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By Email (*alex.duce@abbeypowergeneration.com*)
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Our ref: PB/5686.S/PB

Dear Alex:

Proposed Short Term Operational Reserve (STOR) Electricity Generators at Land East of Spalding Drove, Spalding, Lincolnshire: Air Quality Screening Assessment

1. Introduction

1.1 Phlorum Limited has been commissioned by Abbey Power Generation to produce an air quality screening assessment to support an extension application associated with the permitted development of Short Term Operational Reserve (STOR) electricity generators on land east of Spalding Drove in Spalding, Lincolnshire. The site is located at Ordnance Survey grid reference: 525420, 321318.

1.2 Figure 1 shows a map of the area, the approximate application site boundary and the location of the proposed generators.

1.3 The application site is an extension to a permitted STOR development (app. no. H16-0372-12) to the immediate west. The permitted development comprises 40 diesel powered electricity generators with associated infrastructure including a control room, transformer compound, switchgear and fuel storage tank.

1.4 The permitted and extension site is an open area of grass and scrub with areas of trees and dense vegetation scattered throughout. It is located on the south eastern edge of Spalding in a small industrial area. The wider landscape is predominantly in agricultural use. The Coronation Channel of the River Welland is located approximately 200m to the north.

1.5 The site is bounded to the east by Spalding Drove and sits between industrial units to the north and south. Further grassland, scrub and scattered trees are to the west, beyond which is a plant nursery and the A16 road. There are a few residential properties fronting Spalding Drove close to the application site boundary.

1.6 The proposed development is to install three natural gas fired engines directly to the east of the permitted diesel generators. The engines will be brand-new units and will be compliant with all relevant EU emissions standards. They will be fully enclosed within two, steel containers: two engines in one container; and the third in one half of a second container, with the other half containing a control room. An extension to the permitted access track along the site's northern boundary is proposed in order to provide a separate access to the gas-fired generators.

1.7 The purpose of the proposed STOR development is to provide emergency backup electricity for the National Grid. This is becoming increasingly important as greater reliance is being placed on wind generation, which is susceptible to weather conditions and other issues that prevent the turbines' operation. This can lead to unexpected changes in energy supply, which will consequently require a larger reserve capacity. Standing reserve plant, such as is proposed at Spalding, is a key solution to the growing reserve problem.

1.8 Although the proposed generators will run on fossil fuel, natural gas is the cleanest of such fuel types that is practicable to use for such applications. Fine particulate emissions from natural gas generators are minimal. The only significant pollutant with a direct health impact from them is oxides of nitrogen (NO_x, which includes NO_2).

1.9 In addition to being relatively clean, the generators will also support the national planning shift towards more sustainable energy supply from wind and other sources. As an emergency backup source, the generators will be used intermittently, usually once in any given day for less than an hour and they are likely to be required for a total of approximately 75 hours per year; although up to 300 hours might be required. Therefore, by supporting national policy they can be considered an integral part of the UK's developing sustainable energy supply infrastructure.

2. Baseline Assessment

2.1 The following air quality legislation and planning policies aimed at reducing adverse air quality effects have been considered in the assessment for the proposed emergency backup generators.

The UK Air Quality Strategy

2.2 The UK Air Quality Strategy (UKAQS)[1] sets a number of "standard" (Air Quality Standards (AQSs)) concentrations that are to be achieved at sensitive receptor locations across the UK by various "objective" dates. The sensitive locations at which the standards and objectives apply are places where the population is expected to be exposed to the various pollutants over the particular averaging period. Thus for those objectives to which an annual mean standard applies, the most common sensitive receptor locations used to measure concentrations against the set standards are areas of residential housing, since it is reasonable to expect that people living in their homes could be exposed to pollutants over such a period of time. For shorter averaging periods of between 15 minutes, 1 hour or 1 day, the sensitive receptor location can be anywhere where the public could be exposed to the pollutant over these shorter periods of time.

2.3 The objectives adopted in the UK are based on the Air Quality Standard Regulations 2007[2] for the purpose of Local Air Quality Management (LAQM). These Air Quality Regulations have adopted into UK law the limit values required by European Union Daughter Directives on air quality. The latest strategy, which was published in 2007[1], replaces the provisional 2010 PM_{10} objectives in England, Wales and Northern Ireland with an exposure reduction approach. This seeks to provide a more efficient way of achieving further reductions in the health effects of air pollution.

