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Sizewell C: Review of the Planning Inspector's Questions on Air Quality

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Quality Assurance

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Experts in Air Quality, Odour and Climate Change

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1 Introduction

1.1 Air Pollution Services (APS) was commissioned by Together Against Sizewell C (TASC) to review the Examination Authority's questions on air quality. The aim is to identify whether there are any issues that give rise to valid concerns about the veracity of the assessments.

1.2 There are a very large number of documents and cross-references that makes reviewing the assessments difficult. This is hindered by inconsistent information across the documents.

1.3 Eight volumes of the Environmental Statement (the 'ES') include a chapter on air quality (Chapter 12 in Volume 2, and Chapter 5 in Volumes 3-9)) as follows:

- Volume 2: Main site;
- Volume 3: Northern park and ride at Darsham (during construction phase);
- Volume 4: Southern park and rise at Wickham Market (during construction phase);
- Volume 5: permanent bypass of Stratford St Andrew and Farnham (the 'two village bypass');
- Volume 6; permanent Sizewell Link Road from A12 to Sizewell
- Volume 7: permanent highway improvements to Yoxford roundabout and other highway improvements to accommodate the Sizewell C construction traffic;
- Volume 8: a temporary Freight Management Facility; and
- Volume 9: temporary extensions to the existing Saxmundham to Leiston branch railway line into the main development site and other permanent improvements to the line to transport freight by rail in order to remove large numbers of heavy goods vehicles (HGVs) from the regional and local road network.

1.4 Volume 1 Appendix 6H provides summary information on the air quality assessment methodology.

1.5 Volume 2 Appendix 12 provides details of the assessment methodology for the main site and for the transport impacts, and Chapter 5 of Volumes 3 to 9 provide information on the specific methodology for the other sites.

1.6 In addition, an addendum to the ES (the 'ESA') has been submitted that takes account of a number of amendments to the proposals and updated information available for the assessments. For air quality this includes updated traffic modelling, the latest emission factors published by Defra and some further sensitivity testing.

1.7 The Examination Authority has prepared a list 78 questions and requests for information on air quality. It is clear from the questions that the Examination Authority find the ES complex and, in a number of places, confusing.

1.8 The aim of this short report is to identify any significant issues identified by the Examination Authority's questions and requests for information. Many of the questions are seeking clarification

from the Applicant. Others are directed at East Suffolk District Council and the statutory consultees seeking confirmation that they are satisfied with the information provided by the Applicant.

1.9 In this report the following potential issues have been considered:

- Construction Phase:
  - Dust Emissions;
  - $PM_{2.5}$; and
  - Non road mobile machinery (NRMM).
- Operation Phase:
  - Assessment Approach;
  - $PM_{2.5}$;
  - Combined heat and power and diesel backup generators;
  - Stratford St Andrews and Woodbridge AQMAs;
  - Sensitivity Tests: Meteorological Data; and
  - Ammonia.

1.10 This report does not consider the releases of radioactive material during the operation of the proposed Sizewell C nuclear power station. It should also be noted that this review was undertaken within the scope of the project budget and not all possibly relevant documents have been read.

2 Potential Issues Identified: Construction Phase

Introduction

2.1 The main focus of the questions and requests for further information relates to dust emissions during the construction phase, and how the Applicant is going to manage these emissions to ensure that appropriate 'standards' will be meet. It should be noted that there are no widely accepted 'standards' for dust deposition and dust flux, although a number of 'custom and practice' criteria are in use.

2.2 There are several questions (e.g. **AQ1.1**) that query the appropriateness of the air quality receptors assessed. APS does not have good local knowledge and therefore is not in a position to comment on the locations of the receptors except to note the lack of receptors in the Accommodation Campus.

