The Eggborough CCGT Project

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The Eggborough CCGT (Generating Station) Order

Land at and in the vicinity of the Eggborough Power Station site, near Selby, North Yorkshire, DN14 0BS

Response to the Examining Authority's Request for Further Information in respect of Habitats Regulations Assessment - Deadline 5

The Planning Act 2008

Applicant: Eggborough Power Limited
Date: January 2018

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GLOSSARY

Abbreviation	Description
Applicant	Eggborough Power Limited
CCGT	Combined Cycle Gas Turbine
DCO	Development Consent Order
EA	Environment Agency
EPL	Eggborough Power Limited
ExA	Examining Authority
HRA	Habitats Regulations Assessment
LSE	likely significant effects
MW	megawatts
N	nitrogen
NE	Natural England
NH_3	ammonia
NSIP	Nationally Significant Infrastructure Project
PA 2008	Planning Act 2008
Proposed Development	Eggborough CCGT Project
SAC	Special Area for Conservation
SCR	Selective Catalytic Reduction
SoS	Secretary of State
the Order	Eggborough CCGT (Generating Station) Order

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TABLES

APPENDICES

1.0 INTRODUCTION

1.1 This document (Document Ref. 9.12) has been prepared on behalf of Eggborough Power Limited ('EPL' or the 'Applicant') in respect of its application (the 'Application') for a Development Consent Order (a 'DCO') for the Eggborough CCGT Project (the 'Proposed Development'). The Application was submitted to the Secretary of State (the 'SoS') for Business, Energy and Industrial Strategy on 30 May 2017 and was accepted for examination on 27 June 2017.

1.2 The Proposed Development comprises the construction, operation and maintenance of a new gas-fired electricity generating station with a gross output capacity of up to 2,500 megawatts ('MW'), including electrical and water connections, a new gas supply pipeline and other associated development, on land at and in the vicinity of the existing Eggborough coal-fired power station, near Selby, North Yorkshire.

1.3 A DCO is required for the Proposed Development as it falls within the definition and thresholds for a 'Nationally Significant Infrastructure Project' (a 'NSIP') under Sections 14 and 15(2) of The Planning Act 2008 (the 'PA 2008'). The DCO, if made by the SoS, would be known as the 'Eggborough CCGT (Generating Station) Order' (the 'Order').

1.4 This document has been prepared in consultation with the Environment Agency and Natural England and sets out the joint response of the Applicant and these Interested Parties to the Examining Authority's (the 'ExA's') request for further information relating to Habitats Regulations Assessment set out at Annex A to the Rule 8(3) and Rule 17 letter dated 5 December 2017. The joint response to the questions in Annex A is provided in Section 2. The document has been submitted for Deadline 5 of the Examination.

2.0 RESPONSE TO THE EXA'S REQUEST FOR FURTHER INFORMATION

2.1 The joint response of the Applicant, the Environment Agency and Natural England to the ExA's request for further information relating to Habitats Regulations Assessment is set out in Table 2.1 on the following pages of this document. A response is provided to each of the Questions (Questions 1 to 8) set out at Annex A to the Rule 8(3) and Rule 17 letter dated 5 December.

2.2 The document also includes the following information:

- **Appendix 1** - Habitats Regulations Assessment Signposting Report and Screening and Integrity Matrices.

Table 2.1 - Response to Questions 1 to 8 of Annex A of the Rule 8(3) and Rule 17 letter dated 5 December 2017

