content ⁽¹⁾</td></tr><tr><td>Waste water from flue-gas treatment</td><td>Flow, pH, and temperature</td><td>Continuous measurement</td></tr></tbody></table> <p>⁽¹⁾ The continuous measurement of the water vapour content of the flue-gas is not necessary if the sampled flue-gas is dried before analysis.</p>			Stream	Parameter(s)	Monitoring	Flue-gas	Flow	Periodic or continuous determination	Oxygen content, temperature, and pressure	Periodic or continuous measurement	Water vapour content ⁽¹⁾	Waste water from flue-gas treatment	Flow, pH, and temperature	Continuous measurement	Not Applicable – BAT 3 relates to Large Combustion Plant. Monitoring of the flue-gas emissions from emergency generator exhausts will be undertaken in accordance with IE licence Conditions, once granted. When air emissions monitoring for the emergency generators is undertaken, the relevant reference parameters will be monitored as per the BAT. There will be no wastewater, and no flue-gas treatment.		N/A					
Stream	Parameter(s)	Monitoring																					
Flue-gas	Flow	Periodic or continuous determination																					
	Oxygen content, temperature, and pressure	Periodic or continuous measurement																					
	Water vapour content ⁽¹⁾																						
Waste water from flue-gas treatment	Flow, pH, and temperature	Continuous measurement																					
4	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. <table border="1"><thead><tr><th>Substance/Parameter</th><th>Fuel/Process/Type of combustion plant</th><th>Standard(s)</th><th>Minimum monitoring frequency</th></tr></thead><tbody><tr><td>NO_x</td><td>gas-oil-fired engines</td><td>Generic EN standards</td><td>Continuous (6) (8)</td></tr><tr><td>CO</td><td>gas-oil-fired engines</td><td>Generic EN standards</td><td>Continuous (6) (8)</td></tr><tr><td>SO₂</td><td>gas-oil-fired engines</td><td>Generic EN standards and EN 14791</td><td>Continuous (6) (11) (12)</td></tr></tbody></table>			Substance/Parameter	Fuel/Process/Type of combustion plant	Standard(s)	Minimum monitoring frequency	NO _x	gas-oil-fired engines	Generic EN standards	Continuous (6) (8)	CO	gas-oil-fired engines	Generic EN standards	Continuous (6) (8)	SO ₂	gas-oil-fired engines	Generic EN standards and EN 14791	Continuous (6) (11) (12)	Not Applicable – The combustion plants (i.e. individual emergency generators) will be below the LCP threshold of 50MW _{th} . Thus, the plant specific BAT do not apply.		N/A	
Substance/Parameter	Fuel/Process/Type of combustion plant	Standard(s)	Minimum monitoring frequency																				
NO _x	gas-oil-fired engines	Generic EN standards	Continuous (6) (8)																				
CO	gas-oil-fired engines	Generic EN standards	Continuous (6) (8)																				
SO ₂	gas-oil-fired engines	Generic EN standards and EN 14791	Continuous (6) (11) (12)																				

Best Available Techniques (BAT)					Applicability assessment and description of the technique	Schedule for implementation
	Dust	gas-oil-fired engines	Generic EN standards and EN 13284-1 and EN 13284-2	Continuous (6) (17)		
	Metals and metalloids except mercury (As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Se, Ti, V, Zn)	gas-oil-fired engines	EN 14385	Once every year (18)		
	TVOC	gas-oil-fired engines	EN 12619	Once every six months (13)		
<ul style="list-style-type: none">In the case of plants with a rated thermal input of < 100 MW operated < 1 500 h/yr, the minimum monitoring frequency may be at least once every six months. For gas turbines, periodic monitoring is carried out with a combustion plant load of > 70 %. For co-incineration of waste with coal, lignite, solid biomass and/or peat, the monitoring frequency needs to also take into account Part 6 of Annex VI to the IED.In the case of natural-gas-fired turbines with a rated thermal input of < 100 MW operated < 1 500 h/yr, or in the case of existing OCGTs, PEMS may be used instead.As an alternative to the continuous measurement in the case of plants combusting oil with a known sulphur content and where there is no flue-gas desulphurisation system, periodic measurements at least once every three months and/or other procedures ensuring the provision of data of an equivalent scientific quality may be used to determine the SO2 emissions.In the case of process fuels from the chemical industry, the monitoring frequency may be adjusted for plants of < 100 MWth after an initial characterisation of the fuel (see BAT 5) based on an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed) in the emissions to air, but in any case at least each time that a change of the fuel characteristics may have an impact on the emissions.If the emission levels are proven to be sufficiently stable, periodic measurements may be carried out each time that a change of the fuel and/or waste characteristics may have an impact on the emissions, but in any case at least once every year. For co-incineration of waste with coal, lignite, solid biomass and/or peat, the monitoring frequency needs to also take into account Part 6 of Annex VI to the IED.In the case of plants combusting iron and steel process gases, the minimum monitoring frequency may be at least once every six months if the emission levels are proven to be sufficiently stable.						

