

Next Generation Data Limited – Newport Data Centre

Decision Document

DRAFT

Contents

Glossary of acronyms used in this document.....	4
New Bespoke Permit.....	5
1.Our decision	5
2. Purpose of this document.....	6
3. Key issues of the decision	7
3.1 What the installation does	7
3.2 Receipt of application	9
3.3 Key Issues in the Determination.....	9
3.4 Consultation	9
3.5 Requests for further information.....	10
4. Operator	11
5. Legislation	11
6. The Regulated facility	12
6.1 The site	12
6.2 Site condition report	13
6.3 Closure and decommissioning	13
7. Biodiversity, Heritage, Landscape and Nature Conservation	14
7.1 Sites considered.....	14
7.2 Habitat risk assessment	15
7.3 Non – Statutory sites.....	20
8. Environmental Risk Assessment	21
8.1 Assessment of impact on Air Quality	21
8.2 Emissions to surface water	25
8.3 Emissions to sewer	26
8.4 Emissions to soil and groundwater	26
8.5 Fugitive emissions.....	27
8.6 Odour	28
8.7 Noise	28
9. Monitoring.	33
10. Reporting.....	34
11. Operating techniques	35
12. Energy efficiency	38
13. The permit conditions	40
13.1 Improvement conditions	40
13.2 Incorporating the application	40

14.Operator Competence.....	40
14.1 Environment management system.....	40
14.2 Relevant convictions	40
14.3 Financial Provision	41
14.4 OPRA.....	41
ANNEX 1: Improvement Conditions.....	42
IC1	42
IC2	42
IC3	42
IC4	43
ANNEX 2: Consultation Reponses.....	43
A) Advertising and Consultation on the Application.....	43
1) Consultation Responses from Statutory and Non-Statutory Bodies.....	43

Glossary of acronyms used in this document

(Please note that this glossary is standard for our decision documents and therefore not all these acronyms are necessarily used in this document.)

BAT	Best Available Technique(s)
CROW	Countryside and rights of way Act 2000
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
ELV	Emission limit value
EPR	Environmental Permitting (England and Wales) Regulations 2016
EQS	Environmental quality standard
IED	Industrial Emissions Directive (2010/75/EU)
NO _x	Oxides of nitrogen (NO plus NO ₂ expressed as NO ₂)
OPRA	Operator Performance Risk Appraisal
PC	Process Contribution
PEC	Predicted Environmental Concentration
PHW	Public Health Wales
SAC	Special Area of Conservation
SCR	Selective catalytic reduction
SPA(s)	Special Protection Area(s)
SSSI(s)	Site(s) of Special Scientific Interest
TGN	Technical guidance note

New Bespoke Permit

The permit number is: EPR/xxxxxxx

The operator is: Next Generation Data Limited

The Installation is located at: Newport Data Centre, Imperial Park, Celtic Way, Marshfield, Newport, NP10 8BE.

1. Our decision

We have decided to grant the permit for Newport Data Centre operated by Next Generation Data Limited.

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.

2. Purpose of this document

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

This document should be read in conjunction with the application & supporting information and the Permit.

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

3. Key issues of the decision

3.1 What the installation does

The permit application is for 77 standby diesel generators with an aggregated thermal input rating of 146 MW. The generators will provide back-up generation in the event of a power failure supply at the data centre from the National Grid. Each generator has its own individual stack. Stack heights range from 3.937m to 3.184m.

There are two possible operating scenarios:

- Emergency operation in the event of a power failure. This is a rare scenario. (National Grid had a reliability of 99.999964% in 2016/17).
- Operation for testing and maintenance comprising quarterly servicing and “black building” tests- There are 5 generator (engine) types in total with varying thermal inputs (MWth), specifically: Perkins 4006-23TAG3A(1.970 MWth) installed at cells GF1 and GF2 (10 generators in total), Kohler MTU 12V1600G20F-E (X715C2)(1.457 MWth) installed at cells GF14-17, GF19, GF20 and GF21 (29 generators in total), Volvo PentaTAD 1642GE(1.311 MWth) installed at cells GF24 and GF29 (18 generators in total), MitsubishiS12R-F1PTAW2 (T1650C)(3.226 MWth) installed at TF1 (5 generators in total) and Kohler KD45V20-5DEP (2.987 MWth) installed at TF2, TF3 and TF4 (15 generators in total). Generators are grouped into 12 different cells. Each cell has a group of one engine type.

The permit and planning permission prevent the operator from testing more than two generator cells (power trains) at any one time. It is also prevented from testing outside the hours of 09:00 and 17:00 Monday to Friday, inclusive of bank and public holidays.

Each cell (bank of generators) has its own fuel storage tank, made up of two separate inner tanks. Each generator has a smaller day tank. The generators and fuel tanks are situated on concrete plinths, surrounding by hardstanding. The generators and tanks are within integrally-bunded metal containers, and the fuel supply system is made up of double skinned pipes. All activities on site occur on hardstanding. There are no bulk

fuel storage facilities. All fuel storage tanks are small and situated close to the point of use. All fuel storage tanks are stored on an impermeable surface with sealed drainage.

The emissions from the exhaust gas will comprise of:

- Oxides of nitrogen (NO and NO₂ expressed as NO₂ (NO_x))
- Particulate Matter (PM)
- Carbon Monoxide (CO)
- Carbon Dioxide (CO₂)
- Sulphur Dioxide (SO₂) (low sulphur fuel will be used, 0.1%)

Raw materials will consist of diesel, engine oil/lubricants and antifreeze/coolant. Waste will be kept to a minimum. Condition 1.4.1 of the permit requires the operator to apply the waste hierarchy from Article 4 of the Waste Framework Directive. Any waste generated will be disposed of via a licenced contractor.

The main wastes produced by the installation are waste oils and filters associated with the operation and maintenance of the generators. These are stored temporarily in a bunded and secure building of approximately 36m³. This is used during generator maintenance. Every 2.5 – 3 years waste antifreeze is also generated and Recycled.

Annual Waste Generation Description	EWC Code	State	Fate	Quantity (kg)
Engine oil	13-02-05*	Liquid	Recycling	5,310
Oil filters	16-01-07	Mixed	Recycling	275
Fuel/air/water filters	15-02-02	Solid	Disposal	290
Antifreeze	16-01-15	Liquid	Recycling	930
Electrical parts	16-01-09	Solid	Disposal	300
Other	Various	Solid	Disposal	15

The only surface water drainage from site will be uncontaminated surface water run-off discharging to the sites drainage system. A drain isolation system is in place which can detect spills. 'Bladders' located within the pipes will inflate and capture the contaminated water within the drainage system which can then be pumped out and disposed of appropriately.

3.2 Receipt of application

The Application was received on 29th November 2018 and was duly made on 7th February 2019 following the receipt of additional information. This means we considered it was in the correct form and contained sufficient information for us to begin our determination, but not that it necessarily contained all the information we would need to complete that determination.

3.3 Key Issues in the Determination

The key issues arising during this determination were;

- Data centre approach – permitting and regulation of data centres. Applications for data centres are novel applications. The Environment Agency has developed the 'Data Centre FAQ Headline Approach' guidance document which Natural resources Wales has adopted.
- Best Available Techniques for data centres.
- Air quality scenarios (testing, maintenance and grid outage).
- Noise assessment (testing, maintenance and grid outage) and predicted impacts.

We therefore describe how we determined these issues in more detail in this document.

3.4 Consultation

The consultation requirements were identified and implemented. The decision was taken in accordance with EPR RGN 6 "Determinations involving Sites of High Public Interest", our Public Participation Statement and our Working Together Agreements.