ExA Question No.	ExA Question	Response
1	Can the Applicant, EA and NE comment on the reliance placed on the EA's significance criteria as set out in paragraphs 8.3.29 and 8.3.42 o the ES [APP-046] and paragraph 3.4 of the Technical Note on air quality impacts [REP3-010] in concluding no likely significant effects (LSE) of the project alone and in-combination for the purposes of HRA. In particular, why the relevant thresholds are applicable for HRA (e.g. increases in process contributions to critical loads of less than 1% being considered 'insignificant').	The significance criteria of 1% is the screening threshold accepted by the EA and NE, below which the magnitude of an effect is judged to be so low as to be inconsequential and can robustly and reasonably be taken to result in no likely significant effect (LSE) when applied to HRA screening. The threshold is based on consideration of the relevant science and its practical application, to inform assessments on sensitive habitats required by the Habitats Regulations as part of the granting of permits under the Integrated Pollution Prevention Control Regulations. This guidance was published by the EA in 2007, and although since superseded by a revised guidance document in 2012[1], the principles remain the same. The wording of the guidance states: "*PCs [Process Contributions] are considered insignificant if the long-term process contribution is less than 1% of the relevant EQS [Environmental Quality Standard]. The long-term 1% process contribution insignificance threshold is based on the judgements that it is unlikely that an emission at this level will make a significant contribution to air quality and the threshold provides a substantial safety margin to protect health and the environment.*" (emphasis added). The IAQM has subsequently published guidance[2] on the application of the 1% criterion to in-combination effects required for HRA, which states that: "*For installations other than intensive pig and poultry farms, AQTAG is confident that a process contribution <1% of the relevant critical level of load can be considered inconsequential and does not need to be included in an in-combination assessment". It further states "The 1% threshold has become widely used throughout the air quality assessment profession to define a reasonable quantum of pollution which is not likely to be discernible from fluctuations in background/measurements.*" Further EA Permitting Guidance[3] notes that "*The choice of the 1% assessment level as a standard approach is a matter of professional Judgement. This professional judgement takes account of:* • *The absolute contribution of a pollutant to an ecosystem which receives an impact at this level. For example, a contribution of 1 % of the critical load for nitrogen of 10kg/ha/yr is equivalent to 0.01 g of nitrogen per square metre per year. It is extremely unlikely that an emission at this level will make a significant contribution to air quality or air pollution impacts, and is therefore considered to be inconsequential both alone and in combination;* • *The likelihood of overlapping in-combination effects occurring at the same location leading to a conclusion of 'no adverse effect' at the appropriate assessment stage (Stage 3). Experience of permitting allows us to be confident that it is unlikely that a substantial number of plans or projects will occur in the same area at the same time, such that their cumulative impact would give rise to concern at the appropriate assessment stage. If such a situation were to arise then the assessment could be determined on a case-specific basis;"* The 1% threshold is therefore a screening threshold for guidance only and is to determine insignificant effects. That does not mean by extension that any predicted process contribution that is marginally above the 1% threshold is significant. As stated in an IAQM consultation document on assessment of air quality effects on designated sites[4], a change of more than 1% does not necessarily indicate that a significant effect (or adverse effect on integrity) will occur; it means that the change in effect cannot on its own be described as imperceptible and therefore requires further consideration.

[1] Environment Agency (2012) Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation. Operational Instruction 66_12. Environment Agency.
[2] Institute of Air Quality Management (IAQM) (2016) Use of a Criterion for the Determination of an Insignificant Effect of Air Quality Impacts on Sensitive Habitats. IAQM Position Statement – Effect of Air Quality Impacts on Sensitive Habitats.
[3] AQTAG21 Draft (2015) Likely Significant Effect – use of 1% and 4% long term thresholds and 10% short term thresholds.
[4] A Guide to navigating the assessment of air quality effects on designated sites (Consultation draft, IAQM, 2017).

