



LON1 Phase B Environmental Permit Variation Application

Non-Technical Summary, LON1 Phase B

NTT Global Data Centers EMEA Limited

Londoneast-UK Business and Technical Park, Yewtree Avenue, Dagenham, RM10 7FZ

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Basis of Report

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Table of Contents

Basis of Report	ii
1.0 Introduction	1
2.0 Environmental Permit Application	2
2.1 Regulated Activities.....	2
2.2 Application Contents	3
2.3 Operating Techniques	3
2.3.1 Management Systems.....	3
2.4 Site Condition Report	4
2.5 Environmental Risk Assessment	4
2.6 Air Emissions Risk Assessment	5
2.7 Key Technical Standards.....	5
3.0 Conclusion.....	8



1.0 Introduction

SLR Consulting Limited (SLR) has been instructed by NTT Global Data Centers EMEA Limited (via RED Engineering Design Limited) to prepare an Environmental Permit (EP) variation application (EP reference EPR/CP3902LV) for the NTT Global Data Centers EMEA Limited owned data centre facility (LON1), which is operated by NTT Global Data Centers EMEA UK Limited (NTT). LON1 is located on Yewtree Avenue, Dagenham, UK, RM10 7FZ.

Electricity for operation of the data centre is provided from connections to the national electricity transmission network; however, given the nature of data centres and their requirement to have an available energy supply at all times, the data centre also incorporates a number of emergency stand-by generators (SBGs).

The EP currently permits a total of 42 SBGs, each SBG having a thermal rated input of 4.1MWth, the aggregated total combustion capacity being 172.2MWth. The SBGs are to be installed in phases:

- **Current EP activities (based on the initial EP application):** The initial EP application related to Phase A of the LON1 development (LON1A). Of the 42 permitted SBGs (as stated in the EP), to date 12 have been installed (generator model SDMO KD1800). The installation of the remaining SBGs (up to a maximum of 28 SBGs) will be completed as required, based on customer demands.
- **EP Variation (submitted March 2023):** An EP variation relating to a change in the number, model and capacity of the remaining 28 SBGs to be installed in LON1A was submitted to the Environment Agency (EA) in March 2023 (SLR project reference 410.V62278.00001). The variation application related to NTT's intention to now install 16 larger SBGs to that which was applied for in the initial EP application; NTT intends to install 16 Kohler KD83V16 SBGs, each being 6.947MWth. The 16 SBGs will be installed in two phases, 9 SBGs initially, followed by the remaining 7 SBGs. This variation application has yet to be determined by the EA.
- **Current EP variation application:** This current EP variation application (SLR project reference 410.V61547.00001) relates to Phase B of the LON1 data centre development (LON1B). LON1B will involve the construction of a new data centre building located to the south LON1A, and the installation of 24 new SBGs within this building (with 22 IT SBGs having a thermal rated input of 7.6MWth and 2 house SBGs with a thermal rated input of 3.8MWth). The SBGs will be fuelled by hydrogenated vegetable oil (HVO), with Selective Catalytic Reduction (SCR) abatement installed on the SBGs to reduce emissions of oxides of nitrogen (NO_x) to atmosphere (each SCR abatement system will be powered by the SBG it serves). It should be noted that if HVO is not available then the SBGs will be operated on diesel.

The SBGs will provide power to the data centre in the event of an emergency situation such as a brown- or black-out of the national electricity transmission network where there are fluctuations or loss of the electrical power provided by the network. On occurrence of such an event, there is the potential for a delay between fault detection and initial operation of the SBGs; on-site battery arrays will provide a temporary uninterruptible power supply in order to cover such delays and the potential for a loss/reduction in the power supply to the on-site equipment.