A copy of the Application and all other documents relevant to our determination (see below) are available for the public to view. Anyone wishing to see these documents could arrange for copies to be made.

We sent copies of the Application to the following bodies, which includes those with whom we have “Working Together Agreements”:

- **Newport County Council Planning Authority**
- **Newport County Council Environmental Protection Department**
- **Food Standards Agency**
- **Aneurin Bevan University Health Board**
- **Public Health Wales (PHW)**
- **Health and Safety Executive**

These are bodies whose expertise, democratic accountability and/or local knowledge make it appropriate for us to seek their views directly.

The consultation started on **13/02/2019** and ended on **13/03/2019**. An advert was also placed on our website.

On completion of the draft determination, we advertised this draft determination on our website from xxxxxxxx until xxxxxx. No responses were received.

Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 2. We have taken all relevant representations into consideration in reaching our determination.

3.5 Requests for further information

The application was submitted on 29th November 2018 and was duly made on 7th February 2019. As is common with these types of application, further information was required to enable final determination of it. We issued three ‘Notices requiring further information’ (Schedule 5 Notice) on the 11th April 15th August and 14th October 2019, requesting further information in relation to the applicant’s air quality and noise modelling and assessment.

The Applicant submitted the response to the first Schedule 5 notice on the 15th, 17th, 25th and 29th July 2019. The response to the 2nd Schedule 5 notice was received on

the 6th September 2019. The 3rd Schedule 5 notice was received 28th October 2019 with revised information provided on the 26th November 2019. Supporting modelling files were provided on the 9th December 2019. The responses received satisfied all notices.

4. Operator

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 EPR RGN 1 “Understanding the meaning of Operator”.

5. Legislation

NRW is satisfied that this decision is compatible with its general purpose of pursuing the sustainable management of natural resources in relation to Wales and applying the principles of sustainable management of natural resources

All applicable European directives have been considered in the determination of the application.

The applicability of the following European directives has particular relevance to combustion plant applications. We have therefore assessed their relevance to this particular Permit as follows:

- [Industrial Emissions Directive 2010/75/EU \(IED\)](#)

The total rated thermal input of the combustion plant at the site is 146,486MWth. The combustion units each have thermal input capacities ranging from 1.311MWth to 3.226MWth. As each individual generator has a capacity of less than 15MWth, it means that although the facility falls within the remit of Section 1.1 Combustion Activities of the Environmental Permitting Regulations (England and Wales) 2016 (EPR), it does not fall within Chapter III of IED: Special Provisions for Combustion Plants.

The Medium Combustion Plant Directive (MCPD) applies to the facility's combustion plant as they all have a rated thermal input of greater than 1MWth. This was discussed at the pre-application meeting with the operator on 9th March 2018. It was agreed that MCPD requirements are unlikely to have any significant impact on the regulation of the NGD facility due to the low number of operating hours. The combustion plants (generators) will each operate for less than 500 hours per year and will be exempt from complying with the emission limits set out in Part 2 of Annex II. As per the EA's 'Data Centre FAQ Headline Approach' guidance, permits 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 generator emissions monitoring) are not required within the permit. NRW agree that specified generator controls do not apply as the generators fall under Chapter II of the IED; the generators are excluded from these additional controls.

6. The Regulated facility

The regulated facility is an installation which comprises the following activities listed in Part 2 of Schedule 1 to the Environmental Permitting Regulations and the following directly associated activities:

- Section 1.1 Combustion Activities- Part A (1) (a) Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts. The activity is at an existing data centre.

Supported by the following directly associated activities:

- Fuel storage
- Surface water drainage

6.1 The site

The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility.

A plan is included in Schedule 7 of the permit and the operator is required to carry on the permitted activities within the site boundary.

6.2 Site condition report

The operator has provided a description of the condition of the site. Due to the current site condition it is not possible to undertake a ground investigation to ascertain what the current ground conditions are beneath the site. However, from a literature review of the site it is understood that there has not been historical contamination on the site itself and that the presence of made ground is associated with the construction of the building. In the absence of intrusive soil and groundwater investigations and based on the literature review, we consider that the baseline level of contamination at permit issue is zero, in line with our H5 Site Condition Report guidance. As such any pre-existing contamination discovered during a future permit surrender will be required to be remediated to zero contamination levels.

We consider that the description within the baseline site report is satisfactory for the areas of the installation that the combustion plant is situated on, where ground cover is concrete. The operator has confirmed that all the fuel tanks are fully bunded and are on concrete bases (impermeable surface). The decision was taken in accordance with our guidance on site condition reports – guidance and templates (H5).

6.3 Closure and decommissioning

Permit condition 1.1.1a requires the Operator to have a written management system that identifies and minimises the risks of pollution from closure. The operator has agreed to have a site closure plan in place within 6 months of the permit being issued. This is incorporated into Table S1.2 operating techniques so is enforceable.

At the definitive cessation of activities, the Operator has to satisfy us that the necessary measures have been taken so that the site ceases to pose a risk to soil or groundwater, taking into accounts both the baseline conditions and the site's current or approved future use. To do this, the Operator will apply to us for surrender of the permit, which we will not grant unless and until we are satisfied that these requirements have been met.

7. Biodiversity, Heritage, Landscape and Nature Conservation

7.1 Sites considered

The following nature conservation sites are within the relevant screening distances for an EPR installation with discharges to air. Screening carried out from centre of the site NGR ST 28142 84568.

A full assessment of the application and its potential to affect the sites, species and habitats has been carried out as part of the permitting process. We consider that the application will not affect the features of the sites, species or habitats.

Specifically, we looked at the potential impacts on the following:

European Protected Sites: Two SACs were identified within the 10km screening distance from the installation; River Usk and Severn Estuary. The Severn Estuary is also designated as a SPA and RAMSAR Site.

One SSSI was identified within the 2km screening distance from the installation; Gwent Levels – St Brides.

We also considered potential impacts on the following non-statutory sites within the 2km screening distance:

- Local Wildlife Sites: Celtic Springs, LG Duffryn Site 2, LG Duffryn Site 1 (South Lake Drive), Duffryn Pond, Afon Ebbw River, Coed Ffynon-Oer, Cwm Pensidan, Gaer Fort and Court Wood.
- Ancient Woodlands: 12 Ancient Semi Natural Woodland Sites, 10 Restored Ancient Woodland Sites, Plantation on Ancient Woodland Site and Ancient Woodland Site of Unknown Category.

There are no National Nature Reserves or Local Nature Reserves within the 2km screening distance. We have also checked our records for the presence of European

Protected Species (EPS), as defined by the Habitats Directive, within the locality of the Installation. We have no records of any EPS being present in the locality outside the boundaries of the designated sites described above.

7.2 Habitat risk assessment

A detailed air quality assessment was carried out using atmospheric dispersion model (AERMOD) and in line with our guidance. Long term air quality objectives are not relevant to this study due to the very restricted generator run time over the year and hence the short-term nature of the emissions from the generator test regime. A worst-case scenario of all 77 generators being run at the same time for one hour has been modelled along with looking at the testing/maintenance scenarios which will be most common. There are two main operating scenarios; emergency and testing/maintenance (Quarterly servicing and Black building testing).

Quarterly Servicing

NGD has a Maintenance Strategy whereby the assets are serviced on a quarterly basis. Each generator has three minor services and one major service a year:

- two of the minor services require a 2-hour load bank test to be completed after the service (each generator is run for 2 hours individually; individual generators are tested sequentially for 2 hours);
- the other minor service and the major service require the generators to be test-run individually for up to 15 minutes after servicing.