2.3 The dust deposition threshold levels used are given in Table 1.1 of Volume 2 Appendix 12A Construction Dust Assessment. The table references a 2006 document from the Greater London Authority (GLA) and London Councils which was replaced by the GLA Supplementary Planning Guidance on The Control of Dust and Emissions during Construction and Demolition published in 2014. The values in Table 1.1 are for monthly means (dust soiling) and annual means (ecological effects).

2.4 The values given are the same as those in a 1998 paper (Vallack & Shillito, 1998) applicable to the commercial centres of towns. The area around the proposed Sizewell C Nuclear Power Station and associated sites cannot be described as commercial centres of towns. If this approach is considered acceptable, then the criteria for open country would be far more appropriate. These thresholds are that complaints are possible when the monthly mean dust deposition is 100 mg/m^2/day or above and complaints are likely when the dust deposition is 140 mg/m^2/day or above. These values are significantly lower than those used in the ES of 200 mg/m^2/day and 260 mg/m^2/day, respectively.

Dust Emissions

2.5 **AQ1.4** and **AQ1.5** questions the impact of dust emissions on agriculture. No explicit mention of this impact has been found in the ES, albeit with so many different air quality sections, it could have been missed. In APS's opinion the only potential impacts would be on crops where appearance is important, such as salad and some vegetables. With good mitigation measures, preferably under the supervision of an independent organisation with powers to stop work if necessary and when it is safe to do so, the risk of significant and frequent dust emissions is relatively low. However, there will be some meteorological conditions when it will be difficult to control the dust (e.g. strong winds from the east), especially if there is a large area of land striped and not re-vegetated, and similarly from the stockpiles. If this coincides with the harvest of sensitive crops there could be an economic impact for local farmers. The probability of this occurring is, however, relatively low. Dust is generally readily washed from vegetation by rain.

2.6 **AQ1.6, AQ1.7, AQ1.10** relate to the baseline monitoring. The 'custom and practice' dust deposition assessment criteria used (200 mg/m^2/day and 260 mg/m^2/day) was developed many decades ago and it is unclear as to whether they remain appropriate today. Also, different types of deposition gauge have different collection efficiencies. It is likely that the removal of the foam inserts in some instances, as reported in the ES, will have affected the collection efficiency. The 'custom and practice' criteria have never been adopted as statutory levels. It is considered best practice to develop site-specific criteria based on the background levels (Vallack & Shillito, 1998).

2.7 This type of monitoring requires the collection of data over several weeks to collect a sufficiently large sample to be detected, and then sent to a laboratory for analysis. This time delay means it is not appropriate for the management of dust emissions during construction works. The Institute of Air Quality Management (IAQM) guidance on monitoring of construction sites states that the use of deposition gauges (e.g. Frisbee Gauge), (emphasis added) "*Provides useful information to supplement PM concentrations (at high risk sites). At other sites, provides an indication of potential loss of amenity and effectiveness of mitigation measures although time resolution of monitoring is a significant disadvantage*" (Institute of Air Quaity Management, 2018).

2.8 **AQ1.11** explicitly raises the question of how sensitive receptors will be safeguarded, and the construction works monitored. As noted above the use of deposition gauges (e.g. the Frisbee gauge use for the baseline measurements) has a significant disadvantage. It is unclear from the Application information reviewed whether continuous monitoring of airborne particulate matter (PM) will be undertaken. This is undertaken as a continuous indicator of disamenity due to dust emissions, although in extreme case can also provide information of the exposure of the local community and workers to high daily PM_{10} concentrations. This together with an alert level would enable the Responsible Person for the site's Dust Management Plan to take rapid action should the action level be triggered. Ideally the alert levels would be site-specific derived from baseline monitoring of airborne particulate matter (PM) (PM_{10} and/or $PM_{2.5}$). This baseline PM monitoring does not appear to have been undertaken.

2.9 Insufficient information on the monitoring of PM is provided in the outline Dust Management Plan (Volume 2, Chapter 13 Air Quality, Appendix 12A.1 Proposed Mitigation Measures). Instead, it appears from Table 12.1 that a monthly mean dust deposition will be used as the site action level. By the time the deposited dust has been collected and analysed, and the data sent to the site management, it could be many weeks after the dust event occurred.

