SSSI Assessment for permit/licence and deployment applications	Cyfoeth Naturiol Cymru Natural Resources Wales

Part 1 – SSSI Assessment

1. Permitting officer/team	Jennifer McGuire Lead Specialist Officer, Installations & RSR Permitting Team
2. Permit application reference and site name	Normal Permit Variation Application – Newport Data Centre Application reference : PAN-026559 Permit number : EPR/BB3599CW
3. a. SSSI name(s) **b. location** **c.NRW Operational Area/Environment Team**	a.Gwent Levels – St Brides b. Newport, South Wales c. Blaenau Gwent, Caerphilly & Newport
4. Brief description of proposal	The Operator, Vantage Data Centers (UK) Limited, has applied for a normal variation to their existing permit which currently allows them to operate 202 back-up generators which will provide power in the event of a power supply failure from the National Grid at Newport Data Centre (CWL11 and CWL12) in Newport, South Wales (permit number EPR/BB3599CW/V003). The permit relates to only this combustion activity, not the Data Centre operation itself. The only planned operation of these engines will be for testing/maintenance. The testing regime is not proposed to be changed as part of this variation and will remain as follows: - Quarterly individual engine testing (2 x 2 hour per year and 2 x 15 min per year) - "Black Building testing" which will be where engines are tested in their cells (groups of 4-9 engines) twice per year (15 mins) Other than this, apart from very minimal additional testing should there be any faults or unplanned maintenance (which will be short duration) the engines will remain off, and retained for emergency use only. Emergency use is considered to be very unlikely and there are extensive measures in place (in line with Best Available Techniques for the sector) to minimise the likelihood and duration of any national grid power failure (e.g. dual HV connection direct to "super grid" each of which is capable of powering the entire site, extensive inventory of electrical spares on site, etc – as further detailed in previous permit applications).

	Should emergency operation be required, generators would operate in emergency mode. Initially all 202 engines would run, and after 10 minutes the number of engines would reduce to the actual site load (there are redundant engines per cell, and the actual power requirement may also be below the maximum rating). This would be a significant event for the site, and for the National Grid network, and would be immediately reported to NRW and managed as necessary as an incident. Of the 202 generators permitted, the Operator has installed 123. Due to generator design developments, the Operator has proposed to change the permitted specifications of the remaining generators to be installed and reduce the total number of generators from 202 to 194. The current permit includes a 75% load constraint for the engines added under the previous variation (V003) which includes the CWL11 expansion and entire CWL12. This application is also to remove the load constraint for 41 of the installed engines and the 71 new engines to be installed. It is proposed these will have a similar aggregated thermal input to that already permitted at 519 MW, although the current permitted engine arrangement has an actual total thermal input under this permitted limit of 415.3 MW due to loading constraints. Therefore the change will mean an increase of 104 MWth input. The new engines will normally run on Hydrotreated Vegetable Oil (HVO), but low sulphur conventional diesel may be used as a secondary backup fuel. They will be fitted with Selective Catalytic Reduction (SCR) for NOx emissions abatement. As per the existing permit, each generator will operate for less than 500 hours per year and will be considered Limited Operating Hours Medium Combustion Plant (MCP) and exempt from the emission limit values within Schedule 25A of EPR. The emissions in the exhaust gas will comprise of: • Oxides of nitrogen (NO_X as NO2) • Particulate matter (PM) • Carbon Monoxide (CO) • Sulphur Dioxide (SO2) • Carbon Dioxide (CO2) The operator also operates another data centre, “CWL13”, located to the east of the site which is permitted for 60 emergency generators with a thermal input of 179 MWth (permit number EPR/CB3895HY). This site will be assessed in-combination but reference is also made to it within the alone assessment. The installation is with close vicinity (550m at its closet point) to the Gwent Levels – St Brides SSSI and so a SSSI assessment is required.

5. What aspects of the proposed permission are likely to damage the SSSI features of special interest?

Gwent Levels – St Brides SSSI is designated an an example of one of the most extensive areas of reclaimed pasture in the UK. The reens are rich in plant species and communities and many nationally rare or notable species are present. Further information on the sites features can be found in the Gwent Level – St Brides SSSI Citation.

The following activities are likely to cause damage:
The installation is located approximately 550m from the site and hence the activity is not likely to damage any of the flora, fauna or geological or physiological features which are of special interest from disturbance, habitat loss or physical damage which are typically associated with direct activity within a protected site boundary.