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation																	
	<ul style="list-style-type: none">The list of pollutants monitored and the monitoring frequency may be adjusted after an initial characterisation of the fuel (see BAT 5) based on an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed) in the emissions to air, but in any case at least each time that a change of the fuel characteristics may have an impact on the emissions.																			
5	BAT 5. BAT is to monitor emissions to water from flue-gas treatment 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.	Not Applicable – The combustion plants will not have flue gas treatment systems.	N/A																	
1.3 General environmental and combustion performance																				
6	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 the techniques given below. <table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a Fuel blending and mixing</td><td>Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type</td><td rowspan="2">Generally applicable</td></tr><tr><td>b Maintenance of the combustion system</td><td>Regular planned maintenance according to suppliers' recommendations</td></tr><tr><td>c Advanced control system</td><td>See description in Section 10.8.1</td><td>The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system</td></tr><tr><td>d Good design of the combustion equipment</td><td>Good design of furnace, combustion chambers, burners and associated devices</td><td>Generally applicable to new combustion plants</td></tr><tr><td>e Fuel choice</td><td>Select or switch totally or partially to another fuel(s) with a better environmental profile (e.g. with low sulphur and/or mercury content) amongst the available fuels, including in start-up situations or when back-up fuels are used</td><td>Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the design of the plant</td></tr></table>	Technique	Description	Applicability	a Fuel blending and mixing	Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type	Generally applicable	b Maintenance of the combustion system	Regular planned maintenance according to suppliers' recommendations	c Advanced control system	See description in Section 10.8.1	The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system	d Good design of the combustion equipment	Good design of furnace, combustion chambers, burners and associated devices	Generally applicable to new combustion plants	e Fuel choice	Select or switch totally or partially to another fuel(s) with a better environmental profile (e.g. with low sulphur and/or mercury content) amongst the available fuels, including in start-up situations or when back-up fuels are used	Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the design of the plant	Applicable – The general techniques to improve combustion performance have been incorporated into the design of the Installation. The techniques from the table in the BAT have been assessed as follows: <ul style="list-style-type: none">Fuel blending and mixing: Low sulphur diesel fuel of a consistent quality will be sourced for the site. It will be mixed in the top up tanks, there will be polishing filters on the top up tank.Maintenance of the combustion system: Regular maintenance will be undertaken as part of the Installation's preventative maintenance programme (Enterprise Asset Management (EAM)). This programme will be incorporated in the EMS.Advance control system: The plant performance and equipment will be continually monitored by onboard control systems and will alarm in the event of a fault. Each installed engine is connected into Electrical Power Monitoring System (EPMS) associated with the building which will control the operation of the units to ensure optimal efficiency at all times.Good design of the combustion equipment: All units will be new and have been procured on the basis that they are highly efficient and fit for purpose.Fuel choice: HVO, which has a better environmental profile, will be used to power the generators where available. Where required, the sulphur content of the diesel fuel used in the generators will not exceed 0.1% by mass.	Will be in place
Technique	Description	Applicability																		
a Fuel blending and mixing	Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type	Generally applicable																		
b Maintenance of the combustion system	Regular planned maintenance according to suppliers' recommendations																			
c Advanced control system	See description in Section 10.8.1	The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system																		
d Good design of the combustion equipment	Good design of furnace, combustion chambers, burners and associated devices	Generally applicable to new combustion plants																		
e Fuel choice	Select or switch totally or partially to another fuel(s) with a better environmental profile (e.g. with low sulphur and/or mercury content) amongst the available fuels, including in start-up situations or when back-up fuels are used	Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the design of the plant																		
7	BAT 7.	Not Applicable - There will be no installed SNCR or SCR abatement.	N/A																	

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation
	<p>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> <p>BAT-associated emission levels</p> <p>The BAT-associated emission level (BAT-AEL) for emissions of NH3 to air from the use of SCR and/or SNCR is < 3–10 mg/Nm3 as a yearly average or average over the sampling period. The lower end of the range can be achieved when using SCR and the upper end of the range can be achieved when using SNCR without wet abatement techniques. In the case of plants combusting biomass and operating at variable loads as well as in the case of engines combusting HFO and/or gas oil, the higher end of the BAT-AEL range is 15 mg/Nm3.</p>		
8	<p>BAT 8.</p> <p>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.</p>	Not Applicable – no significant impacts to the ambient air quality environment are predicted and no additional abatement systems will be required.	N/A
9	<p>BAT 9.</p> <p>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 control programmes for all the fuels used, as part of the environmental management system (see BAT 1):</p> <ul style="list-style-type: none"> i. Initial full characterisation of the fuel used including at least the parameters listed (in the table provided) and in accordance with EN standards. ISO, national or other international standards may be used provided they ensure the provision of data of an equivalent scientific quality; ii. 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); iii. 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)). <p>Description</p>	<p>Applicable - An EMS has been developed for the Installation and will be updated in accordance with the requirements of this BREF and the requirements of Installation's IE Licence, once granted.</p> <p>Full characterisation of the fuel used will be undertaken by the vendor typically every 12 months to EN standards and supplied to ADSIL.</p> <p>Regular SDS sheets provided by fuel vendor typically every 12 months as part of GHG reporting. It is unlikely that there will be much variation in the fuel supplied.</p>	EMS will be in place 12 months after commencement of IE Licence

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation
	Initial characterisation and regular testing of the fuel can be performed by the operator and/or the fuel supplier. If performed by the supplier, the full results are provided to the operator in the form of a product (fuel) supplier specification and/or guarantee.		
10	<p>BAT 10.</p> <p>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:</p> <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 maintenance plan for these relevant systems; • 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. 	<p>Applicable – Under normal operating conditions the emergency generators will be used for routine testing only.</p> <p>The Installation requires a continuous supply of electricity to operate. During normal operations, the Installation will be supplied by electricity from the national grid. Outside of normal operations, in the event that there is a loss of utility power to the Installation, emergency generators maintain power at critical loads. The emergency generators will be designed to automatically activate and provide power pending restoration of the primary power supply to the Installation site. An uninterruptible power source or UPS system will be used for the short-term transition from mains power to generator power.</p> <p>The changeover will be a highly controlled process which will be automated and will be controlled at the central control room. This automated system is required to ensure consistency of power supply and will ensure maximum efficiency.</p> <p>The generators will be monitored continuously and will be connected to the EPMS and alarm system to alert the Operator to any inefficiencies or irregularities.</p> <p>There is no requirement to monitor the emissions to air during the OTNOC as the emissions profile is known and has been assessed as part of the air dispersion modelling included in Section 7 of this application.</p> <p>Changeovers and emergency events will be logged, and corrective actions recorded and reported to the site lead where applicable.</p> <p>An EMS has been developed for the Installation and will be updated in accordance with the requirements of this BREF and the requirements of Installation's IE Licence, once granted.</p> <p>A preventative maintenance SOP for the generators is already in place for ADSIL sites. A schedule of preventive maintenance is in place which will be included as part of the EMS.</p> <p>Enterprise Asset Management (EAM) is the software platform ADSIL Infrastructure uses to maintain and manage its mechanical, electrical, and plumbing (MEP) equipment. This platform enables Infrastructure teams to do a variety of tasks:</p> <ul style="list-style-type: none"> • Track and coordinate planned and unplanned maintenance • Track the full life cycle of critical data centre assets 	<p>Will be in place</p> <p>*EMS will be in place 12 months after commencement of IE Licence</p>