ExA Question No.	ExA Question	Response
2	For the last sentence of question 1 above, can NE specifically confirm that the EA's EPR Risk Assessment screening criteria, set against National Air Quality Strategy Objectives, which defines 'insignificant effects' as being where long-term process contributions should be less than, or equal to 1%, is a suitable criteria for the assessment of the effects on European sites in respect of HRA.	NE confirms that the EA's 1% criterion is an acceptable screening threshold for enabling a conclusion of no LSE on European sites for HRA. It is important to note that, as set out in the IAQM guidance note[2], the criterion was set at 1% and not 1.0% and the screening criteria should not be used to a numerical precision greater than one decimal place. This is due to the uncertainties surrounding the calculation of air quality impacts that are inherent within the technical modelling process. The IAQM guidance therefore suggests that a precautionary approach would be to explore the likelihood of an adverse effect when the impact is, for example, marginally in exceedance of the 1% threshold of the critical load/ level. The IAQM Guidance states that it is the position of the IAQM that the use of a criterion of 1% of an assessment level in the context of habitats should be used only to screen out impacts that will have an insignificant effect. It should not be used as a threshold above which damage is implied and therefore should not be used to conclude that a significant effect is likely. The consultation draft notes that a PC that is, for example, 1.2% of the critical level or critical load should be considered to be equal to 1%. NE, in applying this criteria and precautionary principle, is satisfied that process contributions of 1.5% or below can be robustly and reasonably assumed to be insignificant both alone and in-combination with other plans or projects.
3	Can the Applicant, EA and NE explain if and why the thresholds applied in the Applicant's assessment for determining the absence of LSE (or otherwise) are appropriate for European sites where there are already exceedances above the critical loads or levels for given pollutants (as identified in tables 2-6 of [REP2-017]). The explanation should take into account the impact of the proposed development alone and in-combination with other plans and projects.	As discussed above, both NE and EA accept and routinely apply the 1% criterion to HRA screening for LSE on European sites, both alone and in-combination. Where there are already exceedances above the critical loads or levels for given pollutants, as in the case of most sites in the UK, the screening threshold is still applicable. This is because the 1% threshold is not a threshold for determining the onset of damage to a habitat; rather it is a screening threshold above which potential effects may need to be examined in more detail (alone and in-combination) and below which it is accepted by the regulators that effects alone or in-combination can be considered to be insignificant. The baseline deposition rate for nitrogen (N) at the 'degraded raised bogs still capable of natural regeneration' habitat feature of Thorne Moor is on average 15.2 kg N/ha/yr, which is well above the critical load of 5 kg N/ha/yr, and represents a process contribution of around 200%. It is acknowledged that the revised modelling of the proposed CCGT with the SCR technology results in ammonia (NH_3) related N deposition of 1.1% of the relevant lower critical load over a small portion (less than 7%) of the Thorne Moor SAC. Therefore the potential effects of this deposition are considered in more detail in a revised appropriate assessment that accompanies this submission.
4	The judgment in Wealden District Council v. Secretary of State for Communities and Local Government (2017) EWHC 351 highlights the procedural requirement of the Habitats Regulations in regard to the assessment of in-combination effects. The ExA acknowledges the Applicant's current approach described in Chapter 20 of the ES (paragraph 20.5.10 [APP-046]) which explains that the in-combination assessment has been undertaken on a qualitative basis. The current HRA matrices [APP-111] refer to this as evidence of no LSE in-combination with other plans and projects. The ExA is unclear as to how the conclusion reached in regards to in-combination effects are substantiated with reference to the thresholds applicable to the findings of LSE as referred to in question 1 above. The ExA requests the Applicant provide the information necessary to undertake the assessment of LSE of the Proposed Development in-	The IAQM guidance[2] states that where process contributions are 1% (or even slightly above) then the magnitude of change is so inconsequential ('*de minimis*') that it does not require an in-combination effects assessment. It would not be considered appropriate, in such a case, therefore, to undertake a quantitative in-combination effects assessment because there is no pathway for LSE. Both NE and EA consider the potential for in-combination effects to be negligible for the Proposed Development based on the predicted process contribution and the conservatism and level of uncertainty inherent within the dispersion modelling assessment undertaken. For impacts that are marginally above the 1% insignificance threshold, professional judgement must be applied to determine what is an appropriate level of assessment of potential in-combination effects. This is provided in the HRA Signposting Report that is provided at **Appendix 1**. In addition it is acknowledged that the cessation of operations of the existing coal-fired power station was not considered