Based on the proposed changes, the aggregated total combustion capacity for the site will now be 335.15MWth as summarised below:

- 12 x KD1800 SBGs - 49.2MWth (already installed in LON1A);
- 16 x KD83V16 SBGs - 111.15MWth (proposed for LON1A (phases 2 and 3))



- 22 x MTU model DS3600 SBGs (IT SBGs) – 167.2MWth (proposed for LON1B)
- 2 x MTU model DS1650 SBGs (house SBGs) – 7.6MWth (Proposed for LON1B)

The SBGs, in accordance with the manufacturer requirements, will be subject to planned maintenance and testing. There are currently no agreements in place for the elective generation of electricity for commercial export to the electricity grid and the SBGs do not operate in Triad avoidance.

In addition to the SBGs, two diesel-fired firewater sprinkler pumps will be installed at LON1B. Each sprinkler pump will have a thermal rated input of 0.206MWth. As the thermal rated input of the proposed pumps is less than 1MWth these will not require permitting as Medium Combustion Plant (MCP) and are therefore not considered further in this EP variation application. However, on the basis of cumulative impacts, the combustion emissions from these two pumps have been considered in the air emissions risk assessment (AERA) submitted with this EP variation application.

This document is submitted on behalf of the operator to support the application for a variation to EP reference EPR/CP3902LV for the data centre (as per the requirements of Section 2(1), Part 1, Schedule 5 of the EP Regulations).

This NTS provides a summary of what is being applied for, along with a summary of the activities that will be undertaken at the data centre as a result of the proposed changes, and an explanation of key technical standards and control measures that will be implemented at the site.

2.0 Environmental Permit Application

2.1 Regulated Activities

The data centre will comprise in total a thermal input of 335.15MWth (52 SBGs). Testing of the SBGs (either routinely or following maintenance) will be undertaken at up to 100% of load.

This EP variation application (including the associated modelling studies and risk assessments) relates to the proposed additional SBGs to be installed in LON1B (22 x MTU model DS3600 SBGs and 2 x MTU model DS1650 house SBGs (174.8MWth)).

Combustion activities that require an EP are defined in Part 2, Schedule 1 of the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EP Regulations):

- Section 1.1 Part A(1)(a) burning any fuel in an appliance with a rated thermal input of 50 or more megawatts.

The EP Regulations clarify that:

“...where two or more appliances with an aggregate rated thermal input of 50 or more megawatts are operated on the same site by the same operator, those appliances must be treated as a single appliance with a rated thermal input of 50 or more megawatts.”

The LON1 data centre currently exceeds 50MWth and is therefore a Section 1.1 Part A(1)(a) combustion activity in accordance with the EP Regulations. Based on the proposed change in number of SBGs, the total number of SBGs for the data centre will now be 52. The SBG provision includes for a level of redundancy to the SBG system such that, even in a worst-case blackout scenario, only the required number of SBGs would start up to deliver the required electricity IT load for the data centre; the number of operational SBGs at the time of the blackout would be dependent on the extent of the blackout. However, it is noted that, without specific physical controls preventing operation of an SBG, that the thermal input of



all SBGs is required for determining the capacity of the site. Therefore, the capacity of the data centre in total will be 335.15MWth based on:

- 12 x KD1800 SBGs - 49.2MWth (already installed in LON1A);
- 16 x KD83V16 SBGs - 111.15MWth (proposed for LON1A); and
- 22 x MTU model DS3600 SBGs and 2 x MTU model DS1650 house SBGs – 174.8MWth (proposed for LON1B).

2.2 Application Contents

The EP variation application comprises the following elements:

- Non-Technical Summary
- Application forms (Parts A, C2, C3 and F1)
- Best Available Techniques and Operating Techniques
- Environmental Risk Assessment
- Noise Risk Assessment
- Air Emissions Risk Assessment
- Site Condition Report

The following drawings accompany this EP variation application:

- Drawing 001 – Site Location Plan
- Drawing 002 – Site Layout and Emission Points
- Drawing 003 – Environmental Permit Boundary
- Drawing 04A – Local Receptors
- Drawing 04B – Natural & Cultural Heritage.