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation
		<ul style="list-style-type: none"> Identify defective equipment through mechanisms like field service bulletins (FSBs) Provide tracking for DCEO spare part inventory Provide key insights for equipment failure, root cause analysis (RCA), and total cost of ownership (TCO) <p>The EAM team maintains the EAM system – the EAM team objective is to create and maintain a reliable maintenance platform that improves operational excellence, reduces both equipment failures and maintenance costs, and promotes standardized processes that support operations in ADSIL data centres.</p>	
11	<p>BAT 11. BAT is to appropriately monitor emissions to air and/or to water during OTNOC.</p> <p>Description 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>Not Applicable – There is no requirement to monitor the emissions to air during the OTNOC as the emissions profile is known and has been assessed as part of the air dispersion modelling included in Section 7 of this application.</p> <p>There will be no discharge to water from the emergency generators.</p>	N/A
1.4 Energy Efficiency			
12	<p>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 the techniques given (in the table provided).</p>	<p>Not Applicable – The plants are not gasification and/or IGCC units. The emergency generators will not operate over 1500 hrs/yr.</p>	N/A
1.5 Water Usage and Emissions to Water			
13	<p>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 given below.</p>	<p>Not Applicable – No wastewater will be produced from combustion processes.</p>	N/A

Best Available Techniques (BAT)			Applicability assessment and description of the technique	Schedule for implementation											
	<table><thead><tr><th></th><th>Technique</th><th>Description</th><th>Applicability</th></tr></thead><tbody><tr><td>a</td><td>Water recycling</td><td>Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream and the water balance of the plant</td><td>Not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present</td></tr><tr><td>b</td><td>Dry bottom ash handling</td><td>Dry, hot bottom ash falls from the furnace onto a mechanical conveyor system and is cooled down by ambient air. No water is used in the process.</td><td>Only applicable to plants combusting solid fuels. There may be technical restrictions that prevent retrofitting to existing combustion plants</td></tr></tbody></table>		Technique	Description	Applicability	a	Water recycling	Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream and the water balance of the plant	Not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present	b	Dry bottom ash handling	Dry, hot bottom ash falls from the furnace onto a mechanical conveyor system and is cooled down by ambient air. No water is used in the process.	Only applicable to plants combusting solid fuels. There may be technical restrictions that prevent retrofitting to existing combustion plants		
	Technique	Description	Applicability												
a	Water recycling	Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream and the water balance of the plant	Not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present												
b	Dry bottom ash handling	Dry, hot bottom ash falls from the furnace onto a mechanical conveyor system and is cooled down by ambient air. No water is used in the process.	Only applicable to plants combusting solid fuels. There may be technical restrictions that prevent retrofitting to existing combustion plants												
14	<p>BAT 14.</p> <p>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> <p>Description</p> <p>Waste water streams that are typically segregated and treated include surface run-off water, cooling water, and waste water from flue-gas treatment.</p> <p>Applicability</p> <p>The applicability may be restricted in the case of existing plants due to the configuration of the drainage systems.</p>	<p>Applicable - Wastewater produced from cooling of the emergency generators, will be segregated and drain to the foul network.</p> <p>No wastewater will be produced from combustion processes. There will be no flue-gas treatment.</p>	Will be in place												
15	<p>BAT 15.</p> <p>In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given below, and to use secondary techniques as close as possible to the source in order to avoid dilution.</p> <p>The BAT-AELs refer to direct discharges to a receiving water body at the point where the emission leaves the installation.</p> <p>Table 10.1 BAT-AELs for direct discharges to a receiving water body from flue-gas treatment.</p>	<p>Not applicable – There will be no flue-gas treatment.</p>	N/A												
1.6 Waste Management															
16	<p>BAT 16.</p> <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 residues which arise as byproducts;</p>	<p>Not applicable – There will be no combustion and/or gasification process and abatement techniques wastes generated from the emergency generators.</p>	N/A												