2.10 Another problem with using dust deposition (or dust flux) measurements is that the data is averaged over the collection period, which can mask high levels that occur over relatively short periods of time but of sufficient duration and magnitude to cause a loss of amenity to local residents.

2.11 **AQ1.13, AQ1.40**. These questions address the proximity of the accommodation campus to the active working site, and stockpiles. As no details of the proposed accommodation campus has been seen and it is unclear whether or not there will be sufficient protection for the workers. What is surprising is the high baseline dust deposition measured in the area over one 4-week period (327

mg/m^2/day). The concern is what happens if the emission source causing this high dust deposition level combines with the dust from the construction site.

2.12 It is not clear what the source of the threshold of 0.5 g/m^2/day (i.e. 500 mg/m^2/day) for ecological sites is. Given a maximum dust deposition of nearly 400 mg/m^2/day it is clear that it would not take much for the ecological criteria to be exceeded.

2.13 **AQ1.34-AQ1.37.** These questions related to the management of dust to avoid the loss of amenity through the soiling of surfaces. This should be managed by the continuous and automatic monitoring of PM for the reasons given earlier in this report.

2.14 **AQ1.38**. This concerns the potential to pollute local water courses and affect surface-run off. Water is needed to mitigate airborne dust, but it needs to be used only when required (i.e. in dry conditions) and where required (e.g. water jets should be aimed at the source of the dust) and that there should be appropriate measures in place to ensure that there are no unintended effects.

2.15 **AQ1.51**. It would be useful to ensure that the haul routes closest to the Accommodation Campus are hard surfaced**, kept clean and well maintained** to protect the amenity of the workers when off-duty. Where haul roads cannot be hard surfaced, good maintenance and the use of water browsers to keep the surface wet during dry weather are **very important**. As workers are likely to live in the Accommodation Campus for long periods of time it is important that there is continuous monitoring of PM at the worst-case location(s). In addition, as they are living there the accommodation should be considered a receptor when the air quality objectives apply.

2.16 **AQ1.54** asks the Applicant to clarify how the Outline Dust Management Plan (oDMP) and Dust Management Plan (DMP) relates to the Construction Environmental Management Plans (CEMP) and the Code of Construction Practice (CoCP), and which document would have precedence in the event of a conflict. This is an important issue.

2.17 **AQ1.55** relates to the enforcement of mitigation measures at LE25 the Round House. This receptor lies within the main site. As noted earlier in paragraph 2.5 there should be an independent organisation overseeing the management of dust during the construction works, and the dust management should include the continuous and automatic monitoring of PM.

2.18 **AQ1.68** relates to mitigation of the construction impacts and seeks clarification from the Applicant regarding the meaning of 'as far as practicable' and 'additional mitigation as necessary'.

$PM_{2.5}$

2.19 **AQ1.2.** It is not clear whether this question relates to the construction or the operational impacts. The construction impact assessment has not considered $PM_{2.5}$. This is because the IAQM guidance (Institute of Air Quality Management, 2016) does not explicitly include $PM_{2.5}$ due to the lack of good data on the impact of construction activities on the emission of this pollutant. Whilst the ES is correct that $PM_{2.5}$ is a subset of PM_{10}; if $PM_{2.5}$ was to be explicitly assessed it should be assessed against its more stringent air quality objective (AQO) or if health is the primary concern, then the World Health Organization (WHO) guideline.

2.20 **AQ1.2**. Using PM_{10} emissions as a surrogate for $PM_{2.5}$ can be appropriate when the size of the PM emission is smaller than $PM_{2.5}$, as is the case for most combustion sources, provided that the concentrations are assessed against an $PM_{2.5}$ criteria not a PM_{10} criteria . For other sources this may not be appropriate.

