Data Centre FAQs version DRAFT version 10.0 01/06/18

Key Aspect of Consideration	*Response*
1. Choice of engine, the particular configuration and plant sizing meeting the standby arrangement	*Diesel/HVO engines are accepted as BAT for deployment as data centre emergency backup power supply. See Main Supporting Document 1.2 and 1.3 Standby Generator Capacity & Technology Justification. The layout and design principle of the back-up generators has already been agreed as part of the original application. This variation is for the addition of a new generator array at substation SQ19 for a new data centre facility (P5).*
2 Combined Thermal Input Capacity	*70 generators with a combined thermal input capacity of 328 MW(th)*
3. Specification	*All equipment is new and specification for generating equipment is provided – Appendix C*
4. Limiting Factors applied	*There are no limiting factors applied. Generator plant capacity is based only on MW(th) inputs of all plant regardless of configuration*
5 Single site v Installation	*The installation is a single site Appendix 1*
6. A maximum 500 hour 'emergency/standby operational limit'	*Site operations will not exceed a maximum of 500 hours (inclusive of emergency repair) for any or all of the combustion plant and therefore Emission Limit Values to air and related monitoring is not applicable*
7. Above hours include Emergency Hours repair	*See above*
8. Planned testing and generator operations are organised to minimise occasions and durations (subject to client requirements). Ideally a target should seek to keep individual generator testing to below 50 hours/annum each.	*See Main Supporting Document 3.2 – generating testing. Each generator typically runs for less than 5 hours a year, with a cumulative run-time of less than 300 hours a year for the maximum number of 70 generators deployed at the site.*
9. The whole or part site can only operate as emergency plant up to 500 hours as an absolute limit for grid backup issues; but that individual plant (at any load) with its own stack (or a stack with multiple plant) with justification can be operated for up to 500 hours (ideally <50) each as part of its non-emergency role under maintenance and testing.	*See Main Supporting Document 3.3 – grid reliability. With the high level of mains electrical system redundancy, it is anticipated that the mains generators are unlikely to operate for extended periods of operation. Each generator typically runs for less than 5 hours a year, with a cumulative run-time of less than 300 hours a year for the maximum number of 70 generators deployed at the site*
10. Data centre diesel generators are regarded as having a minimal start-up or shut-down times. Operational hours start on the first fuel ignition.;	*See Main Supporting Document 3.4 – generator testing. Operation hours are recorded.*
11. Data Centre permits (unless they apply and justify it in a permit application) will expressly have a limit on the activity to exclude voluntary 'elective power operation' for grid support	*The generators will not be used for elective power operation for grid support.*
12. The default engine specification as a minimum for new plant to minimise the impacts of emissions to air (NOx) is 2g TA-Luft (or equivalent standard). A detailed cost benefit analysis (CBA) is otherwise needed	*All engines are new and emissions optimised. Supplier's specification demonstrate that as a minimum they comply with the BAT '2g' for NO_x to air requirement.*

justifying worse emission such as 4g TA-Luft plant or for example a justification under FCDM.	
13. CBA for improved exhaust emissions, dispersion and mitigations from the plant is expected for the maintenance/testing and the emergency standby roles. We would be looking for improvements particularly if Local Air Quality (LAQ) modelling indicates anything other than an insignificant contribution to short term local air quality for the 'planned' maintenance emissions of the plant.	*See Air Quality Assessment*
14. Retrofit abatement techniques for existing installations for engine emissions	*NA - All combustion equipment under this variation is new.*
15. 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.	*See Main Supporting Document 3.2 – generator testing.*
16. When AQ modelling the emissions from the engines, the certified technical standard provided by the manufacturer should be used	*Certified technical standard provided by the manufacturer have been used as input parameters for the purposes of air quality modelling.*
17. The groundwater monitoring of fuel storage tanks and distribution pipework using GW boreholes is risk based for the site condition report (SCR) and IED 5-yearly monitoring	*See Main Supporting Document 3.4.2 – Fuel Storage and Delivery* *All fuel storage tanks are double skinned above ground and served by leak detection equipment linked to alarms in the relevant the control room.*
18. 10-yearly soil sampling under IED is normally not needed.	*See above*
19. The permit application must assess and provide evidence of actual reliability data for the local electricity grid distribution (including data centre internal electrical design) for the EA to judge the realistic likelihood of the plant needing to operate for prolonged periods in an emergency mode (especially if emissions model so as to exceed short term air quality standards).	*See Main Supporting Document 3.3 – Grid Reliability*
20. Optimising grid reliability within the site as part of general BAT to minimise emergency operating hours is required	*See Main Supporting Document 3.3– Grid Reliability*
21. Reporting of standby engine operational run hours and discussion of any electrical outages (planned or grid failures regardless of duration) required annually.	*Operational run hours is recorded and is reported to the regulator in line with permit requirements*
22. Assuming AQ modelling, based on operating scenarios, indicates a local air quality risk then notification to the EA of unplanned (and pre-notification of planned)	*All unplanned and where required under the permit planned continuous grid outages of greater than 18 hours will be notified to the EA under the reporting procedure in line with the permit requirements.*