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation																		
	<div>b. waste preparation for reuse, e.g. according to the specific requested quality criteria;</div> <div>c. waste recycling;</div> <div>d. other waste recovery (e.g. energy recovery), by implementing an appropriate combination of techniques.</div>																				
1.7 Noise Emissions																					
17	<div>BAT 17.</div> <div>In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below.</div> <table><thead><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr></thead><tbody><tr><td>a Operational measures</td><td><div>These include:</div><div><div>improved inspection and maintenance of equipment</div><div>closing of doors and windows of enclosed areas, if possible</div><div>equipment operated by experienced staff</div><div>avoidance of noisy activities at night, if possible</div><div>provisions for noise control during maintenance activities</div></div></td><td>Generally applicable</td></tr><tr><td>b Low-noise equipment</td><td>This potentially includes compressors, pumps and disks</td><td>Generally applicable when the equipment is new or replaced</td></tr><tr><td>c Noise attenuation</td><td>Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. Appropriate obstacles include protection walls, embankments and buildings</td><td>Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of space</td></tr><tr><td>d Noise-control equipment</td><td><div>This includes:</div><div><div>noise-reducers</div><div>equipment insulation</div><div>enclosure of noisy equipment</div><div>soundproofing of buildings</div></div></td><td>The applicability may be restricted by lack of space</td></tr><tr><td>e Appropriate location of equipment and buildings</td><td>Noise levels can be reduced by increasing the distance between the emitter and the receiver and by using buildings as noise screens</td><td>Generally applicable to new plants. In the case of existing plants, the relocation of equipment and production units may be restricted by lack of space or by excessive costs</td></tr></tbody></table>	Technique	Description	Applicability	a Operational measures	<div>These include:</div> <div><div>improved inspection and maintenance of equipment</div><div>closing of doors and windows of enclosed areas, if possible</div><div>equipment operated by experienced staff</div><div>avoidance of noisy activities at night, if possible</div><div>provisions for noise control during maintenance activities</div></div>	Generally applicable	b Low-noise equipment	This potentially includes compressors, pumps and disks	Generally applicable when the equipment is new or replaced	c Noise attenuation	Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. Appropriate obstacles include protection walls, embankments and buildings	Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of space	d Noise-control equipment	<div>This includes:</div> <div><div>noise-reducers</div><div>equipment insulation</div><div>enclosure of noisy equipment</div><div>soundproofing of buildings</div></div>	The applicability may be restricted by lack of space	e Appropriate location of equipment and buildings	Noise levels can be reduced by increasing the distance between the emitter and the receiver and by using buildings as noise screens	Generally applicable to new plants. In the case of existing plants, the relocation of equipment and production units may be restricted by lack of space or by excessive costs	<div>Applicable – The Installation as a whole has been designed to minimise noise emissions and to ensure that the Installation is compliant with the relevant noise limits for the Installation as set out in the planning permissions for the Installation and presented in Attachment-7-1-3-2-Noise Emissions Impact Assessment. An assessment on the noise emissions during testing and emergency operation is presented in Section 7 of this IE Licence application.</div> <div>Low noise equipment has been selected where practical during site design. Plant have also been located to minimise the potential for impact at the noise sensitive receptors.</div> <div>Preventative maintenance will be undertaken at the Installation as part of the EMS and EAM and the generators and other equipment will be operated by experienced staff.</div>	Will be in place
Technique	Description	Applicability																			
a Operational measures	<div>These include:</div> <div><div>improved inspection and maintenance of equipment</div><div>closing of doors and windows of enclosed areas, if possible</div><div>equipment operated by experienced staff</div><div>avoidance of noisy activities at night, if possible</div><div>provisions for noise control during maintenance activities</div></div>	Generally applicable																			
b Low-noise equipment	This potentially includes compressors, pumps and disks	Generally applicable when the equipment is new or replaced																			
c Noise attenuation	Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. Appropriate obstacles include protection walls, embankments and buildings	Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of space																			
d Noise-control equipment	<div>This includes:</div> <div><div>noise-reducers</div><div>equipment insulation</div><div>enclosure of noisy equipment</div><div>soundproofing of buildings</div></div>	The applicability may be restricted by lack of space																			
e Appropriate location of equipment and buildings	Noise levels can be reduced by increasing the distance between the emitter and the receiver and by using buildings as noise screens	Generally applicable to new plants. In the case of existing plants, the relocation of equipment and production units may be restricted by lack of space or by excessive costs																			
2. BAT CONCLUSIONS FOR THE COMBUSTION OF SOLID FUELS																					
18 - 27	BAT 18 to BAT 27 pertain to the combustion of coal and / or lignite.	Not Applicable – No coal and / or lignite will be combusted at the Installation.	N/A																		
3. BAT CONCLUSIONS FOR THE COMBUSTION OF LIQUID FUELS																					

Best Available Techniques (BAT)			Applicability assessment and description of the technique	Schedule for implementation																																	
3.1. HFO and/or gas-oil-fired boilers																																					
3.1.2 NOX and CO emissions to air																																					
28	<p>BAT 28.</p> <p>In order to prevent or reduce NOX emissions to air while limiting CO emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given below.</p> <table><thead><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr></thead><tbody><tr><td>a.</td><td>Air staging</td><td rowspan="4">See descriptions in Section 8.3</td><td rowspan="4">Generally applicable</td></tr><tr><td>b.</td><td>Fuel staging</td></tr><tr><td>c.</td><td>Flue-gas recirculation</td></tr><tr><td>d.</td><td>Low-NO_x burners (LNB)</td></tr><tr><td>e.</td><td>Water/steam addition</td><td></td><td>Applicable within the constraints of water availability</td></tr><tr><td>f.</td><td>Selective non-catalytic reduction (SNCR)</td><td></td><td>Not applicable to combustion plants operated < 500 h/yr with highly variable boiler loads. The applicability may be limited in the case of combustion plants operated between 500 h/yr and 1 500 h/yr with highly variable boiler loads</td></tr><tr><td>g.</td><td>Selective catalytic reduction (SCR)</td><td>See descriptions in Section 8.3</td><td>Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Not generally applicable to combustion plants of < 100 MW_a</td></tr><tr><td>h.</td><td>Advanced control system</td><td></td><td>Generally applicable to new combustion plants. The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system</td></tr><tr><td>i.</td><td>Fuel choice</td><td></td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr></tbody></table>		Technique	Description	Applicability	a.	Air staging	See descriptions in Section 8.3	Generally applicable	b.	Fuel staging	c.	Flue-gas recirculation	d.	Low-NO _x burners (LNB)	e.	Water/steam addition		Applicable within the constraints of water availability	f.	Selective non-catalytic reduction (SNCR)		Not applicable to combustion plants operated < 500 h/yr with highly variable boiler loads. The applicability may be limited in the case of combustion plants operated between 500 h/yr and 1 500 h/yr with highly variable boiler loads	g.	Selective catalytic reduction (SCR)	See descriptions in Section 8.3	Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Not generally applicable to combustion plants of < 100 MW _a	h.	Advanced control system		Generally applicable to new combustion plants. The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system	i.	Fuel choice		Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State	<p>Not Applicable – There will be no LCP Boilers at the Installation.</p>	N/A
Technique	Description	Applicability																																			
a.	Air staging	See descriptions in Section 8.3	Generally applicable																																		
b.	Fuel staging																																				
c.	Flue-gas recirculation																																				
d.	Low-NO _x burners (LNB)																																				
e.	Water/steam addition		Applicable within the constraints of water availability																																		
f.	Selective non-catalytic reduction (SNCR)		Not applicable to combustion plants operated < 500 h/yr with highly variable boiler loads. The applicability may be limited in the case of combustion plants operated between 500 h/yr and 1 500 h/yr with highly variable boiler loads																																		
g.	Selective catalytic reduction (SCR)	See descriptions in Section 8.3	Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Not generally applicable to combustion plants of < 100 MW _a																																		
h.	Advanced control system		Generally applicable to new combustion plants. The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system																																		
i.	Fuel choice		Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State																																		
3.1.3. SOX, HCl and HF emissions to air																																					
29	<p>BAT 29.</p> <p>In order to prevent or reduce SOX, HCl and HF emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given below.</p>		<p>Not Applicable – There will be no LCP Boilers at the Installation.</p>	N/A																																	