2.4 At sensitive receptor locations where an objective concentration has been predicted to be exceeded, a local planning authority should declare an Air Quality Management Area (AQMA). In setting an AQMA, the local planning authority must then formulate an Air Quality Action Plan (AQAP) to seek to reduce pollution concentrations to values below the objective levels. In determining whether or not an AQMA needs to be declared, a local planning authority produces an on-going series of air quality review and assessment reports. These seek to audit, measure and predict pollution concentrations at sensitive receptor locations where the UKAQS objectives might be exceeded.

2.5 At present no AQMAs have been declared by South Holland District Council (SHDC).

[1] DEFRA, 2007, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, HMSO.
[2] DEFRA, 2007, The Air Quality Standards Regulations 2007 - Statutory Instrument 2007 No.64, HMSO.

National Planning Policy Framework (NPPF)

2.6 The NPPF, which was published in March 2012, sets out the Government's planning policy for England. At its heart is an intention to promote more sustainable development. A core principle in the NPPF that relates to air quality effects from development is that planning should *"contribute to conserving and enhancing the natural environment and reduce pollution"*. In achieving this, it states in paragraph 109 that:

> *"The planning system should contribute to and enhance the natural and local environment by: […]*
>
> *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability […]".*

2.7 PPG32[3] (Air Quality), which was updated in March 2014, supports the NPPF by providing guiding principles on how planning can take account of the impact of new development on air quality. The PPG summarises the importance of air quality in planning and the key legislation relating to it.

Local Planning Policy

2.8 South East Lincolnshire Joint Strategic Planning Committee is a partnership of Boston Borough, South Holland District and Lincolnshire County Councils that is working to create a single Local Plan for the area of South Holland and Boston Borough. However, this has not yet been produced. Therefore, SHDC's Local Plan[4], which was adopted in July 2006, remains extant. Policy SG13 from the SHDC Local Plan considers Pollution and Contamination, stating that planning permission will only be permitted for development proposals which:

> *1) do not cause unacceptable levels of pollution of the surrounding area by noise, light, toxic or offensive odour, airborne pollutants or by the release of waste products;*
>
> *2) provide, as necessary, appropriate treatment of land to clean up pollution and contamination".*

[3] Planning Policy Guidance, 2014, PPG 32 Air Quality.
http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/
[4] **South Holland District Council**, 2006, Local Plan, Adopted 18th July 2006.

2.9 This Policy was considered in the decision notice for the permitted STOR scheme to the west of the extension site. The decision notice also requires, by way of Condition 4, that the approved scheme shall not be operated:

> *"(i) for more than 6 hours in any 24 hour period save where this is necessary in order to comply with an instruction from the operator of the electricity transmission system for England and Wales to provide short term operational reserve back up generation; or*
>
> *(ii) in any event for more than 12 hours and 20 minutes in any 24 hour period or between the hours of 23:00 and 06:00."*

2.10 Condition 5 also requires that:

> *"The generators hereby approved shall not be operated for more than 330 hours in any calendar year (running from 1st April to 31st March) save for exceptional circumstances where this is necessary in order to comply with an instruction from the operator of the electricity transmission system for England and Wales to provide operational reserve back up generation."*

2.11 Should the extension application be approved, it is reasonable to assume that these Conditions would also apply to the proposed gas-fired generators.

Local Air Quality Management

2.12 Following obligations under the Environment Act 1995[5], SHDC has published a series of Local Air Quality Management (LAQM) review and assessment reports. The latest report was an *'Air Quality Progress report'*[6] published in 2013. The report concluded that the AQSs are currently being met and that monitoring will continue to ensure future compliance.

Baseline concentrations

2.13 DEFRA provides estimated background concentrations of the UKAQS pollutants on the World Wide Web at the UK Air Information Resource (UK-AIR) website (www.uk-air.defra.gov.uk). These estimates are produced using detailed modelling tools and are presented as concentrations at central 1km^2 National Grid Square locations across the UK.

[5] DEFRA, 1995, Environment Act 1995, HMSO.
[6] South Holland District Council, 2013, LAQM Progress Report 2013. May 2013.