2.3 Operating Techniques

The proposed SBGs, air emissions abatement systems and associated fuel storage at LON1B will be designed and operated in accordance with the relevant sections of the following guidance:

- Develop a management system: environmental permits guidance, 03 April 2023;
- Risk assessments for your environmental permit guidance, 31 August 2022;
- Emergency backup diesel engines on installations: best available techniques (BAT), 23 August 2023;
- Best Available Techniques: environmental permits, February 2016;
- Data Centre FAQ, Draft Version 21.0 to TechUK for Discussion 15/11/22; and
- Specified generator: comply with permit conditions, 28 December 2022.

2.3.1 Management Systems

The data centre is operated in accordance with the following standards:

- ISO/IEC 27001:2013 that specifies the requirements for establishing, implementing, maintaining and continually improving an information security management system;
- ISO 14001:2015 that specifies the requirements for an environmental management system (EMS) to enable an organisation to develop and implement a policy and



objectives which take into account legal requirements and other requirements to which the organisation subscribes, and information about significant environmental aspects; and

- ISO9001:2015 that specifies the requirements for establishing, implementing, monitoring, managing and improving quality throughout the organisation.

The EMS places particular importance on:

- Reducing risks to the environment to a level that is as low as reasonably practicable using best available techniques;
- Integrating EMS responsibilities within line management;
- A commitment to personnel environmental awareness and competence;
- The ongoing monitoring and review of environmental performance; and
- A commitment to working to achieve continuous improvement in environmental performance.

The policies, processes and procedures associated with these standards will be updated to include the proposed changes, as required.

A summary of the proposed EMS is detailed in the site's Operating Techniques document (SLR reference: 410.V61547.00001_BATOT) submitted with the EP variation application.

2.4 Site Condition Report

A Site Condition Report (SCR) (SLR Ref: 410.V61547.00001_SCR) has been prepared in support of the EP variation application.

Sections 1-3 comprise the following aspects:

- site details;
- condition of the land at permit issue;
- geology;
- hydrology;
- hydrogeology;
- pollution history;
- evidence of historic contamination; and
- permitted activities.

Sections 4 to 7 will be maintained during the lifetime of the EP, and Sections 8 to 10 will be completed and submitted in support of an application to surrender the EP.

2.5 Environmental Risk Assessment

The Environmental Risk Assessment (ERA) prepared for the EP variation application is in accordance with the EA *Risk assessments for your environmental permit* and is included with the EP variation application. The ERA is a simple assessment of the risk to the environment and human health from point source emissions to air, accidents, noise, fugitive emissions and global warming potential that may be associated with the proposed operations. The aim of the assessment is to identify any significant risks and demonstrate that the risk of pollution or harm will be acceptable by taking the appropriate measures to manage these risks.



The ERA has assessed the potential risks from the data centre based on the balance between the probabilities of exposure and the magnitude of the consequences of those exposures. Overall, with measures in place to manage potential risks, no significant environmental risks have been identified at the site.

2.6 Air Emissions Risk Assessment

A detailed air quality risk assessment (SLR Ref: 410.V61547.00001_AERA) has been undertaken to investigate the potential for emission of nitrogen oxides (NO_x) from the proposed 24 SBGs and the potential impact on air quality by comparison to UK Air Quality Standards and EA regulatory benchmarks (e.g. Environmental Assessment Levels) in line with the prevailing guidance. Emissions from the site will vary dependent upon the operational scenario of the SBGs (e.g. full emergency load, testing, etc.).

The proposed LON1B SBGs will each operate for less than 500 hours per annum and will therefore not be subject to emissions limit values (ELV) for the substances listed in Annex V of Directive 2010/75/EU on industrial emissions (Industrial Emissions Directive, IED).

Overall, the risk assessment concluded that potential impacts on air quality as a result of routine (testing and maintenance) operations of the SBGs are not significant. The assessment of potential impacts on air quality as a result of an assumed 72 hour 'electrical grid outage' occurrence concluded that there is potential for air quality impacts at certain receptors. It is, however, recognised that such a prolonged emergency scenario is highly unlikely and that the reliability of electricity supply from the local network could, conservatively, be expected to be unavailable for <1 hour per year. The assessment of potential impacts on air quality as a result of the commissioning of the SBGs are not significant.

