

# Permitting decisions

## Bespoke permit

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We have decided to grant the permit for East India Dock Road, London North and London East Data Centres operated by Global Switch Limited.

The permit number is EPR/BP3530YR.

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

### Purpose of this document

This decision document provides a record of the decision making process. It summarises the decision making process in the decision checklist to show how all relevant factors have been taken in to account.

This decision document provides a record of the decision making process. It:

- highlights [key issues](#) in the determination
- summarises the decision making process in the [decision checklist](#) to show how all relevant factors have been taken into account
- shows how we have considered the [consultation responses](#).

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Read the permitting decisions in conjunction with the environmental permit. The introductory note summarises what the permit covers.

## Key issues of the decision

### Description of the installation

The site is an existing data centre which consists of a Schedule 1 Part A(1) 1.1 activity under the Environmental Permitting Regulations for the burning of any fuel in an appliance with a rated thermal input of 50 or more megawatts (MW).

The combustion plant provides for the event of a failure in the electrical supply, whereby the operator will utilise standby Diesel Rotary Uninterruptable Power (DRUP) units to maintain operational resilience. The DRUPS will not be used solely for the purpose for generating power for the facility. They can be employed as providers of a scheme known as Frequency Control by Demand Management (FCDM) This would mean occasionally running the DRUPS units to support the site in response to frequency dips in the electricity supply. This would reduce demand on the national grid and likely prevent outages to the surrounding area. However when the facility operates in this manner the generators will be equivalent to tranche A generators and so will have to comply with an emission limit of 190mg/m<sup>3</sup> for oxides of nitrogen as soon as practicable, as required by the specified generator regulations, and improvement condition IC 2 has been set within the permit to reflect this. This is discussed further in this document in the section "BAT for FCDM Operations".

The data centres are known as London North and London East.

**London North** has a total of 6 diesel generators and 3 DRUPS units. The total thermal capacity of this installation is 32 MWth. Fuel for these engines is stored in underground tanks to the north of the Data Centre building (90,000 litres) as well as within tanks internal to the building on level 1 (72,000 litres).

**London East** has a total of 37 DRUPS units with a total thermal capacity of 159 MWth. These units are grouped into four power stations named B, C, D and H1. Fuel for these units is stored underground to the north of the Data Centre building (480,000 litres).

The two buildings are only separated by a private road and are considered to be part of a single site. Where 2 or more appliances with an aggregated thermal input of 50MW are operated on the same site by the same operator they must be treated as a single appliance. We therefore consider that this is a single installation undertaking an activity within section 1.1 A(1) of schedule 1 EPR - burning any fuel in an appliance with a rated thermal input of 50 or more MW.

The installation provides a total aggregated thermal input of 191 MWth.

No electricity will be exported from the installation.

The standby generators are designed and configured so that in the event of a mains failure all or some of the generators will fire up then subsequently ramp down to meet the load demand at the site. All the generators are subject to a testing schedule which is as follows:

### **Planned Operation**

The testing regime of the generator/DRUPS units for each building is described below. This is the minimum duration that the units are expected to run.

#### **London North**

Each unit is tested at building load for one hour annually. This is usually scheduled for the summer months and one unit would be tested per day until complete.

#### **London East**

The DRUPS units are tested weekly off-load for 15 minutes. Every month there is a 15 minute test at building load.

### **Unplanned Operation**

The generators/DRUPS units are used to support the building in times of grid failure. The DRUPS units are more sensitive to dips in frequency in the electricity supply and therefore run more often than the diesel generators. There have been no brown or black outs exceeding 15 minutes in the history of the site's operation.

### **Frequency Control by Demand Management**

Global Switch are providers of a scheme known as Frequency Control by Demand Management (FCDM). This would mean occasionally running the DRUPS units to support the site in response to frequency dips in the electricity supply. This would reduce demand on the national grid and likely prevent outages to the surrounding area.

The sites DRUPS would operate during these frequency dips regardless of whether the site engages in FCDM as the threshold to operate is the same. The only difference is the DRUPS will operate for 15 minutes more each time they operate. It is expected that would not happen more than 12 times in one year.

The facility is located in the Poplar area of London and the campus is centred on National Grid Reference TQ 3858 8099.

The site is located in close proximity to the River Thames which has been designated as a Marine Nature Reserve. There are no source protection zones or groundwater protection zones in the vicinity of the site. There will be no process effluent discharge from the installation. Uncontaminated water from roof and hard standing run off will drain via a below ground surface water drainage system.