There are no new/changes to emissions to water proposed as part of this permit variation. The only emissions to water will be uncontaminated surface water run-off which is already permitted. All potentially polluting hazardous substances will be suitably stored and contained to effectively minimise the risk of accidental release to water. Therefore the activity is not likely to damage any of the flora, fauna or geological or physiological features which are of special interest as a result of changes to any watercourses (flow regimes, thermal regimes, siltation etc).

There are changes to emissions to air as a result of the variation. The emissions in the exhaust gas will comprise of:

- Oxides of nitrogen (NO_X as NO2)
- Particulate matter (PM)
- Carbon Monoxide (CO)
- Sulphur Dioxide (SO_2)
- Carbon Dioxide (CO_2)

On the new engines, SCR abatement is proposed (which will use AdBlue) to reduce NO_X emissions which may lead to emissions of ammonia (NH_3) should “ammonia slip occur”. However the applicant has screened out this risk due to secondary abatement proposed in the form of an “Ammonia Slip Catalyst” which will capture any un-used ammonia from the SCR abatement process. A statement from the SCR supplier (IMS Eco SCR systems) has been provided to confirm this and details the monitoring systems in place to identify ammonia emissions, in the very unlikely event they should occur. We are in agreement of this approach in this instance and conclude there is no risk of likelihood of damage to the site form NH3 emissions from this proposal for both emergency and testing scenarios.

The applicant has also screened out SO2 emissions from detailed assessment on the basis that HVO will used which has a very low sulphur content (note that ultra-low sulphur diesel may be used in place of HVO and the air quality assessment has been based on this as a worst case scenario although suplhur emissions are still expected to be extremely low) . They have instead used the modelled results for NOX and the sulphur content calculate / demonstrate low sulphur emissions (e.g. 0.0566 µg/m^3 for a single engine). Due to the nature of the testing and emergency operational use, short term environmental standards are the most relevant for assessing impact. There is no short term environmental standard for SO2. When considering all these factors, we conclude there is no likelihood of damage to the site from SO2 emissions.

The principle emission on concern is NO_X. Emissions of this substance could could damange features via toxic contamination from airbourne concentrations and nutrient enrichment and/or acidification from deposition.

The following operations requiring consent (ORC) is relevant for consideration for this assessment:
"7 Dumping, spreading or discharging of any waste materials"
This ORC is relevant for the spreading of air pollutants described above.

The following SSSI(s) features and potential impacts have been considered to assess the likelihood of damage:

The site's features include standing water, an assembledge of aquatc and marginal plant species, and nationally scares vascular planst species which may be sensitive to the impacts of NO_X emissions.

The applicant has provided a detailed assessment of NO_X impacts, using detailed modelling to determine the significance of the NO_X emissions and deposition against the relevant environmental standards in line with relevant guidance[1]. Impacts of testing and emergency usage have been assessed.

Please refer to the air quality modelling report for a full description of modelling approach[2]. We are in agreement with this approach. The assumptions underpinning the model have been checked and are reasonably precautionary. The way in which the applicant used dispersion models, its selection of input data, use of background data and the assumptions it made have been reviewed by Natural Resources Wales modelling specialists to establish the robustness of the applicant's air impact assessment. These checks indicated that we are in general agreement with the modelling results and as such, they have been used to support this HRA assessment.

The air quality modelled has calculated process contributions (PC) and predicted environmental concentrations (PEC) at locations within the Gwent Levels St Brides SSSI and compared them against the relavent environmental standard to predict if impacts are to be significant using the accepted guidance on determining significance of air quality modelling results[2]. Impacts can generally be screened out as insignificant where they are under 10% for short term impacts and 1% for long term impacts (please refer to guidance for further information).

Note that where applicant has provided results for CWL11 and CWL12 separately, results have been added together by NRW to demonstrate impact from the whole site. Results discussed represent maximum point of impact within the site's boundary.

1. Testing

1.1. Toxic contamination from airborne NO_X – short term assessment

For the short term (daily mean) assessment, the quarterly tests and black building tests have been assessed separately.

Quarterly tests
Emissions of NOX from were assessed against a short term critical level of 200 micrograms per cubic metre (µg/m^3). Whilst the standard critical level for NO_X for protected sites is usually 75 µg/m3, 200 µg/m^3 has been used where ozone is below the AOT critical level and sulphur dioxide is below the critical level of 10 µg/m^3. This approach is line with guidance and NRW are in agreement with the critical level used.