NTT will update the Air Quality Emergency Action Plan (AQEAP) for the LON1 data centre, which details the management actions to be taken in the event of an emergency outage that could result in the prolonged usage of the SBGs which could potentially result in adverse impacts on the local air quality, with LON1B. NTT will liaise with the local authority and the Environment Agency to agree actions to be taken in the event of a prolonged outage situation and a finalised plan will be incorporated into the site's EMS.

2.7 Key Technical Standards

The LON1B data centre has been designed to provide maximum reliability of the electrical power supply to the systems on site that are critical for continuous operation of the site as a data centre.

The operational techniques that will be in place to manage the activities at the LON1B data centre can be summarised as follows:

- The SBGs will be operated for emergency back-up purposes (other than planned maintenance and testing) which will only commence in the event that electricity is not available from the national transmission network (e.g. brown- or black-out) or if there is an internal failure of power supply.
- The planned maintenance and testing regime for the SBGs will be scheduled so that the impact on air quality as a result of the fuel combustion emissions is minimised.
- The scheduled maintenance and testing regime for each SBG will be below the 50-hour testing regime for generators which are purely for a stand-by emergency role as stated in the EA Datacentre FAQ (v.11 2020).
- The SBGs will not be operated on an 'elective' basis as an alternative source of electricity, or for Triad avoidance.



- The 24 SBGs will following on-site installation, be subject to a period of commissioning. The commissioning will be undertaken during weekdays between the hours of 08:00-18:00. The commissioning plan has yet to be developed, however it is expected to be very similar to that for the LON1A phase 2 and 3 SBGs; for the purpose of the air emissions modelling, the commissioning model scenario has been based on this commissioning plan.
- With regard to engine selection, considering that the requirement for the SBGs is to provide emergency/standby power for the data centres, diesel engines have been determined as a best available technique (BAT). NTT will operate the LON1B SBGs on HVO fuel but may revert to the use of diesel if HVO availability becomes an issue.
- To minimise NO_x emissions to air, SCR abatement will be installed on each SBG. The SCR abatement will be designed to reduce NO_x emissions to meet the Medium Combustion Plant Directive emission limit for NO_x (190mg/m³ @ 15% oxygen). This is considered BAT. The SCR abatement system has yet to be selected; NTT will confirm to the EA the SCR abatement once selected.
- The operator will notify the EA:
 - In advance of planned outage/maintenance of the national transmission system that is expected to exceed 18 continuous hours that would require the operation of more than two SBGs at the site; and
 - Upon an incident of unplanned continuous outage that exceeds 18 hours or requires operation of more than two SBGs.

Each LON1B SBG will have a dedicated stack to aid the dispersion of the engine flue gases, each LON1B SBG will have one flue which will discharge via an SBG exhaust air duct (i.e. riser). The SBG vertical flues will extend to 3m below the terminal height of each riser. The release height of each of the risers for the 24 proposed SBGs at the LON1B data centre will be 20.6m above ground level (agl). The risers, which will be vertical and unimpeded, will terminate 5m from the roof level, but at the same height as roof plant.

The AERA has taken into account the profiles and heights of all stacks and building downwash impacts at the site and has concluded that there will not be significant impacts on air quality as a result of the planned routine testing and maintenance operations of the SBGs.

- The LON1B SBGs will be sited within dedicated generator rooms to be located on the ground floor of the LON1B data centre building. The fuel belly tank will be located underneath each SBG and will automatically supply fuel to the SBG. Each generator room will be provided with containment, designed to contain 110% of the maximum volume of SBG fuel stored within the belly tank within these rooms, and will be fitted with a leak detection alarm.
- The belly tanks will be filled directly from refuelling vehicles (the fuel being delivered by an NTT appointed fuel supplier). Fuel will be delivered directly to the belly tanks via fill points which will be located on the external northern wall of the LON1B data centre building; these fill points will be positioned in lockable cabinets with integral drip trays.
- The belly tanks will each have the following protection measures:
 - Fill points located in a lockable cabinet provided with a drip tray designed to capture any minor spillages of fuel from the fill point during delivery. The tank fill point cabinets will remain locked when not in use.
 - Tank level gauge.