The installation will operate an Environment Management System in line with the requirements of ISO 14001.

There is one Special Area of Conservation (SAC), one Special protection Area (SPA) within 10km of the installation and 17 local wildlife sites (LWS) located within 2km of the installation.

## **Air Quality**

The primary pollutant of concern to air quality is nitrogen dioxide (NO<sub>2</sub>) resulting from the combustion process on site. The Applicant has submitted an air dispersion modelling report which assesses the potential impact of emission of NO<sub>2</sub> from the generators on local air quality.

The site is located in the Borough of Tower Hamlets. The Borough is designated as an Air Quality Management Area (AQMA) as the background concentrations of NO<sub>2</sub> and PM<sub>10</sub> occasionally exceed the AQS for those

pollutants. The Applicant's consultant has assessed potential impacts at human and ecological receptors of nitrogen oxides (NOX), carbon monoxide (CO), sulphur dioxide (SO<sub>2</sub>) and particulates (PM<sub>10</sub>) for testing and emergency operation of the generators.

Our Air Quality Modelling and Assessment Unit (AQMAU) audited the air dispersion modelling and report submitted with the permit application. Both the maintenance testing and emergency scenarios within the modelling were assessed.

### **Maintenance testing**

Scenario 1: Planned maintenance

- Each of the London North engines (9 engines) operate one time per year for 15 min at 20% load, which have been modelled as each engine operate annually for 1 hour. For example, one Broadcrown engine is tested at 20% load for 1 hour within the year.

- Each group of the London East engines (37 engines) operate for 1 hour per week at either 50-60% or 20% loads. For example, one group of engines consisting of 10 Eurodiesel DRUP engines are tested weekly for 1 hour at 50% load.

All long term Predicted Environmental Concentrations (PECs) are not likely to exceed the Environmental Standard (ES) at human receptors.

All short term PCs are either less than the 10% insignificance threshold of any ES, or PECs are below 100% of any ES at human receptors.

Their predictions are insignificant at ecological receptors for all ES.

The results show that there is a negligible risk of the process resulting in an exceedance of the EQSs and we agree with this conclusion.

Improvement condition IC1 is specified in the permit which requires the operator to produce a report outlining the details of the annual maintenance operating regime following the first year of operation following permitting to validate the information provided with the permit application.

### **Emergency scenario**

Scenario 2: Scenario 1 plus a number of grid outages with engines operating at 100% load:

- The outages at London North involve the operation of individual generators running from 1 to 5 hours per year i.e. one generator at a time with a maximum of 10 hours per year;
- the outages at London East involve the operation of a group of 25 generators at once for 13 hours and a group of 10 generators at once for 10 hours per year.

Scenario 3: London East outages of scenario 2

Scenario 4: Emergency - All engines operating full time at 100% load for a period of 48 hours per year

The consultant's predicted Process Contributions (PCs) and Predicted Environmental Concentrations (PECs) for human receptors, for all scenarios show the following:

Long term PCs for all pollutants are less than 1% of the ES with the exception of NO<sub>2</sub> which has a PEC of less than 100% of the ES at receptor locations for all scenarios.

All short term PCs are either less than the 10% insignificance threshold of the ES or the PECs are below 100% ES for all pollutants and scenarios, except for short-term PCs of NO<sub>2</sub> hourly 99.79th percentile for emergency scenario.

With regard to emergency scenario 4, short term PCs are not insignificant with little headroom, leading to PEC values higher than 100% of the ES. Under the emergency scenario statistical analysis has been used to show that at the worst case receptor exceedances of the ES greater than 19 times (the EQS allows for 18 times) in any 48 hour period will only occur for around 6% of the year. In reality such a scenario will never probably occur and we therefore consider the environmental risk to be acceptable.