Non-Road Mobile Machinery (NRMM)

2.21 **AQ1.49 and AQ1.76.** The first question asks the Applicant whether they are willing to commit to the use of low emitting plant (such as NRMM that meets the Stage V emission limits which apply for new machinery from 2019). This would be preferable to plant meeting earlier emissions standards, but, gein the long life ofNRMM there may be limited plant meeting this emission standard available to purchase or lease.

2.22 The second question on NRMM suggests that the Applicant is willing to commit to using Stage IV NRMM 'as far as practicable'.

2.23 There is a precedent for requiring NRMM to meet specified emission standards. The Greater London Council has introduced a Low Emission Zone for NRMM covering the Central Activities Zone and Opportunity Areas, including Canary Wharf. NRMM in this zone must meet at least Stage IV emission limits from September 2020. New NRMM was required to meet Stage IV from 2014.

2.24 The GLA requires each construction site to register the NRMM including the emission standard that it was constructed to meet. A similar system could be introduced for the Sizewell C development to enable the local authority to monitor the machinery used and its emissions standard. Construction contractors in London are used to this requirement so it is not considered to be an onerous requirement for the Applicant.

2.25 The impact of the exhaust emissions from NRMM and other on-site vehicles appear to have been assessed qualitatively with one exception. The exhaust emissions from the NRMM used on the haul roads of the Main Development Site was quantified, but the impact on the accommodation campus was not assessed. For the other sites in the Sizewell C Application, the Applicant justifies this by quoting the IAQM guidance (Institute of Air Quality Management, 2016). As this guidance is for the assessment of dust and PM_{10} concentrations (as part of dust emissions) it is not appropriate to use this methodology to assess the impact of the exhaust emissions of PM (PM_{10} and $PM_{2.5}$) and NOx from NRMM and on-site vehicles (Volume 1Cchapter 6 Appendix 6H: Air Quality Legislation and Methodology).

3 Potential Issues Identified: Operation Phase

Air Quality Assessment

3.1 **AQ1.1.** This request for information is related to the issues raised by Laurence Moss, and appear to relate to ultrafine particles (UFPs), that is particulate matter in the $PM_{0.1}$ size fraction. These very small particles are better defined by the number of particles not their mass. This is because their mass contributes little to the mass of PM_{10} and $PM_{2.5}$, but these small particles are very numerous close to roads.

3.2 Due to the very small size of the particles UFP can penetrate deep into the human lung. They can penetrate biological membranes, enabling them to reach all organs in the body including the brain and the nervous system. Toxicological studies suggest that UFP exerts a higher toxicity per unit mass than larger particles and may contribute to the development and progression of various diseases.

3.3 According to a WHO 2013 report, *"There is increasing, though as yet limited, epidemiological evidence on the association between short-term exposures to ultrafine (smaller than 0.1 µm) particles and cardiorespiratory health, as well as the health of the central nervous system. Clinical and toxicological studies have shown that ultrafine particles (in part) act through mechanisms not shared with larger particles that dominate mass-based metrics, such as $PM_{2.5}$ or PM_{10}."* (World Health Organization, 2013).

3.4 A more recent review of the epidemiological studies suggests that short-term exposure to UFP affects a number of risk factors for cardiovascular disease. (Ohlwein, Kappeler, Joss, Kunzli, & Hoffmann, 2019).

3.5 In light of evidence that UFP acts (in part) through mechanisms not shared with larger particles and can contribute to the health effects of PM, WHO recommended that efforts to reduce UFP in engine emissions should continue. There is existing legislation to control the emission of particles from motor vehicles but is limited to particles larger than 23 nanometres. The removal of sulphur from automotive fuels resulted in a significant reduction in UFP in the atmosphere.

3.6 There are currently no air quality standards for UFP and WHO has not recommended an air quality guideline, although this is under consideration. Authoritative reviews of the health effects of exposure to UFP have concluded that, although some studies are suggestive of adverse health effects, there is currently insufficient evidence to justify setting a standard for UFP separate from those for $PM_{2.5}$ and PM_{10}.