Best Available Techniques (BAT)				Applicability assessment and description of the technique	Schedule for implementation																					
	<table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a.</td><td>Duct sorbent injection (DSI)</td><td rowspan="3">See description in Section 8.4</td><td rowspan="3">Generally applicable</td></tr><tr><td>b.</td><td>Spray dry absorber (SDA)</td></tr><tr><td>c.</td><td>Flue-gas condenser</td></tr><tr><td>d.</td><td>Wet flue-gas desulphurisation (wet FGD)</td><td></td><td>There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW_{th}. Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr</td></tr><tr><td>e.</td><td>Seawater FGD</td><td></td><td>There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW_{th}. Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr</td></tr><tr><td>f.</td><td>Fuel choice</td><td></td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr></table>	Technique	Description	Applicability	a.	Duct sorbent injection (DSI)	See description in Section 8.4	Generally applicable	b.	Spray dry absorber (SDA)	c.	Flue-gas condenser	d.	Wet flue-gas desulphurisation (wet FGD)		There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW _{th} . Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr	e.	Seawater FGD		There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW _{th} . Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr	f.	Fuel choice		Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State		
Technique	Description	Applicability																								
a.	Duct sorbent injection (DSI)	See description in Section 8.4	Generally applicable																							
b.	Spray dry absorber (SDA)																									
c.	Flue-gas condenser																									
d.	Wet flue-gas desulphurisation (wet FGD)		There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW _{th} . Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr																							
e.	Seawater FGD		There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW _{th} . Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr																							
f.	Fuel choice		Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State																							
3.1.4. Dust and particulate-bound metal emissions to air																										
30	BAT 30. In order to reduce dust and particulate-bound metal emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given below.			Not Applicable – There will be no LCP Boilers at the Installation.	N/A																					

Best Available Techniques (BAT)				Applicability assessment and description of the technique	Schedule for implementation																				
	<table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a.</td><td>Electrostatic precipitator (ESP)</td><td rowspan="4">Generally applicable</td></tr><tr><td>b.</td><td>Bag filter</td></tr><tr><td>c.</td><td>Multicyclones</td></tr><tr><td>d.</td><td>Dry or semi-dry FGD system</td></tr><tr><td>e.</td><td>Wet flue-gas desulphurisation (wet FGD)</td><td>See description in Section 8.5. The technique is mainly used for SO_x, HCl and/or HF control</td><td>See applicability in BAT 29</td></tr><tr><td>f.</td><td>Fuel choice</td><td>See description in Section 8.5</td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr></table>			Technique	Description	Applicability	a.	Electrostatic precipitator (ESP)	Generally applicable	b.	Bag filter	c.	Multicyclones	d.	Dry or semi-dry FGD system	e.	Wet flue-gas desulphurisation (wet FGD)	See description in Section 8.5. The technique is mainly used for SO _x , HCl and/or HF control	See applicability in BAT 29	f.	Fuel choice	See description in Section 8.5	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State		
Technique	Description	Applicability																							
a.	Electrostatic precipitator (ESP)	Generally applicable																							
b.	Bag filter																								
c.	Multicyclones																								
d.	Dry or semi-dry FGD system																								
e.	Wet flue-gas desulphurisation (wet FGD)	See description in Section 8.5. The technique is mainly used for SO _x , HCl and/or HF control	See applicability in BAT 29																						
f.	Fuel choice	See description in Section 8.5	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State																						
3.2. HFO- and/or gas-oil-fired engines																									
3.2.1. Energy efficiency																									
31	<p>BAT 31.</p> <p>In order to increase the energy efficiency of HFO and/or gas oil combustion in reciprocating engines, BAT is to use an appropriate combination of the techniques given in BAT 12 and below:</p> <p>Table 10.17: BAT-associated energy efficiency levels (BAT-AEELs) for the combustion of HFO and/or gas oil in reciprocating engines.</p> <table><tr><th rowspan="3">Type of combustion unit</th><th colspan="2">BAT-AEELs ⁽¹⁾</th></tr><tr><th colspan="2">Net electrical efficiency (%) ⁽²⁾</th></tr><tr><th>New unit</th><th>Existing unit</th></tr><tr><td>HFO- and/or gas-oil-fired reciprocating engine – single cycle</td><td>41.5–44.5 ⁽³⁾</td><td>38.3–44.5 ⁽³⁾</td></tr><tr><td>HFO- and/or gas-oil-fired reciprocating engine – combined cycle</td><td>> 48 ⁽⁴⁾</td><td>No BAT-AEEL</td></tr></table> <p>⁽¹⁾ These BAT-AEELs do not apply to units operated < 1 500 h/yr. ⁽²⁾ Net electrical efficiency BAT-AEELs apply to CHP units whose design is oriented towards power generation, and to units generating only power. ⁽³⁾ These levels may be difficult to achieve in the case of engines fitted with energy-intensive secondary abatement techniques. ⁽⁴⁾ This level may be difficult to achieve in the case of engines using a radiator as a cooling system in dry, hot geographical locations.</p>			Type of combustion unit	BAT-AEELs ⁽¹⁾		Net electrical efficiency (%) ⁽²⁾		New unit	Existing unit	HFO- and/or gas-oil-fired reciprocating engine – single cycle	41.5–44.5 ⁽³⁾	38.3–44.5 ⁽³⁾	HFO- and/or gas-oil-fired reciprocating engine – combined cycle	> 48 ⁽⁴⁾	No BAT-AEEL	<p>Not Applicable – These BAT-AELs are not applicable as the units are standalone emergency generators and will be operated less than 1500 hours per year.</p>	N/A							
Type of combustion unit	BAT-AEELs ⁽¹⁾																								
	Net electrical efficiency (%) ⁽²⁾																								
	New unit	Existing unit																							
HFO- and/or gas-oil-fired reciprocating engine – single cycle	41.5–44.5 ⁽³⁾	38.3–44.5 ⁽³⁾																							
HFO- and/or gas-oil-fired reciprocating engine – combined cycle	> 48 ⁽⁴⁾	No BAT-AEEL																							
3.2.2. NO _x , CO and volatile organic compound emissions to air																									
32	<p>BAT 32.</p>			<p>Applicable – Low NO_x combustion concept techniques are applicable to the emergency generators.</p>	Will be in place																				