Background concentrations used by the applicant were taken from Defra's UK Air Quality Archive (1 km x 1 km grid square) from 2001 for SO<sub>2</sub> and CO and Local authority pollutant measurement data for 2015 and 2016 from sites located within the Tower Hamlets Council area. It is recognised that the engines have been operating since the early part of 2008 and therefore those emissions for part of the recorded background concentrations. Tower Hamlets Council undertakes monitoring of both NO<sub>2</sub> and PM<sub>10</sub> at a number of locations using both automatic analysers and diffusion tubes across the borough. They used a background of 35.5 µg/m<sup>3</sup> for NO<sub>2</sub>, 22 µg/m<sup>3</sup> for PM<sub>10</sub>, 0.5 µg/m<sup>3</sup> for CO and 4.3 µg/m<sup>3</sup> for SO<sub>2</sub>. Since the dispersion site is an Air Quality Management Area (AQMA) declared for NO<sub>2</sub> there is likely to be a high background

concentration with high spatial and temporal variability with some long-term concentrations exceeding the ES at receptor locations. We agree with the Applicants methodology in predicting the impacts from the Installation on the AQMA and their conclusions that there will be no significant pollution or harm to human health.

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### **Permit conditions**

The permit will include a maximum 500 hour 'emergency/standby operational limit' for any or all the plant producing on-site power under the limits of the combustion activity; and thereby emission limit values ELVs to air (and thus engine emissions monitoring) are not required within the permit because the MCPD exempts emergency plant from needing emission limits. Emergency hours' operation includes those unplanned hours required to come off grid to make emergency repair of electrical infrastructure associated but occurring only within the data centre itself.

Each individual generator with its own discharge stack, can be maintained, tested and used in a planned way for up to 500 hours per calendar year each without ELVs or associated monitoring under IED/MCPD. Though clearly the Environment Agency requires planned testing and generator operations to be organised to minimise occasions and durations (subject to client requirements). This is provided through general condition 1.1 of the Permit.

Operations and management procedures should reflect the outcomes of the air quality modelling by minimising the duration of testing, phasing engines into subgroups, avoiding whole site tests and planning off-grid maintenance days and most importantly times/days to avoid adding to "at risk" high ambient pollutant background levels.

Reporting of standby engine maintenance run hours is required annually and any electrical outages (planned or grid failures regardless of duration) requires both immediate notification of the Environment Agency and annual reporting.

### **BAT**

We accept that oil fired diesel generators are presently a commonly used technology for standby generators in data centres as they provide a fast start to generate electricity in the event of a Grid failure. The Environment Agency has determined therefore, that DRUPS can be consider BAT for Data Centres.

In the event of a sustained loss of grid power, data centre infrastructure is designed to react to restore electrical provision by operating the emergency backup DRUPS / diesel generators. In most circumstances the DRUPS / generators will only operate during the time taken (approx. 15 minutes) to switch to an alternate grid supply that is unaffected (known as "bus coupling"). The short operation of the generation plant means the likelihood of any impact on air quality is low.

In the unlikely event that all supplies are compromised the DRUPS / generators will run until the fault is repaired. This event is considered to be very rare, often described as a 1 in a 100 year event due to the catastrophic failure that would be required in the grid supply / supplying power station. In such a circumstance, the DRUPS / generators may run for a prolonged period.

BAT for prolonged operation of the generation plant would be to implement an Air Quality Management Plan (AQMP). The main aim of this would be to restore grid supply as soon as practicable to limit the operation of the DRUPS / generators and to mitigate the impacts of their operation.

BAT may also include an Air Quality Incident Response Plan (AQIRP). This would be based on a decision tree aimed at notifying highly sensitive receptors / the Environment Agency (EA) in the event of a prolonged grid outage (engines operate over several hours). This would include observations on the current weather conditions / wind direction / time of day / day of the week and their likely impact on local air quality. As this is a Data Centre, we have set an Improvement Condition in the Permit to provide this certainty.

At the Installation, the generation plant is operated for either emergency or non-emergency purposes. Emergency operation is where the grid fails or there is a fluctuation in the supply that causes the DRUPS / generators to operate. Non-emergency operation of the generation plant is generally constrained to maintenance and testing. The maintenance tests are 15 minutes for the DRUPS and 1 hour per year for the generators. Tests are generally scheduled in advance to meet customer Service Level Agreements (SLAs), and operational requirements.

## **BAT for FCDM Operation.**

The Operator has also operated the DRUPS as part of a scheme known as Frequency Control by Demand Management (FCDM). FCDM is similar to several schemes available to data centre operators which necessitates non-emergency operation of the DRUPS. There are two main bodies responsible for this, a Distribution Network Operator (DNO) or an independent third party aggregator. Normally, the National Grid will make a request to an aggregator to request a site / sites switches from grid supply to onsite generation during periods of high demand where the grid cannot meet current requirements. FCDM requires only the DRUPS units to be operated to support the site, to reduce demand on the national grid when the frequency of electricity supply dips significantly. Without FCDM intervention there could be a power loss to the surrounding area. The frequency is unlikely to be more than 12 times a year for up to 30 minutes at a time. In practice it is likely that this will replace the monthly test, therefore there is negligible impact on the total hours of operation in a year and therefore on environmental impacts e.g. air quality.