3.7 Mr Moss's representation seems to suggest there is evidence that APS is not aware of. It is recommended the TASC discuss the evidence with him. It is normal practice to rely on multiple studies that show similar health effects than to rely on single or a very small number of studies. The former provides confidence that the evidence of an effect is robust.

3.8 **AQ1.19 and AQ1.20.** These are general requests for comments on the air quality assessment approach. Concerns are covered elsewhere in this report.

PM2.5

3.9 **AQ1.2.** It is not clear whether this question relates to the construction or the operational impacts. In the ES/ESA the Applicant has assessed the impact on $PM_{2.5}$ concentrations against the national AQO which is 25 µg/m^3. According to Table 1-1 (Volume 2, Chapter 12, Appendix 12C: Combustion Activity Impact Assessment for Air Emissions) the $PM_{2.5}$ AQO is 20 µg/m^3, which is incorrect.

3.10 An Environmental Impact Assessment (EIA) should assess the potential health impacts, not simply compliance with a national target, as has been done in the ES. Given the recent Coroner's conclusions, that air pollution was a significant contributory factor in the death of a 9 year old girl, APS believe that the health-based WHO guideline (10 µg/m^3) should also be used as an assessment criteria. The difference between the AQO and the WHO guideline is that the former takes into account a number of economic and technical issues in its derivation whereas the WHO guideline is solely based on an assessment of the scientific and medical evidence. Where there are no AQOs for a pollutant it is common practice to use the WHO guidelines as an assessment criteria. It is noteworthy that the Coroner concluded that it was exposure to air pollution above the WHO guidelines, not the AQOs, that caused Ella Abdoo Kissi-Debrah's death.

3.11 The Government's website states that "*Currently, there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects*. *Therefore, further reduction of PM or NO_2 concentrations below air quality standards (https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits) is likely to bring additional health benefits*" (Public Health England, 2018).

Receptors

3.12 **AQ1.18 receptors**. APS is not familiar with the local area around the proposed Sizewell C development and therefore are not able to comment on the suitability of the receptors used in the assessment.

3.13 No receptors within the accommodation campus, however, appear to have been included in the assessments. There is no reason why the workers should not expect a reasonable level of amenity and air quality in and around their living accommodation.

Stratford St Andrews and Woodbridge AQMAs

3.14 **AQ1.45-AQ1.48**. Annual mean nitrogen dioxide (NO_2) levels are declining in the AQMA and the highest concentration measured in 2019 in the Stratford St Andrews AQMA was 36 µg/m^3 compared to the AQO of 40 µg/m^3. It was lower in the Woodbridge AQMA. It is considered unlikely that there will be a significant adverse impact on NO_2 concentrations in these area and there is predicted to be a benefit at the Stratford St Andrews AQMA due to the construction of the two village bypass.

A12

3.15 **AQ1.16 and AQ1.22.** These questions relate to the impact on the health of students at Farlingaye High School, Woodbridge and elsewhere along the A12. APS could not find these representations.

The traffic impact assessment, however, shows that at all human receptors the impact is imperceptible, negligible, or beneficial. There are no predicted material adverse impacts.

Combined Heat and Power (CHP) Engine and Backup Diesel Generators

3.16 **AQ1.25-AQ1.31, AQ1.33, AQ1.59-AQ1.62.** There is an issue regarding the assessment of the impacts of the diesel backup generators and CHP engine in the accommodation campus. The predicted impacts of the CHP emissions have been assessed using the Environment Agency (EA) risk assessment guidance used for Environmental Permitting not guidance specifically aimed at the planning system. This approach has also been used to assess the significance of the impacts of the modelled NRMM using the haul roads in the Main Development Site.