ExA Question No.	ExA Question	Response
	combination with other plans and projects, with particular reference to the thresholds of LSE as referred to above.	within the in-combination effects HRA screening appraisal for the Proposed Development because at the time of undertaking the assessment, the CCGT was not seen as a direct replacement for the coal-fired power station. However, it is acknowledged that the environmental permit variation application currently being determined by the EA, and Requirement 4 of the draft DCO, will not permit the two power stations to operate simultaneously. There would be a reduction in process contribution of Nitrogen deposition to Thorne Moor SAC of around 3% associated with the process contribution from the existing coal-fired power station. The HRA Signposting Report and PINS Matrices (**Appendix 1**) have been updated to take this into account.
5	Notwithstanding the points raised above, and in accordance with the Applicant's methodology, an appropriate assessment is necessary for the Thorne Moor SAC. The ExA requests the applicant to provide the information necessary for the competent authority to undertake this assessment. The information should be sufficient to enable an assessment of the impacts to the integrity of the site in view of its conservation objectives. Where necessary, the information should explain the current conservation status of the site and how the proposed development will or will not affect this.	The HRA Signposting Report (**Appendix 1**) provides this information. The Significance and Integrity Matrices have also been updated and are submitted as requested by the ExA.
6	The Applicant's submissions identify that the contributions associated with the "fully operational" existing Eggborough Power Station are circa 3% of the critical loads but are not specific as to which pollutants/ sites this relates (paragraph 2.27 of [REP3-010]). In undertaking the assessments referred to above, the applicant should explain the extent to which the reductions referred to are taken into account and are relevant to the findings of no LSE or the appropriate assessment(s). The ExA also invites NE and the EA to comment on this point.	The process contribution of the fully operational existing coal-fired Eggborough Power Station is c. 3% of the minimum critical load relating to N deposition at the Thorne Moor SAC. As discussed in response to Q4 above, the reduction in process contributions resulting from the cessation of operations at the coal-fired power station were not previously taken into account in the air quality modelling, or consequently in the HRA for the Proposed Development. This was because the CCGT was not treated as a direct replacement of the coal-fired power station in the DCO application. Following a Schedule 5 'further request for information' issued by the EA in respect of the permit variation application, the air quality modelling has been updated to take into account less conservative modelling assumptions - see the Memo at **Appendix 1** (Appendix H of the HRA Signposting Report). This Memo also considers the reduction in process contributions of N deposition at the Thorne Moor SAC resulting from the cessation of operations at the coal-fired power station. This does not change the findings of no LSE in the HRA Signposting Report, although clearly the closure of the coal-fired power station would represent a significant reduction in the annual N deposition rates to the Thorne Moor SAC. NE agrees with the Applicant's comments above and does not have any further comments to make. The EA has not reviewed the submitted fully operational existing coal-fired power station predictions as these were not included as part of the original Environmental Permit application variation. Therefore, the EA are not able to validate the Applicant's N deposition PC of 3% of the minimum critical load and as a result it cannot confirm whether the reduction in N deposition is considered significant. However, due to the cessation of the coal-fired power station and the revised CCGT PC prediction of 1.1% indicating that impacts of N deposition from the proposed plant are not likely to be significant, the level of reduction is of less importance when considering the environmental impacts.
7	The ExA notes the purported agreement reached between the applicant and the EA and NE regarding BAT and the potential use of SCR (paragraphs 2.22 and 2.28 of [REP3-010]). The ExA is aware that, at this moment in time, the applicant is unable to discount the need for SCR during the operation of the proposed development. Therefore, the assessment undertaken to inform the HRA process including appropriate assessment (where required) should include assessment of the SCR option.	For the avoidance of doubt, the only process contribution to N deposition that is marginally above the 1% screening threshold for no LSE on the Thorne Moor SAC results from the Proposed Development if operating with SCR. The worst case predicted process contribution at Thorne Moor is dominated by ammonia deposition resulting from the operation of the SCR system. The assessment undertaken to inform the HRA process therefore does include assessment of the SCR option. The process contributions from the Proposed Development operating without SCR are below the 1% screening threshold. The HRA Signposting Report (**Appendix 1**) clarifies this point.
8	With regard to the above, the ExA requests NE to confirm if they are still content with the	NE confirms that it is content with the conclusions of no LSE on the Thorne Moor SAC alone and in-combination for the

ExA Question No.	ExA Question	Response
	Applicant's conclusions of no LSE (alone and in-combination with other plans and projects) at the sites identified as being relevant in the assessment.	Proposed Development without SCR, for which the process contribution of N deposition is below the 1% screening threshold. For the Proposed Development operating with SCR, for which the process contribution results in a small exceedance of the 1% screening threshold for N and NH_3, NE considers that a precautionary approach to the HRA has been taken, and the screening conclusion of LSE has been used as a trigger to consider the potential effects in more detail. The Applicant has prepared an appropriate assessment, in consultation with the EA and NE, that is proportionate to the likely impact on the SAC from the Proposed Development: based on revised dispersion modelling requested by the EA through the permit variation application process, the process contribution is only slightly above the 1% threshold (at 1.1%) and therefore it is not considered necessary to undertake a detailed in-combination assessment with all other plans and projects that may affect the SAC. This is on the basis that even a process contribution of 1.5% is still negligible in the context of what level of N deposition could result in a measurable change (damage) to the SAC raised bog habitat. NE therefore agrees that for the Proposed Development with SCR, there will be no adverse effects on the integrity of Thorne Moor SAC, and the HRA Signposting Report and Significance and Integrity Matrices (**Appendix 1**) reflect the revised assessment.