The services requiring the 2-hour load bank test and the 15-minute test runs are carried out in alternating quarters. This testing mode is not carried out at the same time or overlapping with any other testing mode.

Black Building Test

Twice per year per bank of generators (a total of 24 times per year), a controlled mains failure is simulated to prove the system's response. In this test a single data hall powertrain is selected, power to the single data hall powertrain is isolated and the system responds as it would in an emergency scenario. All generators associated with the isolated data hall powertrain fire up during this test, with load shedding down to

the required output occurring within 10-15 minutes. As in a real emergency scenario, the number of generators which would continue to operate after load shedding would vary depending on the client's use of their data racks at that particular time. A maximum of nine generators would be left running, the number of generators being dependant on the size of the data hall powertrain being tested. This testing mode is not carried out at the same time or overlapping with any other testing mode. Only one Black Building test will be carried out per day.

The Applicant has modelled the predicted maximum ground level concentrations of NO_x at the European protected sites listed above and compared them with the relevant NO_x short term daily critical level (CLE) of 75 µg/m³. Only short term CLEs have been considered in our assessment due to the nature of the installation's operating regime.

There are no critical loads to assess against for the River Usk SAC or St Bride's SSSI in regard to acid and nutrient deposition, therefore no further assessment is required. There are critical loads set for species/habitats under the Severn Estuary SAC/SPA/RAMSAR, however, these critical load figures are set for as annual loads (N/ha/yr). As the proposed diesel generators will only be used in emergency situations, there are only short-term concentrations included. As there are no long-term concentrations expected or included there is no comparable PC figures to compare against the annual critical load standards.

Acid deposition is not a concern with an Installation of this type, as diesel is the only fuel, which is low in Sulphur, therefore acid deposition will be insignificant and has been screened out of the below assessments.

7.2.1 River Usk SAC

NO_x

The assessment to consider the impact on the SAC was initially carried out by looking at the nearest designated ecological receptor which was the Gwent Levels – St Brides SSSI which is approximately 700m away from the Data Centre. Further details were provided on the NO_x concentrations at River Usk SAC. The daily mean (short term prediction PC) NO_x concentration at the SAC (nearest point) is 0.2 µg/m³. This is

based on the critical level of $75 \mu\text{g}/\text{m}^3$. As this is less than 10% of the $75 \mu\text{g}/\text{m}^3$ short term CLe, the PC screens out as insignificant.

Nutrient Nitrogen Deposition

There are no critical loads to assess against for this SAC in regard to acid and nutrient deposition, therefore no further assessment is required.

Acid Deposition

No critical loads to assess against for this habitat.

These are results based on the worst-case testing and maintenance scenario (Black Building test scenario). Under an emergency scenario, there are likely to be exceedances of the short-term standard for protected sites. However, this scenario will only happen under emergency situations, Prolonged emergency operations are not anticipated. The facility has a dual connection to the super grid. The probability of an emergency scenario occurring is thus very small; the Office of Nuclear Regulation (ONR) identifies a conservative value for an outage of up to 2 hours as a 1 in 20-year event. Longer events have a lower probability. The potential impact on sensitive receptors in the event of a grid failure would be mitigated by NGD through the implementation of power shedding to provide only the amount of power necessary to meet the facilities' demand at the time. While an outage of a few hours has the potential to occur, the likelihood of that is extremely small. For instance, National Grid reliability was reported to be 99.99964% in 2016/17.

7.2.2 Severn Estuary SAC, RAMSAR, SPA

NO_x

As above, initially the closest receptor of the SSSI was looked at. Further details were provided on the NO_x concentrations at the Severn Estuary SAC. The predicted daily mean NO_x PC at the SAC/SPA/RAMSAR (nearest point) is $2.5 \mu\text{g}/\text{m}^3$ which is 3.3% of the 10% of the $75 \mu\text{g}/\text{m}^3$ short term CLe for protected sites. On this basis, the PC screens out as insignificant and no further assessment is required.

Nutrient Nitrogen Deposition and Acid Deposition

There are critical loads set for species/habitats, however these critical load figures are set for as annual loads (N/ha/yr). As the proposed diesel generators will only be used in emergency situations, there are only short-term concentrations included. As there are no long-term concentrations expected or included there is no comparable PC figures to compare against the annual critical load standards.

As above, these are results based on the worst-case testing and maintenance scenario (Black building testing scenario). Under an emergency scenario, there are likely to be exceedances of the short-term standard for protected sites. As detailed above for the River Usk SAC, there is a small probability of such results occurring during an emergency event, given the very low likelihood of an outage occurring on the hour of least favourable meteorological data in five years.

There are no other Installations (proposals, plans or projects) with similar emissions within the 10km screening distance, therefore no in-combination assessment is necessary, and any similar sites/emissions are already existing and would be included in background. As such the impacts from the Installation on protected European sites can be screened out as insignificant.

On this basis, we consider that there will be no likely significant effect on the interest features of the above protected sites, as a result of the installation's operations.

7.2.3 Gwent Levels – St Bride's SSSI

NO_x

The short-term predicted Process Contribution (PC) from the installation is 12.93% of the 24-hour mean CLe. In this instance as the PC is greater than 10% of the short-term CLe screening threshold, the predicted impact needs to be considered further. A further screening stage examining the PCs added to existing background NO_x concentrations to give a Predicted Environmental Concentration (PEC), was therefore required to determine the likelihood of the CLes being exceeded.

The short-term NO_x PEC is 71% of the 75 µg/m³ short term CLe. We are therefore satisfied that an exceedance of the short term CLe is unlikely and no further assessment is required. The proposed permission is not likely to damage any of the flora, fauna or geological or physiological features which are of special interest under testing and maintenance scenarios. It is also concluded that under an emergency situation there is not likely to be a significant impact as the statistical analysis shows that there is a negligible risk of the process resulting in an exceedance of the standard. In the event of an emergency, this is not likely to be over a long duration and will be a rare occurrence.

Nutrient Nitrogen Deposition

No critical loads to assess against for this habitat.

Acid Deposition

No critical loads to assess against for this habitat.

These are results based on the worst-case testing and maintenance scenario (Black Building scenario). Under an emergency scenario, a significant exceedance of the short-term standard is predicted for protected sites. However, there is a small probability of such results occurring during an emergency event, given the very low likelihood of an outage occurring on the hour of least favourable meteorological data in five years.

The Habitat Risk Assessments (SAC/SPA/RAMSARS) and Crow Assessments (SSSI) are mainly to confirm that the results from the more regular testing and maintenance programs are acceptable. In the rare event of an emergency scenario taking place, all generators will start up initially but will have load shedding within 10-15mins. This scenario could see a significant release in NO_x emissions. However, this scenario will only happen under emergency situations. Prolonged emergency operations are not anticipated, as the facility has a dual connection to the super grid. The probability of an emergency scenario occurring is thus very small. Although not a nuclear site, for context the applicant has referenced the Office for Nuclear Regulation [ONR] loss of off-site power event frequencies for use in nuclear power station safety assessments. The Office for Nuclear Regulation identifies a conservative value for an outage of up

to 2 hours as a 1 in 20-year event. Longer events have a lower probability. The potential impact on sensitive receptors in the event of a grid failure would be mitigated by NGD through the implementation of power shedding to provide only the amount of power necessary to meet the facilities' demand at the time. While an outage of a few hours has the potential to occur, the likelihood of that is extremely small. For instance, National Grid reliability was reported to be 99.99964% in 2016/17.