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation																											
	<p>In order to prevent or reduce NOX emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.</p> <table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a.</td><td>Low-NO_x combustion concept in diesel engines</td><td>See descriptions in Section 8.3 Generally applicable</td></tr><tr><td>b.</td><td>Exhaust-gas recirculation (EGR)</td><td>Not applicable to four-stroke engines</td></tr><tr><td>c.</td><td>Water/steam addition</td><td>Applicable within the constraints of water availability. The applicability may be limited where no retrofit package is available</td></tr><tr><td>d.</td><td>Selective catalytic reduction (SCR)</td><td>Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space</td></tr></table>	Technique	Description	Applicability	a.	Low-NO _x combustion concept in diesel engines	See descriptions in Section 8.3 Generally applicable	b.	Exhaust-gas recirculation (EGR)	Not applicable to four-stroke engines	c.	Water/steam addition	Applicable within the constraints of water availability. The applicability may be limited where no retrofit package is available	d.	Selective catalytic reduction (SCR)	Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space	<p>The combustion strategy for the emergency generators (in-cylinder technologies) are optimized for emissions requirements (Tier 2, 2g TA Luft & local regulation requirements). The emergency generators also include altitude capability and fuel staging to optimize the engine’s performance.</p> <p>Water/steam addition and exhaust-gas recirculation (EGR) are not applicable to HVO/diesel powered emergency generators.</p> <p>In respect of the SCR applicability assessment in BAT 32 SCR is not applicable to combustion plants operated < 500 h/yr. The emergency generators on site are not intended to be operated more than 500 h/yr.</p>													
Technique	Description	Applicability																												
a.	Low-NO _x combustion concept in diesel engines	See descriptions in Section 8.3 Generally applicable																												
b.	Exhaust-gas recirculation (EGR)	Not applicable to four-stroke engines																												
c.	Water/steam addition	Applicable within the constraints of water availability. The applicability may be limited where no retrofit package is available																												
d.	Selective catalytic reduction (SCR)	Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space																												
33	<p>BAT 33.</p> <p>In order to prevent or reduce emissions of CO and volatile organic compounds to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or both of the techniques given below.</p> <table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a</td><td>Combustion optimisation</td><td>Generally applicable</td></tr><tr><td>b</td><td>Oxidation catalysis</td><td>See descriptions in Section 10.8.3 Not applicable to combustion plants operated < 500 h/yr. The applicability may be limited by the sulphur content of the fuel</td></tr></table> <p>Table 10.18: BAT-associated emission levels (BAT-AELs) for NOX emissions to air from the combustion of HFO and/or gas oil in reciprocating engines</p> <table><tr><th rowspan="3">Combustion plant total rated thermal input (MW_{th})</th><th colspan="4">BAT-AELs (mg/Nm³)</th></tr><tr><th colspan="2">Yearly average</th><th colspan="2">Daily average or average over the sampling period</th></tr><tr><th>New plant</th><th>Existing plant ⁽¹⁾</th><th>New plant</th><th>Existing plant ⁽²⁾⁽³⁾</th></tr><tr><td>≥ 50</td><td>115–190⁽⁴⁾</td><td>125–625</td><td>145–300</td><td>150–750</td></tr></table> <p>⁽¹⁾ These BAT-AELs do not apply to plants operated < 1 500 h/yr or to plants that cannot be fitted with secondary abatement techniques.</p> <p>⁽²⁾ The BAT-AEL range is 1 150–1 900 mg/Nm³ for plants operated < 1 500 h/yr and for plants that cannot be fitted with secondary abatement techniques.</p> <p>⁽³⁾ For plants operated < 500 h/yr, these levels are indicative.</p> <p>⁽⁴⁾ For plants including units of < 20MW_{th} combusting HFO, the higher end of the BAT-AEL range applying to those units is 225 mg/Nm³.</p> <p>As an indication, for existing combustion plants burning only HFO and operated ≥ 1 500 h/yr or new combustion plants burning only HFO,</p> <ul style="list-style-type: none">the yearly average CO emission levels will generally be 50–175 mg/Nm³ ;	Technique	Description	Applicability	a	Combustion optimisation	Generally applicable	b	Oxidation catalysis	See descriptions in Section 10.8.3 Not applicable to combustion plants operated < 500 h/yr. The applicability may be limited by the sulphur content of the fuel	Combustion plant total rated thermal input (MW _{th})	BAT-AELs (mg/Nm ³)				Yearly average		Daily average or average over the sampling period		New plant	Existing plant ⁽¹⁾	New plant	Existing plant ⁽²⁾⁽³⁾	≥ 50	115–190 ⁽⁴⁾	125–625	145–300	150–750	<p>Not Applicable – An advanced control system will be used on all generators to control the combustion efficiency and support the prevention and/or reduction of emissions.</p> <p>Oxidation catalysts are not applicable to combustion plants operated < 500 h/yr. The BAT-AELs set out in Table 10.18 are not applicable as the units are standalone emergency generators and will be operated less than 1500 hours per year.</p>	N/A
Technique	Description	Applicability																												
a	Combustion optimisation	Generally applicable																												
b	Oxidation catalysis	See descriptions in Section 10.8.3 Not applicable to combustion plants operated < 500 h/yr. The applicability may be limited by the sulphur content of the fuel																												
Combustion plant total rated thermal input (MW _{th})	BAT-AELs (mg/Nm ³)																													
	Yearly average		Daily average or average over the sampling period																											
	New plant	Existing plant ⁽¹⁾	New plant	Existing plant ⁽²⁾⁽³⁾																										
≥ 50	115–190 ⁽⁴⁾	125–625	145–300	150–750																										