Although the installation is excluded from the Specified Generator regulations (as required by Schedule 25 B of Statutory Instrument 2018 No. 110 made 29 January 2018), due to it having over 50 MWth combustion activities, we consider that the requirements of the regulations are BAT for the installation. The Specified Generator Guidance explains how to comply with the provisions of the Specified Generator Regulations. It explains the scope and definitions and details how the regulations apply to different types of generators.

**Firm Frequency Response for Data Centres:** Data Centres require very stable frequency of electricity supply to maintain the integrity of the IT functions they support. Data Centre operators will periodically proactively operate their onsite emergency backup generation when the transmission system frequency is unstable to prevent damage or disruption to data processing functions. The Environment Agency considers such operation to constitute an onsite emergency and are thus excluded when this activity is not part of a formal agreement or contract. Such periods of operation will be kept to a minimum. However, **Backup Generator** means a generator that is operated for the sole purpose of providing power at a site during an onsite emergency from the 1 January 2019. Balancing Services, and Demand Side Response operations, whether procured or not, such as Triad Avoidance or Fast Frequency Response are not on site emergencies and a generator that provides these services is not excluded. **Balancing service** means any services procured by the transmission system operator in order to balance demand and supply, and to ensure the security and quality of electricity supply across the national transmission system for Great Britain. For example, generators can be generating for their own use, sometimes known as Demand Side Response, or for export. Services include but are not limited to: Enhanced Frequency Response, Enhanced Reactive Power Service, Fast Reserve, Firm Frequency Response and Short Term Operating Reserve.

A response to a Schedule 5 request for information received on 18/01/2019 confirmed that the Operator was under contract to provide generation under FCDM and as such under the Specified Generator Regulations the generators would be considered to be Tranche A generators. As explained above we consider that the requirements of the regulations are BAT even for plant excluded due to their size consequently the generators are required to meet the **standard ELV** for nitrogen oxides = 190 mg/Nm<sup>3</sup> at a temperature of 273.15 K, a pressure of 101.3 kPa and after correction for the water vapour content of the waste gases to dry gas and at a standardised O<sub>2</sub> of 15%. This is the equivalent of 500 mg/Nm<sup>3</sup> at 5% O<sub>2</sub>. This Standard ELV is applicable to all generator technologies and fuels is tighter than that required by the MCPD and will minimise emissions due to the need for SCR abatement. At the time of determination of this application the generators have no form of NO<sub>x</sub> abatement and are not capable of meeting these emission limits. An improvement condition, IC 2, is included in the permit which requires the Operator to demonstrate to the Environment Agency that it has modified the plant and equipment at the site in order to meet the above ELV before it can demonstrate BAT for FCDM operation.

## **Protection of Groundwater**

The site is covered in hardstanding. Diesel tanks are double skinned and part of a preventative maintenance programme. Leak detection alarms are installed within the tanks. Each set of generators are housed within bunded containers. Fuel lines to generators are enclosed.

Storm drains in the generator compound run into the oil interceptors. The interceptors are cleaned on an annual basis.

Each set of generators are housed within bunded containers sufficient to contain complete loss of all fluids held within the generator / engine. Spill prevention kits are located in the plant areas.

Fuel is supplied to the engine by a suction pump. A float switch is present in the tank to detect the level of liquid. Fuel fill points are bunded. Oil interceptors have been installed on the drainage system surrounding the fuel tank/fill points.