Improvement condition IC2 requires the operator to develop and submit a site specific Air Quality Management Plan (AQMP) which identifies the emergency operating conditions (grid failure) when Local Air Quality may be adversely impacted by emissions to air from the installation. This will include but not be limited to the following considerations; predicted potential impacts at individual receptors, timescales for response measures, how local conditions during a grid failure might influence the response required, for example meteorological conditions or time of day, contingency for how the response will be carried out in the event scenario (i.e. loss of power and timescales for continued review of the management plan). The agreed AQMP shall be submitted to Natural Resources Wales for approval.

Based on the above, we consider that the special interest features of the SSSI are not likely to be damaged.

7.3 Non – Statutory sites

For non-statutory sites, Natural Resources Wales impact assessment criteria considers whether or not an installation can cause significant pollution. If the process contribution from an installation is less than 100% of the critical level or load for a site, we consider that no significant pollution will be caused.

The Applicant screened for non-statutory sites within a 2km range and included all of the sites in the air dispersion impact modelling carried out to inform both the Habitats Risk Assessment (HRA) and the human health air quality assessment. The impacts to the two closest sites were assessed, Celtic Springs Local Wildlife site and LG Duffryn Site (South Lake Drive) Local Wildlife Site. The impact on the closest non-statutory site was less than 100% of the relevant critical levels (for NO_x) and therefore we are

satisfied that significant pollution will not be caused at any of the non-statutory sites within the 2km screening radius. Critical loads (for nutrient nitrogen and acid deposition) look at the annual load. Given this activity is for back-up emergency operations with short term testing, the critical load is not considered. The modelling looked at a worst-case scenario meaning that max deposition and concentrations were seen at the closest site, so sites that are further away will be less affected.

As with the above designated sites, these results are based on the testing/maintenance scenarios and the impacts will be greater in an emergency situation. However, as detailed above emergency scenarios will be rare and there is an improvement condition (IC2) within the permit to look at managed prolonged emergency events. This condition will help better understand the prolonged impacts, how a response will be carried out and help review of management plans.

8. Environmental Risk Assessment

8.1 Assessment of impact on Air Quality

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the stack and its impact on local air quality.

The Applicant has assessed the Installation's predicted emissions to air against the relevant air quality standards, set for the protection of human health. The primary pollutant of concern is nitrogen oxides (NO_x) resulting from the combustion processes on site.

The atmospheric dispersion modelling was undertaken using the latest version of the US EPA model AERMOD (18081). Modelling was undertaken for the testing/maintenance scenarios as well as the rare event of an emergency situation where all 77 generators will start up initially followed by load shedding.

The data centre is not situated in an Air Quality Management Area (AQMA) and there are no AQMAs within 2km of the site.

The air impact assessment, and dispersion modelling is based on the short-term air quality standards for NO_x. Long term air quality objectives are not relevant to this study due to the very restricted generator run time over the year and hence the short-term nature of the emissions from the generator test regime. The short-term statutory air quality objective for nitrogen dioxide (NO₂) is an hourly average concentration of 200µg/m³, not to be exceeded for more than 18 x 1-hour periods per year. We are in agreement with this approach. We have checked the assumptions underpinning the model and are satisfied that they are reasonably precautionary.

It is expected that combustion plants for new data centres will meet the latest emissions standards for emergency standby plants stipulated in Environment Agency's (EA) 'Data Centre FAQ Headline Approach' guidance which Natural Resources Wales has adopted. The minimum appropriate standard is the 'TA-Luft 2g' standard which requires 2000mg/m³ NO_x, 650mg/m³ for CO, 130mg/m³ for PM and dust and 150mg/m³ for hydrocarbons (at 5% O₂).

Emissions for NO_x, PM and dust are in line with Best Available Technique (BAT) limits detailed in the EA's 'Data Centre FAQ Headline Approach' except for CO. Out of the five generator types, only two have maximum CO emissions values above the indicative 650mg/m³ figure; the Kohler KD45V20-5DEP generators at 667mg/m³, and the Volvo TAD 1642GE at 896mg/m³. However, it is noted that TA Luft 2g specifically states that emission limits for CO do not apply to emergency generators (or generators used for peak shaving for less than 300 hrs per year). As the generators are for emergency use only, we are satisfied that ELV's for CO are not required.

Maintenance testing scenarios

The testing and maintenance operations assessed include the following (detailed in section 7.2 Habitat Risk Assessment):

- Quarterly Servicing
- Black Building Test

For the quarterly testing, no exceedances of the NO₂ hourly threshold (including an allowance for background) were identified at sensitive receptors for the operation of

individual generators during routine testing. No single generators cause an exceedance. Quarterly testing involves only one generator running at a time with no overlap of any other testing scenarios. For Black Building testing however, the highest maximum hourly mean NO₂ concentrations from the simultaneous operation of all generators within a given bank during Black Building Test (mains failure) tests were found to exceed the air quality standard. The worst case selected for modelling purposes is that all generators in a power bank may operate for one full hour. The results for GF21 show the highest maximum nitrogen dioxide concentration (566µg/m³) occurs at Receptor 5, 11 Pencarn Avenue for the maximum hourly nitrogen dioxide.

The Black Building test was assessed in terms of the worst-case testing and maintenance scenario. Given the total 24 hours of testing in a year, there is a potential for the NO₂ hourly objective for human health to be exceeded as described above, albeit an extremely low possibility, as there will only be one black building test (one cell) per day, a total of 24 times per year. To demonstrate this, the hypergeometric mean has been calculated using a precautionary approach, using the result for the GF21 bank of generators which gave the highest number of exceedances in an individual year, at a sensitive receptor. The resultant cumulative probability (which, in order to be legible, is expressed here as an exponential numerical value and not as a percentage), for GF21 clearly demonstrates that the probability that the black start testing could lead to an exceedance of the NO₂ hourly mean objective approaches zero. This is having assumed testing coincides with the least favourable meteorological conditions in a five-year period and that all 24 black start tests would apply to the same, least favourable bank of generators (an implausible scenario). Modelling was based on one hour of testing. It was later confirmed that there is likely to be only be 15 minutes testing in a single day for black building testing, but worst case 1-hour scenario has been assessed. Therefore, the testing duration is expected to be less than that assessed and the air quality impact on the 24 hours NO_x critical level for habitats will also be significantly reduced compared to that described in the detailed in the air quality modelling report as well as impacts to human health.

The maximum short-term concentrations of carbon monoxide and sulphur dioxide were similarly not found to result in exceedances of the relevant health-based air

quality standards at residential receptors for the operation of entire banks of generators.

Given the short-term nature of the testing and maintenance scenarios, accompanied by statistical analysis, NRW are satisfied with the air quality impact assessment. To ensure the operations detailed are adhered to we have imposed Improvement Condition IC4 which requires the operator to produce a report outlining the maintenance and operating regime following the first year of permitted operation, which will include an update on the control systems used to carry out the testing of the generators and how these have been used to minimise emissions. Any additional improvements that have been identified to reduce emissions during the maintenance testing and operation of the generators shall also be reported. The report shall include timescales for the implementation of any improvements identified.

Emergency scenario

An air quality assessment was carried out to look at two emergency scenarios:

- a) a hypothetical scenario in which all 77 generators operate concurrently for one full hour; and
- b) an example emergency scenario in which all 77 generators would be fired up and then load shed after ten minutes to meet the required residual demand for the remainder of the hour.