[1] Environmental permitting: air dispersion modelling reports - GOV.UK
[2] PAN-026558 - Vantage Newport_Air Quality Impact Assessment_v2 FOR ISSUE.pdf

The maximum short term process contribution (PC) (1.4 µg/m^3)[3] was predicted to be less than 10% of the critical level. Therefore, in accordance with the relevant guidance, impacts can be considered insignificant.

Black building tests

Emissions of NO_X were assessed against short term critical level of 200 µg/m^3. The maximum short term PC (3.65 µg/m^3)[3] was predicted to be less than 10% of the critical level. Therefore, in accordance with the relevant guidance, impacts of air pollution from NO_X can be considered insignificant.

1.2. Toxic contamination from airborne NO_X – long term assessment

Long term assessment (annual mean) of testing impacts included both testing scenarios (quarterly and black building tests).

Emissions of NO_X were assessed against the long term critical level of 30 µg/m^3. The maximum long term PC (0.00505 µg/m^3) was predicted to be less than 1% of the critical level. Therefore, in accordance with the relevant guidance, long term impacts can be considered insignificant.

1.3. Nutrient enrichment from NOX deposition

NO_X deposition has been assessed against a minimum critical load of 2 N kg/ha/yr. The applicant has explained that APIS had no critical loads listed for this site as the time of the assessment so this critical load has been chosen for assessment to be conservative. For this site APIS suggests seeking site specific advice, however in this instance we are in agreement of the critical load used for initial assessment purposes as it is highly conservative.

The applicants assessment reported that maximum PC (0.003516N kg/ha/yr) was predicted to be less than 1% of a critical load of 2 N kg/ha/yr. Therefore, in accordance with the relevant guidance impacts can be considered insignificant.

1.4. Acidification from N and S deposition

For the purposes of screening the predicted impact of acid deposition, it is necessary to using the APIS Critical Load Function Tool to see if there is a risk of the minimum critical load range for acidity being exceeded.

At the time of this assessment, there were no acidity critical loads listed on APIS for the Gwent Levels St Brides SSSI although the applicant has stated they have used critical loads which were listed on APIS (no feature specified) when they carried out their assessment in May 2024. The critical load range used was a minimum critical load of MinCLminN: 0.321 keq/ha/yr, MinCLMaxS: 0.280 keq/ha/yr and MinCLMaxN: 0.601 keq/ha/yr and and a maximum critical load of MaxCLminN: 0.321 keq/ha/yr, MaxCLMaxS: 0.901 keq/ha/yr and MaxCLMaxN: 1.222 keq/ha/yr.

In most cases where there are no critical loads listed for acidity, acidity impacts can be screened out on the basis of an assumption of no sensitivity or lack of known sensitivity. Therefore in this instance and in

[3] Note that result is for CWL11, CWL12 and CWL13 as this was the only result provided by the applicant for individual testsing. Although CWL13 is technically a different installation, due to the very close proximity of the site and how it is permitted for the same activity, it is considered these results are suitable to use for assessment in this instance.

accordance with technical advice, we consider the critical load values used acceptable (and precautionary) for the purpose of screening.

Maximum predicted combined N and S deposition PC has been calculated to be 0.003536 keq/ha/yr.

The APIS website does not list the background concentrations for the SSSI. We have therefore used the background concentrations used by the applicant which we have determined to be acseptable for the use of assessment: N deposition 0.975 keq/ha/yr and S deposition 0.208 keq/ha/yr.

The background concentrations of N and S and predicted PC have been inputted into the Critical Load Function Tool on APIS to check whether the Predicted PC falls within the "envelope of protection" where the critical loads are not exceeded. The Critical Load Function Tool shows that the predicted PC falls far below the minimum critical load range and no exceedance of the critical load will occur. PC has been calculated to be less than 1% of the critical load and therefore, in accordance with the relevant guidance impacts can be considered insignificant.

2. Emergency Operation – 1 hour

2.1. Toxic contamination from NO_X – short term assessment

Emissions of NO_X were assessed against a short term critical level of 200 µg/m^3. As discussed, this approach is line with guidance and NRW are in agreement with the critical level used.

The maximum short term PC (128.7 µg/m^3) was predicted to be more than 10%. Therefore, in accordance with the relevant guidance, impacts cannot be considered insignificant. Detailed modelling has calculated that the maximum short term PEC (Predicted Environmental Concentration i.e. PC and background concentration) is 83% of the short term critical level. This indicates, that when considering existing background concentrations, there is no risk of the critical level being breached during a 1 hour emergency event.