2.14 Being background concentrations, the UK-AIR data are intended to represent a homogenous mixture of all emission sources in the general area of a particular grid square location. Concentrations of pollutants at various sensitive receptor locations can, therefore, be calculated by modelling the emissions from a nearby pollution source, such as a busy road, and then adding this to the appropriate UK-AIR background datum.

2.15 For the extension application site the predicted background pollution concentrations for the UKAQS pollutants for the baseline year of 2014 are presented below in Table 1. These data were taken from the central grid square location closest to the application site (i.e. grid reference: 525500, 321500).

Table 1: Background concentrations of pollutants at the application site from UK-AIR

Pollutant	Prediction year	Predicted background concentration ($\mu g.m^{-3}$)	Averaging period	Air quality standard concentration ($\mu g.m^{-3}$)	Objective: to achieve the standard by
NO_2	2014	11.39	annual mean	40.00	End of 2005
PM_{10}	2014	17.09	(gravimetric) annual mean	40.00	End of 2004

2.16 Table 1 shows that the predicted background concentrations of the pollutants of major concern at the application site are well below their respective AQSs.

Local Sources of Air Pollution

2.17 The Environment Agency provides a mapping tool *'What's in my backyard'* on their website (www.environment-agency.gov.uk). This tool provides data for sources of industrial emissions of air pollutants which are regulated under the EC Integrated Pollution Prevention and Control Directive (IPPC).

2.18 Using data from this tool there are no relevant industrial emission sources of NO_2 or PM_{10} in the area around the application site. The nearest large-scale combustion sources of industrial air pollution regulated under the IPPC Directive is Spalding Power Station, which is located approximately 4km to the north.

3. Sensitive Receptors

3.1 With the emergency backup generators likely to be used for up to an hour in any one day and for just 75 hours per year, it is highly unlikely that they will have any effect on annual average concentrations of air pollutants. With such short operating periods they are also unlikely to affect the short term, 24-hour AQS for PM_{10}. They could, however, have an impact on the short term, hourly AQS for NO_2, which allows up to 18 average hourly exceedences of 200µg.m^{-3} per year.

3.2 The hourly NO_2 AQS applies anywhere where the public could be exposed over this averaging period. This therefore includes any living areas, playing areas, footpaths, walkways, pavements, rights of way or other areas where the public have access close to the application site.

3.3 The nearest residential receptor is located approximately 100m to the west. Further residential properties are located to the north and the south with no sensitive receptors located within a kilometre to the east.

4. Discussion and Conclusions

4.1 Local and national planning policies that could potentially affect the proposed emergency backup generators are mainly focused on promoting sustainable infrastructure and not allowing significantly adverse effects from development. As is the case for most parts of the UK, air quality policies tend to focus on traffic emissions, which are by far the greatest reason for the declaration of AQMAs.

4.2 The LAQM review and assessment work undertaken by SHDC has shown that there is currently no need to declare any AQMAs in any part of the District. This is supported by local monitoring that shows the pollutants of greatest concern, NO_2 and PM_{10}, are achieving their AQSs at all monitoring sites.

4.3 This is corroborated by national background data from the UK-AIR, which shows that key pollutant concentrations at the application site are well within their respective AQSs. This would be expected due to the rural location and absence of significant emission sources nearby.

4.4 Considering the above, the air quality screening assessment for the proposed emergency backup generators suggests that due to their highly infrequent use, they will not impact on existing air quality to an extent that might compromise the current achievement of the various UKAQS standards and objectives.

4.5 This particularly relates to the long term AQSs for NO_2 and PM_{10}, which are the pollutants that cause the declaration of almost all AQMAs in the UK.

4.6 In terms of current pollution concentrations the operation of the backup generators should not pose any significant obstacles to SHDC's planning policies. Moreover, as they support the shift towards more sustainable sources of energy, the proposed generators are in line with national and local planning objectives.

4.7 It is therefore considered that the emergency backup generators should not cause a significantly adverse impact on local air quality and that the development is acceptable as proposed.

4.8 We trust you are in agreement with the above. If you have any queries on this air quality screening assessment, please do not hesitate to contact us.

Yours sincerely



Dr Paul Beckett
Director

Enc.



Figure 1: Site location showing proposed generators

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