The air quality modelling for both indicates that the emergency outage operating scenarios could pose a risk to local air quality and identified receptors for short term NO₂. The maximum predicted hourly NO₂ (PC) concentration exceeds the 200µg/m³ standard for human health. Results are based on continuous operation in all hours in the least favourable year of meteorological data. However, emergency operation would only occur for a very short period of time in the event of a power outage. While an outage of a few hours has the potential to occur, the likelihood of that is extremely small. For instance, National Grid reliability was reported to be 99.99964% in 2016/17. Any emergency scenario is extremely unlikely; NGD is connected directly to the Super Grid via two independent connections. Both supply power to NGD concurrently under

normal operational conditions, and both could be used in isolation if the other were to fail.

Statistical analysis was carried out and determined that even if there was an outage for 24 hours in a single year, the hypergeometric mean gives the probability of an exceedance of the objective close to zero.

In line with the “Data centre FAQ Headline Approach” guidance adopted by NRW, (based on when an emergency outage operating scenario indicates a very significant risk to local air quality and identified receptors), NRW has asked the operator to have a written action plan to manage prolonged emergency running of the plant (including sensitive receptors lists and mitigations, assessment and impact evaluation against modelled risk conditions). This will help ensure a plan is in place taken into account local factors and how to improve/mitigate against impacts. This concern will be addressed through the Air Quality Management Plan required by Improvement Condition IC2.

8.2 Emissions to surface water

Based upon the information in the application we are satisfied that the appropriate measures will be in place to prevent pollution of ground and surface water.

The only surface water drainage from site will be uncontaminated surface water run-off discharging to the sites drainage system. A drain isolation system is in place which can detect spills. ‘Bladders’ located within the pipes will inflate and capture any contaminated water within the drainage system which can then be pumped out and disposed of appropriately.

No water is used by the installation, and no process effluent produced. Point source emissions to water from the installation are confined to uncontaminated surface water drainage from within the installation boundary. Rainwater draining from roofs, roads and areas of hardstanding within the installation boundary is kept free of contamination and drains, (along with clean rain water from the areas of the NGD site outside the installation boundary), into the site’s overall drainage system.

8.3 Emissions to sewer

There will be no emissions to sewer from the combustion activity.

8.4 Emissions to soil and groundwater

There will be no emissions to soil or groundwater as a result of the operation of the Installation.

Fugitive emissions could result from engine oil leaks, oil distribution pipe leaks, storage tanks/container leaks, delivery leaks and spills and the drainage system.

The generators and fuel tanks are situated on concrete plinths, surrounded by hardstanding. The generators and tanks are also within integrally-bunded metal containers, and the fuel supply system is made up of double-skinned pipes. All piping is above-ground, either on the surface or in open trenching covered by metal grilles. Pipe connection points are all in bunded areas.

The fuel storage tanks are integrally-bunded to provide secondary containment and are located on hardstanding. The bunding has the following features: • impermeable and resistant to stored materials; • has no outlets (drains or traps); • is designed to catch leaks from tanks and fittings; • has a capacity greater than 110% of the tank; • have connection points within the bund; and • is protected from vehicle impact. The tanks undergo regular visual inspection for their condition. All on-site staff operating the installation have access to spillage containment equipment and are appropriately trained.

For the Directly Associated Activity (DAA) of fuel storage, the limits of specified activity in Table S1.1 of the permit are that all fuel storage tanks must be stored on an impermeable surface with sealed drainage. Due to the increased risk to ground and groundwater from spills in these areas, operational procedures are in place to carefully monitor any higher-risk activities and respond quickly in the case of occurrence of any leaks or spills. Coupling points, valves and joints are contained within bunding to prevent these instances. Vehicles are not permitted in these areas but kept on areas

of hardstanding. Fuel deliveries are made by tanker and delivered into the fuel storage tanks via the supplier's own flexible hose.

Permit condition 3.1.2 requires periodic monitoring to be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination. NRW is satisfied that the permit condition 3.2.1 on emissions not controlled by emission limits is sufficiently protective.

8.5 Fugitive emissions

Based upon the information in the application we are satisfied that the appropriate measures will be in place to prevent or where that is not practicable to minimise fugitive emissions and to prevent pollution from fugitive emissions. Details on fugitive emissions and measures in place to minimise pollution are detailed in Section 4 of the main application, 'Application Supporting Information, 7th November 2018'.

Fugitive emissions of Volatile Organic Compounds (VOC) to air may arise from the storage of diesel fuel. These emissions occur due to the displacement of VOC-containing air above the diesel in tanks as a result of thermal expansion due to temperature variation, or volume displacement from filling the tanks. Measures to control fugitive emissions from fuel storage have been adopted at the installation, and include: • selection of diesel fuel, which has relatively low volatility; • the use of enclosed storage vessels (each fuel tank has a vent); and • regular inspection and maintenance to reduce leaks and spills. As the generators are infrequently used, fuel deliveries are not received frequently.

Potential sources of fugitive emissions to surface water, ground or groundwater may arise from the storage and handling of: • fuel oil; • lubrication oil; • waste oils; and • antifreeze; Fugitive emissions may arise from: • engine oil leaks; • oil distribution pipe leaks; • storage tank / container leaks; • delivery leaks and spills, including tanker and flexible hose leaks; and • drainage system for the site.

A drain isolation system is in place within the site surface water drainage. In the event of a fugitive release to the surface water drains, this will be detected in the drainage system and the bladders will automatically inflate and capture the contaminated water within the drainage system. From there, it can be pumped out and disposed of suitably off-site. Outside the installation boundary and wider NGD site, there are also interceptors installed within the wider business park drainage system which act as a further protection to surface water receptors.

Raw Materials and Waste

Storage of other raw materials and wastes is limited to a single location within the installation boundary. This is a building with internal bunding of at least 25% of the total volume of the potential stored chemicals which is sufficient. As such, there is no external storage of solid raw materials, and wastes are appropriately contained to prevent wind-blown litter. NGD's approach to managing waste applies the Waste Hierarchy to maximise material re-use, prevent waste, minimise waste generation and maximise recycling and recovery of waste. Waste are handled to minimise releases of pollutants to the environment. Condition 1.4.1 requires the operator to take appropriate measure to ensure waste is minimised and recovered in line with the Waste Hierarchy.

8.6 Odour

It is considered unlikely that off-site pollution due to odour will occur as a result of the operation of the installation. Release of fugitive emissions to land and water will be prevented through appropriate infrastructure and management controls.

As we are satisfied that appropriate measures will be in place to prevent or, where that is not practicable to minimise odour and prevent pollution from odour, we consider that no odour management plan is needed and Permit conditions 3.4.1 and 3.4.2 are sufficiently protective.

8.7 Noise

A BS 4142:2014 worst case assessment of the impact of sound from generator testing at the nearest sensitive receptors has been undertaken, with reference to the baseline

conditions at the sensitive receptors and both measured and manufacturer sound data of the generators.

An initial estimate of the impact of the sound source is obtained by subtracting the measured background sound level from the rating level and considering the following: Typically, the greater this difference, the greater the magnitude of the impact.

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.

Where the rating level does not exceed the background sound level, this is an NGD's assessment used the following impact scale has been adopted:

Rating level of industrial/commercial sound Impact Significance

- Up to 1dB above the background sound level is Negligible/Not significant
- 1 to 5 dB greater than the background sound level is Minor adverse/Not significant
- More than 5 dB greater than the background sound level is Moderate adverse/Significant
- More than 10 dB greater than the background sound level is Major adverse/Significant

8.7.1 Maintenance testing scenarios

Updated noise reports providing following submission indicate impacts around +5dB & +10dB at the worst affected receptors which is likely to be an indication of an adverse and significant adverse impact respectively depending on context. A significant adverse impact (+10dB) is predicted as a result of monthly testing, quarterly testing and black building testing. At Cardiff Road, NRS5 (the receptor with the highest predicted impact) the impacts are looked at in terms of duration for each type of testing. It is calculated to experience 56.3 hours of major impacts. There are several nearby

receptors that will experience moderate impacts from the different testing scenarios, Pencarn Avenue is calculated to experience the longest duration of moderate impacts, 155.3 hours per year. However, the testing periods are generally quite short, as detailed in above sections.