3.17 The *Planning* and *Environmental Permitting* regimes, whilst having some overlaps, are fundamentally different. For the planning system an assessment of the impacts of a proposal is required to assess the suitability of a site, and its environs, for the proposed use. For Environmental Permitting the regulator (the Environment Agency in this case) undertakes a risk assessment as to whether or not the process is likely to have a significant contribution to an exceedance of an environmental assessment level. There can be a significant impact on air quality even if an AQO or limit value is not exceeded.

3.18 Guidance for assessing air quality in the planning system is provided by Environmental Protection UK/IAQM (EPUK/IAQM, 2017). It states, "*The EA's risk assessment methodology has not been designed for conducting an assessment to accompany a planning application, especially one undertaken for the EIA Regulations. In these circumstances, a framework is required that allows the assessor to describe the degree of impacts before reaching a conclusion on significance of the effects.*". The Environmental Permitting risk assessment and reporting guidance does not provide any mechanism for defining significance of effects.

3.19 A recent Planning Inspectorate Appeal Decision (APP/R5510/W/20/3245309) notes that using the Environment Agency's risk assessment methodology results in different impacts on air quality compared to using the EPUK/IAQM approach. The latter has a more nuanced and stringent approach to assessment while the former only assesses the risk of an exceedance of an AQO or limit value.

3.20 The Inspector gave greater weight to the EPUK/IAQM approach in the planning system as "… this appears to be more relevant to the consideration of a planning proposal".

3.21 **AQ.1.30** requires clarity regarding the power plant to be used for the accommodation campus. APS could find little detail about the CHP plant in the ES. It should be noted that nuclear sites are exempt from meeting emission limits for medium combustion plant (MCP) [1] and specified generators[2]. It may be important that planning conditions are used to ensure modern low emitting plant is used.

[1] As set out in Schedule 25A of the Environmental Permitting Regulations.

3.22 The backup generators have a combined thermal input of 227MW. The two reactors will each have four emergency diesel generators (EDGs) and two smaller ultimate diesel generators (UDGs). The Applicant states that each generator has to operate independently with its own stack and therefore the thermal inputs of the generators are not required to be aggregated and compared with the 50MW large combustion plant (LCP) threshold. The Applicant considers the generators to be medium combustion plant (MCP) which are exempt from emission limits in the MCP Environmental Permitting Regulations (EPR) as they form part of a nuclear safety role[3] .

3.23 The pollutant of most concern from these generations is nitrogen oxides (NO_x). The nitrogen oxides (NO_x) emissions from the generators assumed in the assessment were provided by an equipment supplier. For other pollutants, the emission data were derived from Environment Agency data and from the sulphur content of the fuel.

3.24 During testing NOx emissions are greatest during the start-up period as the generator is run up to full load. Emissions during this period can be greater that the emissions when the engine is warm. No mention of cold start emissions could be found in Volume 2 Chapter 12 Air Quality Appendix 12: Combustion Activity Impact Assessment for Air Emissions.

3.25 The Applicant also does not appear to have modelled part load operations which can significantly change the area where the impacts occur, and the emissions can be higher during these sub-optimal operating conditions.

3.26 The modelling predicts that the long-term AQOs will be achieved; but that the one-hour AQO for NO_2 will be exceeded under several modelled scenarios. Receptor LE41 Keepers Cottage is particularly affected. During a loss of off-site power event the hourly average concentration (as a 99.8th percentile) is predicted to be 28% above the AQO. At LE30 Sizewell Village it is predicted to be 99% of the AQO. The ES argues (Volume 2 Chapter 12 Appendix 12C) that because the whole year was modelled to account for the worse case meteorological conditions, it is very unlikely that a loss of off-site power event would occur during the worse-case meteorological conditions. APS agrees that it would be unlikely, but it could occur. It is difficult to comment on whether loss of power would be a 'once in a lifetime event' for a fleet of nuclear reactors.