- High- and low-level alarms connected to the building management system (BMS).
 - A pressure delivery over-fill prevention valve.
 - Leak detection alarms connected to the BMS.
 - To minimise the risk of corrosion all pipework is painted or is constructed of corrosion resistant material.
- Any minor spillages of fuel and AdBlue will be cleaned up using propriety spill kits, the contaminated materials will then be stored in suitable bunded containers in a waste storage area on the site prior to off-site disposal by an NTT approved waste contractor. Any major spillages/leaks of fuel or AdBlue will be transferred to suitable containers/directly to road tanker for off-site treatment/disposal by a suitably licensed waste contractor. The management of spills will be undertaken in accordance with the site's spill procedures.
 - NTT has developed a preventative maintenance system, which defines the required checks for storage tanks and associated infrastructure. This will be updated to include LON1B.
 - The LON1B SBG planned testing schedule will be managed via NTTs PPM CAFM software. To minimise the number of SBGs tested at the LON1 data centre at any one time, the PPM software system is used to schedule this maintenance and testing.
 - There will be no discharges to the on-site drainage systems from the LON1B generator rooms. Surface water run-off from the external SBG refuelling area will drain to the on-site surface water drainage system via an oil interceptor (Class 1 full retention). The interceptor will be fitted with an automatic closure device and high-level audible alarm system for oil and silt levels. Following the interceptor, the surface water drainage will drain into the on-site surface water attenuation system (Tuborsider system), prior to discharging into the Thames Water municipal combined sewer, this point of discharge being located on the central southern boundary of the site.
 - The oil interceptor will be emptied at least annually and subject to annual inspection and integrity testing.
 - Significant fugitive emissions, odours and noise are not considered likely with respect to operation of the 24 SBGs and associated SCR abatement systems at the data centre, and measures will be employed to prevent such emissions.
 - A Noise Assessment (410.V61547.00001_Noise Assessment) submitted in support of this EP variation application, found that at the noise sensitive receptors at Rainham Road the SBGs will exceed the background sound level (by up to 1dB during the day time and 4dB during the night time), which is an indication of an adverse impact, depending on the context. In Western Avenue and Rainham Road there will be an exceedance of the background sound during the day-time and night-time, however, operational noise from the data centre will be masked by other ambient noise sources such as road and rail traffic. It should be noted that the noise model assumes that all SBGs will operate all together, and therefore presents a worst-case assessment scenario. As the SBGs will be operated for emergency back-up purposes and intermittently for maintenance and testing purposes only, and also when considering the context of the acoustic environment which the sound occurs, the noise impacts will be low and are considered unlikely to cause a significant noise impact at the identified receptors.
 - The management of energy will be an integral part of the ISO140001 EMS.



- The correct design, operation and maintenance of the SBGs will ensure the lowest possible consumption rate of fuel.
- Operation of the SBGs will not produce significant amounts of waste. Waste oil will be generated as a result of SBG maintenance. SBG maintenance will be undertaken by an appointed third-party specialist who will be responsible for the offsite disposal of this waste.
- In accordance with the EMS, procedures are in place for the regular inspection and maintenance of storage areas and associated infrastructure. These procedures will be updated to include LON1B. Any accidents or incidents and the action taken to rectify these, will be recorded.

3.0 Conclusion

The overall conclusion from the studies undertaken as part of the EP variation application is that there is unlikely to be a significant environmental impact as a result of the operation of the proposed LON1B SBGs at the data centre. NTT is fully committed to ensuring the highest standards are met and will undertake its activities in a manner consistent with best industry practices.