Different generator cells have different impacts on nearby receptors. Across all scenarios and receptors, 2 cells are shown to have major impacts – GF14 and GF19. Across all scenarios and receptors 9 cells are shown to have moderate impacts – GF14, GF19, GF20, GF21, GF24, GF1, GF2, TF1 and TF2. Cells GF14 and GF19 do not currently have acoustic fencing around them. The inclusion of acoustic fencing around these two cells has the potential to reduce the major impacts at NSR5 (Cardiff Road) down to moderate impacts. It may also reduce some of the moderate impacts down to minor or minor impacts down to negligible at Receptor 1. Cells GF20, GF21, GF24, TF1 and TF2 already have acoustic fencing installed. Cells GF1 and GF2 do not have acoustic fencing installed.

Mitigation measures have been proposed by the operator to reduce the noise impacts from the testing and maintenance of the generators. The inclusion of a noise barrier around GF19 only has been proposed as well as omitting the monthly testing operations reducing the duration of Major impacts at NSR5 Cardiff Road, the worst impacted receptor from 109.1 hours to 59.8 hours per year. This equates to 57.3 hours of moderate impacts (adverse impacts) and 2.5 hours of major impacts (significant adverse impacts). There are no major impacts at other receptors. There are also reductions in duration of moderate impacts at certain receptors, but the overall amount of moderate impacts increases as the hours of major impacts are reduced to the moderate category. The inclusion of a noise barrier around GF19 also reduces the noise pollution from GF14.

The combined effect of the inclusion of a noise barrier around GF19 and removing the monthly testing scenario will provide the optimal reduction in noise impacts and there will be reduction in the number of weeks in the year that testing will take place.

Due to the relatively short testing periods, testing is confined to weekday hours and the implementation of additional mitigation measures, we agree the activity can be permitted with conditions.

To address these noise issues, improvement conditions have been included, IC1 and IC3. These improvement conditions will ensure noise monitoring is carried out and potential mitigation measures assessed as well as the implementation of proposed mitigation measures.

Improvement Condition (IC3) requires the Operator to undertake a noise impact assessment at sensitive receptors once the plant is operational, to provide validation to the applicants proposed noise source levels and predicted impact. IC3 also requires the Operator to include an assessment of the most suitable abatement techniques, an estimate of the cost and a proposed timetable for their installation, if rating levels likely to cause adverse impact at sensitive receptors are detected.

IC1 is to Include an acoustic barrier around GF19 as proposed in the Operator's Generator testing Assessment, Revision 4.0.

The Operator's commitment to omit monthly testing has been incorporated as an operating technique in Table S1.2 of the permit and is enforceable. Omitting the monthly testing scenario helps minimise the duration of testing hours and whole site testing is avoided by the requirement that there shall be no overlapping testing scenarios, in Table S1.1 of the permit "Limits of specified activity column".

8.7.2 Emergency scenario

The operation of the generators during an emergency is considered to give rise to a significant adverse impact (Major impacts) at the nearest receptors. The likelihood of this impact occurring is low however, as the site has dual national grid linkage and the emergency scenario has not occurred since the site commenced operations in 2009. In the year 2016/17(the most recently reported year), the National Grid in England and Wales had a reliability of 99.999964%.

Our check calculations and check modelling agree with the Applicants noise predictions. Given the likelihood of an emergency event being very rare, NRW agrees that the activity can be permitted.

In summary, we consider that the activities carried out at the site have the potential to cause noise and/or vibration that might cause pollution outside the site and consider it appropriate to impose specific measures.

The primary noise source on site will be from the generators. Noise will be generated from regular testing and maintenance work as well as if the generators are all started up in an emergency situation.

There have not been records of noise complaints from nearby residents. Testing and maintenance is restricted to the hours of 0900 and 1700 Monday to Friday, or on bank or public holidays as in line with planning conditions. We are satisfied with the noise permit conditions included in the permit and relevant Improvement Conditions.

8.1.2 Emission limits

We have decided that emission limits are not required for the installation.

Permit condition 2.3.5 sets a maximum 500-hour emergency/standby operational limit for any or all plant producing on-site power under the limits of the combustion activity; and thereby emission limit values ELVs to air (and thus generator emission monitoring) are not required within the permit. As discussed above, it was agreed that MCPD requirements are unlikely to have any significant impact on the regulation of the NGD facility due to the low number of operating hours. Combustion plants will operate for less than 500 hours per year and will be exempt from complying with the emission limits set out in Part 2 of Annex II. As per the EA's 'Data Centre FAQ Headline Approach' guidance, permits 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 generator emissions monitoring) are not required within the permit. NRW agree that specified generator controls do not apply as the generators fall under Chapter II of the IED; the

generators are excluded from these additional controls. In permit condition 2.3.5, '500 hours in Emergency use' 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 (and hence no monitoring) under IED/MCPD. Though clearly NRW expects planned testing and generators operations to be 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.

In summary, 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. The operator has confirmed that each individual generator will operate for less than 50 hours each (testing and maintenance). This is incorporated in Table S1.2 of the permit as an operating technique and is enforceable.

The permit has a limit on the combustion activity in Table S1.1, that "Electricity produced at the installation shall not be used to provide commercial services to the National Grid or Distribution Network Operator" examples of which could be grid short term operating reserve (STOR) and Frequency Control by Demand Management (FCDM) for grid support. This is primarily to differentiate data centres from diesel arrays that voluntary operate within the balancing market, and to demonstrate minimisation of emissions to air as Emergency plant.

9. Monitoring.

The permit includes a maximum 500 hours emergency/standby operational limit and therefore Emission limit values (and thus generator emissions monitoring) are not required within the permit, as explained in the Emission Limits section above.

10. Reporting

We have specified the reporting requirements in Schedule 4 of the Permit. We are satisfied that this frequency is appropriate for a plant of this type.

The reporting requirements are to ensure the installation is being operated in line with that specified in the operating techniques and to ensure we are notified immediately in the instance that the site ever operates in the emergency mode scenario.

DRAFT

11. Operating techniques

We have reviewed the techniques used by the operator and have compared these with those set out in the Data Centre FAQ Guidance adopted by NRW. The operating techniques that the operator must use are specified in table S1.2 in the environmental permit.

The proposed techniques / emission levels for priorities for control are in line with the benchmark levels contained in the Data Centre FAQ Guidance and we consider them to represent appropriate techniques for the facility.

We accept that the diesel generators represent a commonly used technique for standby generators in data centres. A BAT assessment was provided but we requested further information detailing the choice of engine, the particular configuration and plant sizing meeting the standby arrangements.

The installation will incorporate the following techniques that are considered to be BAT as detailed in the adopted Data Centre FAQ guidance:

NO_x control

The default generator specification as a minimum for new plants to minimise the impacts of NO_x emissions to air is 2g TA-Luft (or equivalent standard) or an equivalent NO_x emission concentration of 2000mg/m³. The generator specification for all engine types are in line with the NO_x emission concentration of 2000 mg/m³.

Plant design is a key measure to control NO_x emissions, through efficient combustion, and this is maintained through monitoring (electronic management system or Engine Control Unit ECU that measures and records process parameters) and controls as well as planned maintenance and testing. All the generators on site utilise turbo charging to improve fuel efficiency. The use of secondary control measures (SCR and SNCR) are not considered to be BAT due to the effectiveness of primary controls, increased operational complexity and the short-term intermittent nature of the standby plant.