2.2. Toxic contamination from NOX – long term assessment

Emissions of NO_X were assessed against a long term critical level of 30 µg/m^3. As discussed, we are in agreement with the critical level used.

The maximum long term PC (0.04147 µg/m^3) was predicted to less tha than 1%. Therefore in accordance with relevant guidance, impacts can be screened out as insignificant.

2.3. Nutrient enrichment from NOX deposition

NOX deposition has been assessed against a minimum critical load of 2 N kg/ha/yr. As discussed, we are agreement with the critical load used.

The applicants assessment reported that maximum PC (0.04147N kg/ha/yr) was predicted to be more than 1% of the critical load (2.1%). Therefore, in accordance with the relevant guidance impacts cannot be considered insignificant. Detailed modelling has calculated that the maximum short term PEC is 23% of the short term critical load. This indicates there is no risk of a significant breach of the critical load.

2.4. Acidification from N and S deposition

The applicant assessed acidification against a minimum critical load range of MinCLminN: 0.321 keq/ha/yr, MinCLMaxS: 0.280 keq/ha/yr and MinCLMaxN: 0.601 keq/ha/yr and and a maximum critical

load of MaxCLminN: 0.321 keq/ha/yr, MaxCLMaxS: 0.901 keq/ha/yr and MaxCLMaxN: 1.222 keq/ha/yr which as discussed above we agree with in this instance.

Maximum predicted combined N and S deposition PC has been calculated to be 0.04147 Keq/ha/yr.

The background concentrations of N and S (refer to discussion around background concentrations above for the testing scenario) and predicted PC have been inputted into the Critical Load Function Tool on APIS to check whether the PC falls within the "envelope of protection" where the critical loads are not exceeded.

The Critical Load Function Tool has determined that although the PC is more than 1% of the minimum and maximum critical loads and so cannot be screened out as insignificant, the PC falls within the "envelope of protection" and there is no anticipated breach of the critical load function.

3. Emergency operation – 72 hour

3.1. Toxic contamination from NO_X – short term assessment

Emissions of NO_X from were assessed against a short term critical level of 200 µg/m^3. As discussed, this approach is line with guidance and NRW are in agreement with the critical level used.

The maximum short term PC (3095 µg/m^3) was predicted to be more than 10%. Therefore, in accordance with the relevant guidance, impacts of air pollution from NO_X from operating for 72 hour in an emergency cannot be considered insignificant. Detailed modelling has calculated that the maximum short term PEC is 1548% of the short term critical level. This indicates a risk of a significant breach of the critical level in the event of a 72 outage.

We do not normally assess the impact of unexpected emergency emissions and an appropriate approach is needed for back-up engines. Emergency operation of all of the engines to provide backup power is a very rare event (estimated to be 1 in 20 year event for 2 hours of emergency operation for the previous permit application). The National Grid reliability of the high voltage transmission system to which the data centre is connected is >99.999%.

Statistical calculations made by the operator (for previous applications for this site) determined probability of a breach of the human health NO_X standard at much closer receptors (less than 200m) puts the probability of exceedance at considerably less than 1%, based on the number of hours per year when dispersion characteristics mean that the critical level would be exceeded. It is considered that the likelihood of exceedance of the critical level at this site during infrequent emergency operation is similarly low.

Detailed modelling which considers every year of operation for 5 years of meteorological data, has found that the absolute maximum impact on the Gwent Levels St Brides SSSI could be above the short term critical level, at 3095 µg/m^3 as a daily average based on the engines running for 72 hours. However, for this impact to occur, worst case weather (dispersion) characteristics would have to occur for the full 72 hours at the same time as a very rare power supply interruption.

There are no standard permitting criteria for assessing risk from possible, but unlikely emergency events. Given that a long term air emission level is regarded as insignificant if it is less than 1% of the critical level, it is considered that a less than 1% likelihood of exceedance in an emergency is similarly an insignificant risk to the protected site. Permit conditions limit the number of hours of emergency operation, and permit conditions would be reviewed if the likelihood of emergency operation substantially changed.

This assessment is considering the impacts of a 72 hour outage. This is a recent requirement which has not been assessed during previous applications and is based on the most recent guidance for data centres[4]. For the previous variation, the HRA only considered the impacts of a 1 hour outage (in line with guidance at the time of assessment). Results from the air quality modelling submitted to support the previous variation application predicted a breach of the short term critical level in the event of a 1 hour outage although for similar reasons to those discussed above, there was not considered to be a risk of adverse integrity on the site. It has not been possible to model a like for like comparison of the already permitted engine arrangement against the proposed, but emissions from the 1 hour scenario have been shown to not predict an exceedance of the critical level. This indicates the variation will result in a *reduced risk* of air quality impacts in the event emergency use of the generators is required. The above assessment has also demonstrated that the impact of the engine testing can be screened out as insignificant. This is of most importance, as it is certain to occur.