continuous grid outage exceeding 18 hours LAQM (or the otherwise assessed short term interval from modelling) is likely required under a permit schedule 5 notification.	
23. The notification requirement stated in the permit should also indicate the actual number of generators that need to be operating above which the local air quality is at risk	*See above*
24. Assuming AQ modelling, based on emergency outage operating scenarios, indicates a very significant risk to local air quality and identified receptors, the EA will ask the operator to have a written AQ outage action plan to manage the issue for prolonged emergency running of the plant (including sensitive receptors list and mitigations, assessments and impacts evaluation against modelled risk conditions	*An air quality management plan has been submitted alongside this variation application (Appendix F).*
25. Due to the emphasis of the permit on electrical (and cooling) systems it is noted that the EA considers the F-Gas regulations as falling under the remit of the EPR permit (for notifications and management) where F-gases (or potentially any polluting potential substance) are used directly under the combustion aspects of the permitted activity (e.g. switchgear). It is important to notify the EA of any significant releases.	*There are formal control procedures for the management of F-Gases on site. With respect to SF-6 each RMU contains less than 200g of gas sealed within the switchgear.*
26. The permit application should detail the likely quantities of waste engine oil generated annually - EWC 13 02 waste oils following servicing for example. Although unlikely to be huge, the Pollution inventory has a reporting threshold of 1 tonne for non-hazardous waste but technically no lower thresholds for hazardous waste oil.	*Waste engine oil volumes are recorded and reported as part of the pollution inventory recording where quantities exceed the relevant thresholds.*
27. Commercial in confidence and Critical National Infrastructure	*The Spring Park application to vary the permit is not subject to commercial in confidence however due to the customers occupying the data centres it is considered critical national infrastructure.*

The following……

Ideally a target should seek to keep individual generator testing (at any load) to below 50 hours/annum each
Each generator typically runs for <5 hours a year with a cumulative run-time of <300 hours a year for the full deployment of generators.

Scheduling Plan for testing - 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 times to avoid adding to “at risk” high ambient pollutant backgrounds levels.

The illustrative testing schedule is shown in the last sheet of the Generator Schedule worksheet provided as Attachment (Appendix C iii). The testing schedule shows that maintenance testing is carried out such that no module testing overlaps, the lowest number of generators for each module are tested for each type of test at any one time
The EA expects the site's management system to embrace aspects of environmental impacts
See Main Supporting Document 3d – Management Systems

Planned audits look at: 1. The most important data centre specific audit would be maintenance/testing run hours procedure so as to minimise impacts to local air 2. Oil storage regs 3. Hazardous waste control (i.e. waste engine oils) 4. EMS (including SCR maintenance) and reporting requirements (annual report and operating hours, possibly Pollution inventory) 5. Oil spills etc 6. F-gas releases 7. Noise complaints 8. Electrical infrastructure maintenance plans to minimise data centre (non-grid) outages
See Main Supporting Document 3d – Management Systems. A planned audit schedule will incorporate all subject areas highlighted above. The site will be subject to regular external compliance audits in addition to BSi certification/surveillance audits.

Combustion plant for new Data Centres generators would be to the latest emission standards for standby plant unless otherwise justified under BAT
All engines are new and emissions optimised. Supplier's specification demonstrate that as a minimum will comply with the BAT '2g' for NO_x to air requirement.

It is appropriate to consider BAT for the adequate dispersion of exhaust emissions as part of the permit application: 1. Increased stack height 2. Vertical ports 3. Increased distances from buildings to be above roof line 4. Common windshield combining several individual flues
See Appendix D Air Quality Assessment – SQ17 has increased stack heights over previous installations dispersion is demonstrated to be effective

Generally same rules acceptable for planning though clearly noise control is a BAT issue within the permit application
See Appendix E Noise Assessment

Fuel Storage - Bunding and management control for deliveries are expected in the permit application.
See Main Supporting Document 3.4.2 – Fuel Storage and Delivery and Appendix F CIRIA Containment Assessment.

Air quality impacts need to be modelled to justify permitting the operation (testing and grid outage).

1. Maintenance Schedule Model - the predictable, managed testing and maintenance activity for the standby plant (including some scope for changes and flexibility), and then 2. Outage Model - the unpredictable emergency grid outage any time during the year requiring the maximum plant to operate for the required outage duration i.e. 'likely maximum' specified by the company. 3. Non-emergency Elective Power Model
See Appendix D Air Quality Assessment

Annual report for Data Centres is mainly a summary of how the year was managed; and is best focused on the BAT type aspects on minimising emissions impacts: 1. Confirming the run hours per engine and how this is apportioned to testing and outage (and possibly elective power operations); any part-site/whole site blackout test and their scheduling with regards to the AQ modelling – is maintenance testing changing significantly to what was modelled? 2. Grid and internal electrics reliability issues (are you getting more brown outs and asking Grid to investigate their kit?) 3. Re-iterate any in-year notifications of grid outages and hence any need to operate in anger; and total plant emergency hours run (how close to the 18hours?) 4. Advising of future plans i.e. need to run due to servicing the switch gear, new phases being planned, reconfiguration of generators e.g. 2n going to an n+1 etc 5. Procedure reviews related to the permit 6. Confirming no incidents (oil spills, F-gas releases etc) 7. General aspects of fuel and energy efficiency
An annual report will be prepared in line with these requirements and those specified within the permit, in the format used under the existing permit.

An EA IED permit includes some standard conditions and the general requirement for the 4-yearly permit review requirements for 1.2.1 Energy Efficiency; 1.3.1 Efficient use of raw materials; and 1.4.2 Avoidance, recovery and disposal of wastes produced by the activities
Periodic audits and reviews are undertaken in line with specified issued and reporting periods within the permit.

Minimise overall energy demand under various routes other than EPR i.e. the CCA or perhaps general standards like 9001, 14001 and 50001
The site is subject to CCA and operates certified systems to the following standards: *ISO 9001:2015 – Quality Management System* *ISO 27001: 2013 – Information Security Management System* *ISO 22301:2012 – Business Continuity Management System* *ISO 14001:2015 – Environmental Management System* *ISO 50001:2018 – Energy Management System*