3.27 High hourly concentrations are also predicted during commissioning. The hourly average NO_2 concentration (as a 99.8th percentile) is predicted to be over 90% of the AQO at Keepers Cottage. No information is provided regarding the accuracy of the model, and therefore there must be a risk that the AQO will be exceeded at this location.

3.28 The daily nitrogen oxides (NOx) critical level is exceeded at ecological receptors at Minsmere (SAC, SPA, Ramsar and SSSI), Sizewell Marshes (SSSI), Suffolk Beaches (CWS) and Sizewell Levels (CWS) during routine testing of the generators. The ES (Volume 2 Chapter 12 Appendix 12C) argues that the short-term NOx critical level is of less importance than the annual mean for the protection of vegetation. APS agrees with this.

3 Generators that have a defined nuclear safety role under a nuclear site licence issued by the Office for Nuclear Regulation are excluded.

3.29 Nitrogen deposition (and acid deposition) is predicted to exceed the critical loads at several ecological receptors without the generators; but the NOx emissions add a potentially significant amount to this deposition at ecological receptors at Minsmere (acid and nitrogen deposition), Suffolk Beaches (nitrogen deposition), Sizewell Marshes (acid deposition), Reckham Pits Wood (nitrogen deposition), and Minsmere South Levels (nitrogen deposition). The significance of the air quality effects on ecological receptors is provided in Chapter 14 Terrestrial Ecology and Ornithology. APS has not reviewed this chapter.

3.30 There is an argument that where critical loads are already exceeded the aim should be to reduce further deposition, particularly where a site is very sensitive to deposition.

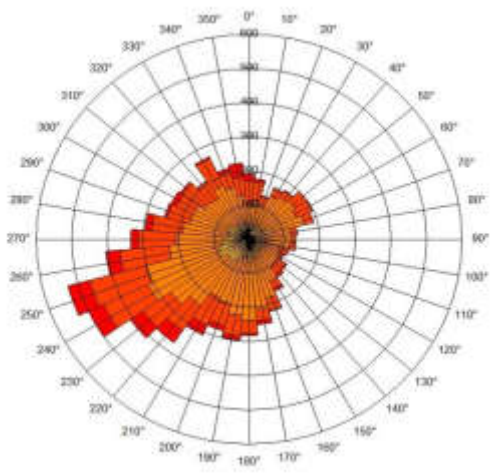
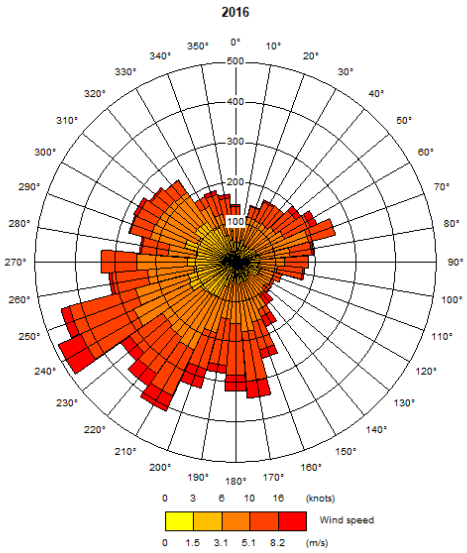
3.31 As the final selection of the combustion plant has not been made, it seems appropriate that a planning condition is included in the DCO that limits the emissions to those for new plant set out within the Medium Combustion Plant Directive to protect human health and the environment. Generators meeting these limits are readily available on the market.

Sensitivity Tests: Meteorological Data

3.32 No sensitivity tests were undertaken using different meteorological data. The data used comes from the Wattisham observation site, which is 40km or 46km from the Sizewell C site (both distances are used in the documentation). The figure below shows a comparison for 2016 between the Wattisham and numerical prediction data (NWP) for the 3kmx 3km grid covering the main site. The comparison is for 2016 because this is the year when, in general, the Applicant states the worst-case predictions occurred out of the 5 meteorological years used in the assessment (2014-2018).