## Decision checklist

Aspect considered	Decision
<b>Receipt of application</b>	
Confidential information	A claim for commercial or industrial confidentiality has not been made. The decision was taken in accordance with our guidance on confidentiality.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential. The decision was taken in accordance with our guidance on confidentiality.
<b>Consultation</b>	
Consultation	The consultation requirements were identified in accordance with the Environmental Permitting Regulations and our public participation statement. The application was publicised on the GOV.UK website. We consulted the following organisations: Environmental Health – Woking Council Food Standards Agency Health and Safety Executive Public Health England and Director of Public Health The comments and our responses are summarised in the <a href="#">consultation section</a> .
<b>Operator</b>	
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the facility after the grant of the permit. The decision was taken in accordance with our guidance on legal operator for environmental permits.
<b>The facility</b>	
The regulated facility	We considered the extent and nature of the facility at the site in accordance with RGN2 'Understanding the meaning of regulated facility', Appendix 2 of RGN 2 'Defining the scope of the installation', Appendix 1 of RGN 2 'Interpretation of Schedule 1', guidance on waste recovery plans and permits. The extent of the facility is defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit.
<b>The site</b>	
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. The plan is included in the permit.
Site condition report	The operator has provided a description of the condition of the site, which we consider is satisfactory. Based on the site condition report, we consider that appropriate pollution prevention measures are in place and that the pollution of land and water is unlikely. The decision was taken in accordance with our guidance on site condition reports.
Biodiversity, heritage, landscape and nature conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat.  With regard to ecological receptors, we agree with the Applicant that the annual impacts from NO <sub>x</sub> will likely be insignificant but we cannot rule out exceedences of the 24-hour NO <sub>x</sub> Critical Level at Saffron Avenue Pond (LNR). Our assessment of the SO <sub>2</sub> critical level and nutrient nitrogen and acid deposition critical loads show the impacts will likely be insignificant.  We have sent an Appendix 11 to Natural England for information only. The decision was taken in accordance with our guidance.
<b>Environmental risk assessment</b>	
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. See Key Issues section above for further details. The operator's risk assessment is satisfactory, however we have included improvement conditions to ensure additional considerations of risk relating to emissions to air are considered on an ongoing basis.

<b>Aspect considered</b>	<b>Decision</b>
<b>Operating techniques</b>	
General operating techniques	We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility. See Key Issues section above for further details. The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.
<b>Permit conditions</b>	
Improvement programme	Based on the information on the application, we consider that we need to impose an improvement programme. We have imposed an improvement programme as outlined in the key issues section above.
Emission limits	We have decided to set emission limits in the permit to cover for the Operator deciding to operate under FCDM in the future once compliant with improvement condition IC 2.
Reporting	We have specified reporting in the permit to ensure that the installation is being operated in line with that specified in the operating techniques and to ensure that we are notified immediately in the instance that the site ever operated in emergency scenario mode.
<b>Operator competence</b>	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions. The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.
Relevant convictions	The Case Management System and National Enforcement Database have been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in our guidance on operator competence.
Financial competence	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.
<b>Growth Duty</b>	
Section 108 Deregulation Act 2015 – Growth duty	We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit. Paragraph 1.3 of the guidance says: “The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.” We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections. We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.



## Consultation

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public and the way in which we have considered these in the determination process.

<b>Response received on 12/12/17 from</b>
Public Health England
<b>Brief summary of issues raised</b>
<ul style="list-style-type: none"><li>• Recommendation that any Environmental Permit issued for the site should contain conditions to ensure that the following potential emissions do not impact upon public health.</li><li>• Recommendation that the environment agency should assess the modelling undertaken for the diesel generators to check whether it is robust.</li><li>• The worst case scenario modelled concentrations indicate that the emissions could pose a potential short-term adverse risk to public health, however the probability of the risk is predicted to be low as the generators are tested infrequently and the site has a dual connection to the grid.</li><li>• The applicant has provided limited detail on abatement / mitigation for the air emissions from the diesel generators. The Environment Agency may wish to assess whether measures to limit nitrogen dioxide emissions from the generators have been fully considered by the applicant to limit any potential impacts on local air quality.</li><li>• Recommendation that the Environment Agency consults the local authority, the Food Standards Agency and the Director of Public Health.</li></ul>
<b>Summary of actions taken or show how this has been covered</b>
We carried out an assessment of the air quality modelling provided with the permit Application. Our Air Quality Assessment and Modelling team audited the assessment. As outlined in the key issues above, we agree with the Applicant's conclusions, that the maintenance scenario is unlikely to cause an exceedance of the EQSs. We have specified a number of improvement conditions which require the operator to carry out additional work in relation to the potential short term predictions resulting from the emergency scenario. These include working with the Local Authority to put together an Air Quality Management Plan and considering additional measures that could be put in place to reduce potential emissions of short term NOx which could include abatement measures.

We also consulted with Environmental Health, Food Standards Agency, the Health and Safety Executive and the Director of Public Health and received no responses.