The site is not located in an AQMA.

SO₂ control

In combustion processes, the fuel is the source of sulphur in the gaseous emissions. Therefore, SO₂ emissions from the generators are controlled via the primary technique of fuel selection. Low-sulphur fuel which contains 0.1% (1,000ppm) sulphur is used at the installation. This is in line with the requirements of the Sulphur Content of Liquid Fuels (SCOLF) 2007 of 0.1% (1,000 ppm) for diesel fuel, and also below the requirements of TA Luft 2002 which recommends <0.2% sulphur.

It is considered that the primary techniques employed to control SO₂ emissions represent BAT for the installation.

CO control

The CO emissions from some generator types are higher than the TA-Luft indicative emission limit of 650mg/m³@5%O₂. The emissions data presented in the application is sourced from manufacturers' guarantees. The stated values are anticipated maxima; actual operational emission levels are expected to be lower than these.

Of the five generator types, two have maximum CO emissions values above the indicative 650 mg/m³ figure; the Kohler KD45V20-5DEP generator at 667mg/m³, and the Volvo TAD 1642GE at 896 mg/m³. However, it is noted that TA Luft 2002 specifically states that emission limits for CO do not apply to emergency generators (or generators used for peak shaving for less than 300 hrs per year) as detailed in the Environmental Risk Assessment – Assessment of Air Quality section above.

VOC Control

The emission of VOCs from the generators will be controlled in the same way as CO emissions, i.e., via combustion efficiency techniques. Measures to control VOC emissions from storage tanks and filling operations are (Application Supporting Information, 7th November 2018).

Particulate Matter

High quality fuels are used, and fuel in storage is routinely tested to ensure quality. This, combined with combustion control, is considered BAT to minimise PM emissions. The use of filters on standby plant is not regarded to be within BAT, as the potential for filter blockages reduces the reliability and availability of the standby power generation plant. In addition, the design of particulate filters for use of diesel generators requires the generators to run to “burn off” the particulate. This increases emission of pollutants.

We are satisfied that PM emissions are within BAT limits for Compression Ignition (CI) liquid fuelled standby generators.

Plant Design and Maintenance

For all combustion plant, plant design features and planned preventative maintenance are important primary measures to maintain optimum emissions in line with manufacturer's performance specification for the units. Such controls include:

- plant design - All the generators on site use turbo-charging to further improve fuel efficiency.
- manual and automatic tuning – Manual and automatic tuning of the generators provides the means for maintaining peak performance to control exhaust emissions at the required levels, whilst also providing consistently good combustion and energy efficiency.
- process parameter monitoring; and, planned preventative maintenance and corrective action - To control the combustion conditions within the generator, an electronic engine management system (or Engine Control Unit (ECU)) is used. The key parameters recorded by the control systems that are used to manage the operation of the generators (and hence may be considered to be surrogate environmental monitors) are listed as follows:
 - fuel flow rate to each unit;
 - fuel delivery system pressure;
 - air flow rate, temperature and pressure;
 - cylinder temperatures and pressures; and,
 - oil temperature and pressures.

These measurements are used by the ECU to adjust the engine ignition timing, airflow from the turbocharger and temperatures in the engine's system. If any of the measured process parameters exceed levels specified in the process control manuals, an alarm is raised, requiring operator action.

All regular maintenance is completed to the timescales specified by the equipment manufacturer, as optimised by best industry practices and operating experiences.

Most of the generators are new but some have been installed already. Retrofit abatement techniques for existing installations for generators emissions such as SCR would not normally be expected for standby plants to mitigate the emissions for standby/emergency operations.

Operations and management procedures have been considered. Testing is minimised where possible, to phased generators into subgroups (cells), avoiding whole site testing and planned off-grid maintenance days between Mon-Fri 9.00am-17:00pm. The applicant has also proposed improvements/mitigation measures of excluding the monthly testing scenario and including an acoustic barrier around cell GF19.

The generators are excluded from the indicative emission limits for NO_x, SO₂ and CO as they operate as emergency plants. PM emissions are in line with BAT limits. ELVs to air and monitoring is not required due to the installation exemption from certain regulations due to the activity's nature (emergency use).

12. Energy efficiency

The installation is not a large user of energy. The generators will only operate occasionally, less than 50 hours per annum for routine testing. Energy efficiency is assured as far as possible through planned maintenance. The operator will regularly review the energy use as part of permit condition 1.2.1.

Under Article 14 of the Energy Efficiency Directive (2012/27/EU), certain types of combustion installations may need to carry out a cost-benefit assessment (CBA) of opportunities for cogeneration (also known as combined heat and power) or supplying

a district heating or cooling network when they apply for a new environmental permit, or for a variation when substantially refurbishing an existing installation. CBA exempt electricity generating installations include:

Those peak load and **back-up electricity generating installations** which are planned to operate under 1,500 operating hours per year as a rolling average over a period of five years, based on a verification procedure established by the Member States ensuring that this exemption criterion is met.

In summary, due to the low number of operating hours (testing and maintenance) expected given the nature of the activity at the NGD site and the details above, we are satisfied that the Energy Efficiency Directive does not apply.

13.The permit conditions

13.1 Improvement conditions

Based on the information on the application, we consider that we need to impose improvement conditions. Details of the improvement conditions used and timescales for completion can be found at Annex 1.

13.2 Incorporating the application

We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the determination process.

These descriptions are specified in the Operating Techniques table in the permit.

14.Operator Competence

14.1 Environment management system

The operator has an accident management plan in place along with an environmental management system certified to ISO 14001:2015.

There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with EPR RGN 5 on Operator Competence.

14.2 Relevant convictions

Our Enforcement Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found.

The operator satisfies the criteria in EPR RGN 5 on Operator Competence.

14.3 Financial Provision

There is no known reason to consider that the Operator will not be financially able to comply with the Permit conditions. The decision was taken in accordance with EPR RGN 5 on Operator Competence.

14.4 OPRA

We are satisfied that the Applicant's submitted Operator Performance Risk Appraisal ('OPRA') profile is accurate. The OPRA score is 140 and will be used as the basis for subsistence and other charging, in accordance with our Charging Scheme. OPRA is Natural Resources Wales method of ensuring application and subsistence fees are appropriate and proportionate for the level of regulation required.

ANNEX 1: Improvement Conditions

Table S1.3 Improvement programme requirements

Reference	Requirement	Date
IC1	Include an acoustic barrier around GF19 as detailed in Generator Testing Assessment, Revision 4.0	3 months of permit issue.
IC2	<p>The operator shall develop and submit a site-specific Air Quality Management Plan AQMP in conjunction with the Local Authority which identifies the emergency operating conditions (grid failure) when Local Air Quality may be adversely impacted by emissions to air from the installation. This should include but not limited to the following considerations:</p> <ul style="list-style-type: none"> • predicted potential impacts indicated by the air modelling at individual receptors; • timescales for response measures; • how local conditions during a grid failure might influence the response required, for example meteorological conditions or time of day; • contingency for how the response will be carried out in the event scenario i.e. loss of power and; • timescales for continued review of the management plan. <p>The agreed AQMP shall be submitted to Natural Resources Wales for approval.</p>	6 months after permit issue.
IC3	<p>The Operator shall undertake noise monitoring at the nearest local receptors for all testing/maintenance scenarios. This shall include:</p> <ul style="list-style-type: none"> • A full noise monitoring survey and assessment meeting the BS4142:2014 standard including details local conditions e.g. meteorological conditions (wind direction) • 1/3rd octave and narrow band (FFT) measurements to identify any tonal elements or low frequency noise • Reference to the World Health Organisation guidelines for community noise • Reference to the Noise Action Plan for Wales 2018-2023 Upon completion of the work, a written report shall be submitted to Natural Resources Wales. • Monitor noise levels at GF19 after the installation of the acoustic barrier (IC1) to demonstrate that the actual reduction is in line with what was predicted and report to writing to NRW. <p>The report shall refer to the predictions in the report produced as part of the application. If rating levels likely to cause adverse impact at sensitive receptors are detected, the report shall include an assessment of the most suitable abatement techniques, an estimate of the cost and a proposed timetable for their installation.</p>	Within 9 months of permit issue.