3.33 The wind roses show the number hours the wind comes from different directions by wind speed. There are some clear differences which would have changed the concentrations predicted by the dispersion model. In particular, there due to the more frequent winds from approximately the north east to east (30^{o} to 100^{0}).

Figure 1: Wind Roses for Wattisham (Observations)and Sizewell (NWP) for 2016

Observation data for Wattisham Meteorological Observation Site 40-46km from Sizewell C site	Numerical Weather Prediction Data for 2016 for Sizewell (3km x 3km resolution)
	

Ammonia

3.34 **AQ1.43**. The impact of ammonia emissions from road transport (both petrol and diesel) and the reactor start-up on ecological receptors has not been assessed.

4 Conclusions

4.1 Air Pollution Services (APS) was commissioned by Together Against Sizewell C (TASC) to review the Examination Authority's questions on air quality to identify whether there are any significant issues which would raise valid concerns about the veracity of the assessments.

4.2 There are three main issues raised by the Examination Authority's questions and requests for further information, which have merit regarding the robustness of the assessment. These are:

- The living facilities within the Accommodation Campus have not been considered as receptors in the assessment of the dust and air quality impacts of the construction and operation phases.
- The management of the construction dust. This should include:
    - an independent organisation to supervise the operation of the dust management plan (DMP) with powers to stop operations, subject to safety requirements.
    - The DMP should be the lead document for the control of dust, and take precedent over the CoCP, CEMP etc.
    - Continuous PM monitoring should be used with appropriate site-specific alert levels developed based on measured baseline levels.
    - There should be a single, well-advertised point of contact for complaints. The Applicant should allow the submission of complaints through a website. The anonymous complaints data should be published, and the information provide on a website.
- Control of emission from the backup generators:
    - To minimise the risk of an exceedance of an AQO, critical level, or critical load there should be a planning condition for the DCO requiring the diesel generators to meet the emission levels for new plant set out in the Medium Combustion Plant directive.

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Appendices

A1 Professional Experience

Dr Claire Holman, BSc (Hons), PhD, CSci, CEnv, FIEnvSc, FIAQM

A1.1 Dr Claire Holman is a Director of Air Pollution Services. She has worked on air quality management for nearly 40 years since being awarded her PhD for research into air pollution in 1980.

A1.2 She was the Chair of the Institute of Air Quality Management (IAQM), the professional body representing those who work in air quality management, from 2015 until 2019, and is currently the Chair of the IAQM Indoor Air Quality Sub-committee.

A1.3 Claire has experience of developing emission inventories, emission control, ambient monitoring, dispersion modelling, cost benefit and cost-effectiveness analysis and policy development. She has undertaken numerous air quality assessments for new developments. She has also advised governments in Europe, Asia, and Africa, as well as the European Commission and local authorities on strategic air quality issues for the development of policy.

A1.4 Her experience includes working in the land development, waste, industry, minerals, and transport sectors providing technical support. Her expertise includes odour, dust, as well as the traditional air pollutants and secondary pollutants.

A1.5 Claire is an experienced expert witness, having prepared expert reports and statements for litigation and land use planning inquiries and hearings. She was the expert witness for the ClientEarth successful challenges to the Government's 2015 and 2017 Air Quality Plans, supported the local authorities opposed to the expansion of Heathrow Airport, and worked for Ella Abdoo Kiss-Debrah's family for her re-opened inquest in December 2020. She has also provided expert advice to many residents' groups on local air quality matters.

A1.6 She contributed to the Environmental Protection UK / the Institute of the Air Quality Management (IAQM) guidance "*Development Control: Planning for Air Quality"* (2017). She led the IAQM working groups that produced "*A guide to the assessment of air quality impacts on designated nature conservation sites*" (2019); "*Guidance on the Assessment of Dust from Demolition and Construction*"(2016), and "*Guidance on the Assessment of Mineral Dust Impacts for Planning*" (2016).