The existing permit includes additional controls to protect the environment in the event of emergency operation. These include an Air Quality Management Plan (AQMP) which requires the operator to notify NRW in the event of any emergency operation. The limits of the permitted activity specifically state that emergency generation shall cease or be reduced if there is credible information that there may an immediate significant adverse effect on the environment (detailed in the permit's Table S1.1). These controls will remain in the permit following the variation.

For these reasons, we do not consider there to be a risk of likely damage any of the flora, fauna or geological or physiological features which are of special interest.

3.2. Toxic contamination from NO_X – long term assessment

Emissions of NOX were assessed against the long term critical level of 30 µg/m^3. The maximum long term PC (4.27 µg/m^3) was predicted to be more than 1% of the critical level. Detailed modelling has calculated that the maximum short term PEC is 76% of the long term critical level. This indicates there is no risk of the long term critical level being breached during a 72 hour emergency event. However, for reasons discussed above (see section 3.1), we do not consider there to be a risk of likely damage any of the flora, fauna or geological or physiological features which are of special interest.

3.3. Nutrient enrichment from NO_X deposition

NO_X deposition has been assessed against a minimum critical load of 2 N kg/ha/yr.

The applicants assessment reported that maximum PC (2.985 N kg/ha/yr) was predicted to be less than than 1% of a critical load of 20 N kg/ha/yr. Assessment of the predicted PC against a critical load of 10 N kg/ha/yr results in a PC contribution which is still over 1% (149%).

This indicates there is a risk of the critical load being breached during a 72 hour outage. However, for reasons discussed above (see section 3.1), we do not consider there to be a risk of likely damage any of the flora, fauna or geological or physiological features which are of special interest.

3.4. Acidification from NOx and SO2 deposition

The applicant assessed acidification against a minimum critical load range of MinCLminN: 0.321 keq/ha/yr, MinCLMaxS: 0.280 keq/ha/yr and MinCLMaxN: 0.601 keq/ha/yr and and a maximum critical

[4] Environment Agency Data Centre FAQ Headline Approach v21 (15/11/2022)

load of MaxCLminN: 0.321 keq/ha/yr, MaxCLMaxS: 0.901 keq/ha/yr and MaxCLMaxN: 1.222 keq/ha/yr which as discussed above we agree with in this instance.

Maximum predicted combined N and S deposition PC has been calculated to be 2.985 Keq/ha/yr.

The background concentrations of N and S (refer to discussion around background concentrations above for the testing scenario) and predicted PC have been inputted into the Critical Load Function Tool on APIS to check whether the PC falls within the "envelope of protection" where the critical load is not exceeded. This and the applicants modelling (which reported PEC to be 201% and 197% of the critical load for CWL11 and CWL12 respectively) indicates there is a risk of the critical load function to be significantly exceeded. However, for reasons discussed above (see section 3.1), we do not consider there to be a risk of likely damage any of the flora, fauna or geological or physiological features which are of special interest.

6. Summary of any informal advice received from internal experts (if required and including pre-app advice)	Heather Galliford (13/12/2024) – confirmation the applicant's acidity critical loads are appropriate to use for the purpose of assessment.
7. Recommendation	The proposed permission is **not likely to damage** any of the flora, fauna or geological or physiological features which are of special interest where: • Impacts from the testing of the engines have been screened out as insignificant. This part of the assessment is of most importance as it is certain to occur • Impacts from the use of the emergency generators for 1 hour have been shown to not result in a breach of the revlevent environmental standards. The SSSI Assessment for the already permitted scenario indicated potensial breaches in this scenario and so this variation is likely to result in better air quality impacts in the event of emergency us • Impacts from the use of the emergency generators for 72 hours have been shown to potensially result in breaches of the relevant environmental standards. However, the use of the engines for back up power is considered an extremely rare event, especially for 72 hours and the modelling results are based on worst case metrological conditions. Furthermore there are permitting controls in place, which will not be changed as part of the variation, to protect the environment in the event of an outage.
8. Signature and date assessment made	Jennifer McGuire 10/01/2025
9. Officers name and job title	Jennifer McGuire Lead Specialist Officer, Installations and RSR Permitting