Table S1.3 Improvement programme requirements

Reference	Requirement	Date
IC4	<p>The operator shall produce a report outlining maintenance and operating regime following the first year of operation following permitting. This shall include but is not limited to the following:</p> <ul style="list-style-type: none"> • An update on the control systems used to carry out the testing of the generators and how these have been used to minimise emissions and; • Any additional improvements that have been identified to reduce emissions during the maintenance testing and operation of the generators. This should include timescales for the implementation of the improvements. <p>The operator shall submit this report in writing to Natural Resources Wales.</p>	15 months after permit issue

ANNEX 2: Consultation Reponses

A) Advertising and Consultation on the Application

The Application has been advertised and consulted upon in accordance with Natural Resources Wales Public Participation Statement. The results of our consultation and how we have taken consultation responses into account in reaching our draft decision is summarised in this Annex. Copies of all consultation responses have been placed on Natural Resources Wales public register.

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from Public Health Wales/Aneurin Bevan Health Board on 15 th March 2019	
Brief summary of issues raised:	Summary of action taken / how this has been covered
<ul style="list-style-type: none"> • The impact of emissions upon local receptors for the scenario of all 77 engines running simultaneously (although very unlikely, it could happen) has not been modelled and may be difficult to forecast. 	<p>Re-consulted PHW/Aneurin Bevan Health Board on the 25th July 2019 when further modelling was provided to include the worst-case scenario. i.e. all 77 generators running simultaneously.</p> <p>NRW carried out an assessment of the air quality modelling provided by the applicant. We agree with the applicant's conclusions that the maintenance scenario is unlikely to cause an exceedance of the EQS (low probability of occurrence). An emergency scenario will be a rare occurrence as detailed in the body of</p>

<ul style="list-style-type: none"> Emissions including noise from routine engine maintenance are to be expected. The current risk assessment has used worst case scenarios to model emissions of NO₂, CO and SO₂. Particulate emissions have not been assessed. The results of this approach have indicated the potential for high hourly concentrations of NO₂ at nearby residential receptors and the likelihood of exceedances of the short-term NO₂ air quality objective (200µg/m³). It is not clear if adjacent or nearby non-residential premises have been considered in terms of relevant exposure. 	<p>this decision document above. Improvement conditions have been included for the applicant to put together an Air Quality Management Plan, IC2.</p> <p>As detailed in the Noise section above, there will be noise pollution from the generator testing/maintenance as well as in an emergency scenario. To help minimise the duration of hours of noise pollution, the operator has proposed mitigation measures of omitting the monthly testing scenario and to include an acoustic barrier around GF19 to help reduce major noise impacts at nearby receptors. Improvement Condition 1 is to install this acoustic barrier. There is also an improvement condition to carry out noise monitoring meeting the BS4142:2014 requirements IC3. Due to the relatively short testing periods, testing is confined to weekday hours and the implementation of additional mitigation measures, we agree the activity can be permitted with conditions.</p> <p>In terms of particulate matter, high quality fuels are used, and fuel in storage is routinely tested to ensure quality. This, combined with combustion control, is considered BAT to minimise PM emissions. The use of filters on standby plant is not regarded to be within BAT, as the potential for filter blockages reduces the reliability and availability of the standby power generation plant. In addition, the design of particulate filters for use of diesel generators requires the generators to run to “burn off” the particulate.</p> <p>There is the potential for high levels of hourly NO₂. However, it has been concluded by statistical analysis that the likelihood of exceedances is low, see detailed explanation in sections</p>
--	---

<ul style="list-style-type: none"> • We would recommend that the regulator considers the nature of these modelled impacts and seeks an agreed engine maintenance regime that does not compromise local air quality by giving rise to exceedances of air quality objectives for NO₂. • Given that the ill-health effects associated with NO₂ are well documented, any increase in exposure may impact adversely on the health of those exposed and should be avoided. Relevant population exposure includes adjacent workplaces if members of the public are outdoors. 	<p>above. Nearby residential premises have been considered in terms of relevant exposure. Areas where the general public would be outdoors for a representative time would be considered. Members of the public would not be in nearby workplaces such as the neighbouring IQE site and would not be covered in an assessment.</p> <p>As above, NRW agree with the applicant's conclusions that the maintenance scenario is unlikely to cause an exceedance of the EQS (low probability of occurrence).</p> <p>As above, nearby residential premises have been considered in terms of relevant exposure. Areas where the general public would be outdoors for a representative time would be considered. Members of the public would not be in nearby workplaces such as the neighbouring IQE site and would not be covered in an assessment. Following a re-consultation with PHW (response directly below), PHW confirmed that "Given the low likelihood of impacts occurring, we have no grounds for objection on public health grounds."</p>
Response Received from Public Health Wales on 5th August 2019	
Brief summary of issues raised:	Summary of action taken / how this has been covered

<ul style="list-style-type: none"> From an air quality perspective, it is possible that NO_x concentrations could breach short term air quality objectives, but likelihood of occurrence is low. 	<p>Summary on air quality: Quarterly testing – single generator testing lasts 15 minutes and 2 hours in alternating quarters. The applicant concluded that the maximum hourly prediction of PEC (PC + background) from any single generator emission will not exceed 200 µg/m³ of NO₂ at any selected receptors.</p> <p>Black building testing - each cell (with 4 to 9) generators will be tested twice a year, 15 minutes each time. There will be 15 minutes testing in a single day. Previous air quality assessment was modelled based on one-hour testing, the testing duration is reduced from the noise assessment update. Consequently, the air quality impact on the 24 hours NO_x critical level will also be significantly reduced.</p>
<ul style="list-style-type: none"> Noise impacts only likely under emergency and some testing situations. However, again unlikely to have a grid failure. Vital that noise mitigation elements are in place and maintained. 	<p>Mitigation has been proposed in the form of omitting the monthly testing scenario to minimise noise and air quality impacts. We have formalised this as an operating technique in Table S1.2 of the permit which is enforceable. IC1 requires the installation of an acoustic barrier around GF19 to prevent significant adverse effects due to noise.</p>
<ul style="list-style-type: none"> Given the low likelihood of impacts occurring, we have no grounds for objection on public health grounds. 	<p>Therefore, proposal is acceptable.</p> <p>No further action required.</p>

Response Received from Newport City Council (Planning Authority and Environmental Protection Department) on 1st March 2019	
Brief summary of issues raised:	Summary of action taken / how this has been covered
<p>No issues raised.</p> <p>Noise proforma form and planning information submitted with details of planning conditions. E.g. testing of the stand-by generators shall be</p>	<p>These time restrictions have been incorporated into permit conditions via table S1.1.</p>

restricted to 0900 to 1700 Monday to Friday and at no times on weekends or Bank or Public Holidays.	
---	--

We also consulted the Food and Standards Agency and Health and Safety Executive; no responses were received.

DRAFT