Best Available Techniques (BAT)		Applicability assessment and description of the technique	Schedule for implementation																												
	<ul style="list-style-type: none">the average over the sampling period for TVOC emission levels will generally be 10–40 mg/Nm3																														
3.2.3 SOX, HCl and HF emissions to air																															
34	<p>BAT 34.</p> <p>In order to prevent or reduce SOX, HCl and HF emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.</p> <table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a Fuel choice</td><td rowspan="3">See descriptions in Section 10.8.4</td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr><tr><td>b Duct sorbent injection (DSI)</td><td>There may be technical restrictions in the case of existing combustion plants Not applicable to combustion plants operated < 500 h/yr</td></tr><tr><td>c Wet flue-gas desulphurisation (wet FGD)</td><td>There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW_{th}. Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr</td></tr></table> <p>Table 10.19: BAT-associated emission levels (BAT-AELs) for SO₂ emissions to air from the combustion of HFO and/or gas oil in reciprocating engines.</p> <table><tr><th rowspan="3">Combustion plant total rated thermal input (MW_{th})</th><th colspan="4">BAT-AELs for SO₂ (mg/Nm³)</th></tr><tr><th colspan="2">Yearly average</th><th colspan="2">Daily average or average over the sampling period</th></tr><tr><th>New plant</th><th>Existing plant ⁽¹⁾</th><th>New plant</th><th>Existing plant ⁽²⁾</th></tr><tr><td>All sizes</td><td>45–100</td><td>100–200 ⁽³⁾</td><td>60–110</td><td>105–235 ⁽³⁾</td></tr></table> <p>⁽¹⁾ These BAT-AELs do not apply to plants operated < 1 500 h/yr. ⁽²⁾ For plants operated < 500 h/yr, these levels are indicative. ⁽³⁾ The higher end of the BAT-AEL range is 280 mg/Nm³ if no secondary abatement technique can be applied. This corresponds to a sulphur content of the fuel of 0.5 wt-% (dry).</p>	Technique	Description	Applicability	a Fuel choice	See descriptions in Section 10.8.4	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State	b Duct sorbent injection (DSI)	There may be technical restrictions in the case of existing combustion plants Not applicable to combustion plants operated < 500 h/yr	c Wet flue-gas desulphurisation (wet FGD)	There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW _{th} . Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr	Combustion plant total rated thermal input (MW _{th})	BAT-AELs for SO ₂ (mg/Nm ³)				Yearly average		Daily average or average over the sampling period		New plant	Existing plant ⁽¹⁾	New plant	Existing plant ⁽²⁾	All sizes	45–100	100–200 ⁽³⁾	60–110	105–235 ⁽³⁾	<p>Applicable – Fuel choice: HVO, which has a better environmental profile, will be used to power the generators where available. Where required, the sulphur content of the diesel fuel used in the generators will not exceed 0.1% by mass.</p> <p>Duct sorbent injection (DSI) and wet flue-gas desulphurisation (wet GFD) is not applicable due to the limited running hours of the emergency generators.</p> <p>The listed AEL’s are not applicable to plants operating less than 1500 h/yr.</p>	In place. ADSIL have a policy to purchase only low sulphur fuels.
Technique	Description	Applicability																													
a Fuel choice	See descriptions in Section 10.8.4	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State																													
b Duct sorbent injection (DSI)		There may be technical restrictions in the case of existing combustion plants Not applicable to combustion plants operated < 500 h/yr																													
c Wet flue-gas desulphurisation (wet FGD)		There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW _{th} . Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr																													
Combustion plant total rated thermal input (MW _{th})	BAT-AELs for SO ₂ (mg/Nm ³)																														
	Yearly average		Daily average or average over the sampling period																												
	New plant	Existing plant ⁽¹⁾	New plant	Existing plant ⁽²⁾																											
All sizes	45–100	100–200 ⁽³⁾	60–110	105–235 ⁽³⁾																											
3.2.4 Dust and particulate-bound metal emissions to air																															
35	<p>BAT 35.</p> <p>In order to prevent or reduce dust and particulate-bound metal emissions from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.</p>	<p>Applicable – Fuel Choice: HVO, which has a better environmental profile, will be used to power the generators where available.</p> <p>Electrostatic precipitation (ESP) and bag filters are not applicable as the emergency generators will operate less than 500 h/yr.</p> <p>The listed ELVs are not applicable to the emergency generators.</p>	In place																												

Best Available Techniques (BAT)			Applicability assessment and description of the technique		Schedule for implementation														
	<table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a Fuel choice</td><td rowspan="3">See descriptions in Section 10.8.5</td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr><tr><td>b Electrostatic precipitator (ESP)</td><td rowspan="2">Not applicable to combustion plants operated < 500 h/yr</td></tr><tr><td>c Bag filter</td></tr></table>		Technique	Description	Applicability	a Fuel choice	See descriptions in Section 10.8.5	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State	b Electrostatic precipitator (ESP)	Not applicable to combustion plants operated < 500 h/yr	c Bag filter								
	Technique	Description	Applicability																
	a Fuel choice	See descriptions in Section 10.8.5	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State																
	b Electrostatic precipitator (ESP)		Not applicable to combustion plants operated < 500 h/yr																
	c Bag filter																		
Table 10.20: BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of HFO and/or gas oil in reciprocating engines.																			
<table><tr><th rowspan="3">Combustion plant total rated thermal input (MW_a)</th><th colspan="4">BAT-AELs for dust (mg/Nm³)</th></tr><tr><th colspan="2">Yearly average</th><th colspan="2">Daily average or average over the sampling period</th></tr><tr><th>New plant</th><th>Existing plant ⁽¹⁾</th><th>New plant</th><th>Existing plant ⁽²⁾</th></tr><tr><td>≥ 50</td><td>5–10</td><td>5–35</td><td>10–20</td><td>10–45</td></tr></table> <p>⁽¹⁾ These BAT-AELs do not apply to plants operated < 1 500 h/yr.</p> <p>⁽²⁾ For plants operated < 500 h/yr, these levels are indicative.</p>		Combustion plant total rated thermal input (MW _a)	BAT-AELs for dust (mg/Nm ³)				Yearly average		Daily average or average over the sampling period		New plant	Existing plant ⁽¹⁾	New plant	Existing plant ⁽²⁾	≥ 50	5–10	5–35	10–20	10–45
Combustion plant total rated thermal input (MW _a)	BAT-AELs for dust (mg/Nm ³)																		
	Yearly average		Daily average or average over the sampling period																
	New plant	Existing plant ⁽¹⁾	New plant	Existing plant ⁽²⁾															
≥ 50	5–10	5–35	10–20	10–45															
3.3. Gas-oil-fired gas turbines																			
3.3.1. Energy efficiency																			
36	<p>BAT 36.</p> <p>In order to increase the energy efficiency of gas oil combustion in gas turbines, BAT is to use an appropriate combination of the techniques given in BAT 12 and below.</p> <table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td><ul style="list-style-type: none">Combined Cycle</td><td>See Description in Section 8.2</td><td>Generally applicable to new units operated ≥ 1 500 h/yr.</td></tr><tr><td></td><td></td><td>Applicable to existing units within the constraints associated with the steam cycle design and the space availability.</td></tr><tr><td></td><td></td><td>Not applicable to existing units operated < 1 500 h/yr</td></tr></table>		Technique	Description	Applicability	<ul style="list-style-type: none">Combined Cycle	See Description in Section 8.2	Generally applicable to new units operated ≥ 1 500 h/yr.			Applicable to existing units within the constraints associated with the steam cycle design and the space availability.			Not applicable to existing units operated < 1 500 h/yr	Not Applicable – No gas turbines will be used at the Installation.		N/A		
Technique	Description	Applicability																	
<ul style="list-style-type: none">Combined Cycle	See Description in Section 8.2	Generally applicable to new units operated ≥ 1 500 h/yr.																	
		Applicable to existing units within the constraints associated with the steam cycle design and the space availability.																	
		Not applicable to existing units operated < 1 500 h/yr																	

Best Available Techniques (BAT)				Applicability assessment and description of the technique		Schedule for implementation																
3.3.2. NOX and CO emissions to air																						
37	<p>BAT 37.</p> <p>In order to prevent or reduce NOX emissions to air from the combustion of gas oil in gas turbines, BAT is to use one or a combination of the techniques given below.</p> <table><tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a.</td><td>Water/steam addition</td><td rowspan="3">See description in Section 8.3</td><td>The applicability may be limited due to water availability</td></tr><tr><td>b.</td><td>Low-NOX burners (LNB)</td><td>Only applicable to turbine models for which low-NOX burners are available on the market</td></tr><tr><td>c.</td><td>Selective catalytic reduction (SCR)</td><td>Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space</td></tr></table>				Technique		Description	Applicability	a.	Water/steam addition	See description in Section 8.3	The applicability may be limited due to water availability	b.	Low-NOX burners (LNB)	Only applicable to turbine models for which low-NOX burners are available on the market	c.	Selective catalytic reduction (SCR)	Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space	Not Applicable – No gas turbines will be used at the Installation.		N/A	
Technique		Description	Applicability																			
a.	Water/steam addition	See description in Section 8.3	The applicability may be limited due to water availability																			
b.	Low-NOX burners (LNB)		Only applicable to turbine models for which low-NOX burners are available on the market																			
c.	Selective catalytic reduction (SCR)		Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space																			
38	<p>BAT 38.</p> <p>In order to prevent or reduce CO emissions to air from the combustion of gas oil in gas turbines, BAT is to use one or a combination of the techniques given below.</p> <table><tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a.</td><td>Combustion optimisation</td><td rowspan="2">See description in Section 8.3</td><td>Generally applicable</td></tr><tr><td>b.</td><td>Oxidation catalysts</td><td>Not applicable to combustion plants operated < 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space</td></tr></table>				Technique		Description	Applicability	a.	Combustion optimisation	See description in Section 8.3	Generally applicable	b.	Oxidation catalysts	Not applicable to combustion plants operated < 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space	Not Applicable – No gas turbines will be used at the Installation.		N/A				
Technique		Description	Applicability																			
a.	Combustion optimisation	See description in Section 8.3	Generally applicable																			
b.	Oxidation catalysts		Not applicable to combustion plants operated < 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space																			
3.3.3. SOX and dust emissions to air																						
39	<p>BAT 39.</p> <p>In order to prevent or reduce SOX and dust emissions to air from the combustion of gas oil in gas turbines, BAT is to use the technique given below.</p>				Not Applicable – No gas turbines will be used at the Installation.		N/A															

Best Available Techniques (BAT)				Applicability assessment and description of the technique	Schedule for implementation								
	<table><tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr><tr><td></td><td>Fuel choice</td><td>See description in Section 8.4</td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr></table>			Technique		Description	Applicability		Fuel choice	See description in Section 8.4	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State		
Technique		Description	Applicability										
	Fuel choice	See description in Section 8.4	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State										
4. BAT CONCLUSIONS FOR THE COMBUSTION OF GASEOUS FUELS													
40 - 54	BAT 40 to BAT 54 pertain to BATs for the combustion of gaseous fuels.			Not Applicable - No gaseous fuels will be combusted at the Installation.	N/A								
5. BAT CONCLUSIONS FOR MULTI-FUEL-FIRED PLANTS													
55 - 59	BAT 55 to BAT 59 pertain to BATs for the combustion of gaseous fuels.			Not Applicable - No multi-fuel-fired plants will be used at the Installation.	N/A								
6. BAT CONCLUSIONS FOR THE CO-INCINERATION OF WASTE													
60 - 71	BAT 60 to BAT 71 pertain to BATs for the co-incineration of waste.			Not Applicable - No waste will be co-incinerated at the Installation.	N/A								
7. BAT CONCLUSIONS FOR GASIFICATION													
72 – 75	BAT 72 to BAT 75 pertain to BATS for gasification plants directly associated to combustion plants.			Not Applicable – No gasification plant will be directly associated to the Installation.	N/A								