APPENDIX 1: HABITATS REGULATIONS ASSESSMENT SIGNPOSTING REPORT AND SCREENING AND INTEGRITY MATRICES

Eggborough CCGT

Habitats Regulations Assessment (HRA) Signposting Report and Screening and Integrity Matrices

Eggborough Power Limited

Project Number: 60506766

January 2018

Quality information

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1. Introduction

This Appendix represents a revised 'Habitats Regulations Assessment Signposting Document' prepared for the Proposed Development, to assist the competent authority in discharging their obligations under the Conservation of Habitats and Species Regulations 2017 (commonly referred to as the 'Habitats Regulations'). This Appendix has been revised to address queries raised by the Examining Authority (ExA) in its consideration of the Development Consent Order (DCO) for the proposed development of a Combined Cycle Gas Turbine (CCGT) power station on the site of the Eggborough power station (the 'Proposed Development').

The terms of reference used in this report are consistent with those defined within the main chapters of the Environmental Statement (ES) that accompanied the DCO application for the Proposed Development. References are included, under relevant subject headings, to those chapters, technical appendices and/ or paragraphs within the ES that contain the information required by the competent authority to undertake an "appropriate assessment" under the terms of Regulation 63 of the Habitats Regulations. It is designed to serve two key functions:

- to assist the competent authority by making it easier to undertake and consult on a Habitats Regulations Assessment; and
- to act as a confirmatory checklist that can be used to ensure that the relevant information needed for a Habitats Regulations Assessment is adequately presented.

Preparation of this report has involved reference to Planning Inspectorate Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects (November 2017).

PINS Advice Note Ten requires an evaluation of the potential for the proposed development to require other consents which could also require Habitats Regulations Assessment by different competent authorities, and a statement as to whether the DCO boundary of the project overlaps with devolved administrations or other European Economic Area (EEA) States.

It is confirmed that the DCO boundary of the project does not overlap with areas of devolved administrations nor with those of other EEA States.

1.1 Rationale for Scoping

For statutory designated nature conservation sites subject to the provisions of the Habitats Regulations, it is usual to consider a search radius of 10 km when examining the potential pathways for air quality impacts on the sites. There are no such statutory designated sites within a 10 km radius of the Proposed Power Plant Site; however, North Yorkshire County Council (NYCC) in its consultation response has indicated that they wish to see a precautionary approach undertaken in respect of the assessment of emissions to air (in particular atmospheric nitrogen deposition) from the Proposed Development. A description of the Proposed Development is provided in Chapter 4 (The Proposed Development) of the ES.

A total of six Special Areas of Conservation (SAC) with qualifying Annex I habitats that are potentially susceptible to the effects of emissions to air from the Proposed Development have therefore been scoped into this signposting document, as identified by NYCC. In addition, potential surface water pathways to the Humber Estuary have also been considered due to the cooling water intake location on the River Aire (which outfalls to the Estuary). The purpose of this signposting document is to assist the competent authority in discharging their obligations under the Habitats Regulations when considering the DCO application submitted to the Secretary of State for determination. The following sites were scoped into the ES (see Figure 10H.1):

- Skipwith Common SAC – approximately 10.5 km north-east of the Site boundary;
- Thorne Moor SAC – approximately 14 km south-east of the Site boundary (15.4km from the emission stacks);
- Hatfield Moor SAC – approximately 14 km south-east of the Site boundary;

- Humber Estuary SPA/ SAC/ Ramsar – approximately 15 km east of the Site boundary;
- Strensall Common SAC – approximately 35 km north of the Site boundary; and
- North York Moors SAC – approximately 60 km north of the Site boundary.

It is a requirement of the EC Habitats Directive 1992 and the Habitats Regulations (Box 1) that plans and projects are subject to an 'Appropriate Assessment' if it is likely that they will lead to significant adverse effects on a Natura 2000 site (the collective name for European designated sites). It is the duty of the competent authority to determine if significant adverse effects are likely and, if necessary, to then undertake the Appropriate Assessment, but the proponent of the scheme can be asked to supply sufficient data/reports to enable such a decision to be reached.

In the past, the term 'Appropriate Assessment' has been used to describe both the overall process and a particular stage of that process (see below). The term Habitats Regulations Assessment (HRA) has come into use in order to refer to the process that leads to an "Appropriate Assessment", thus avoiding confusion. Throughout this report, HRA is used to refer to the overall procedure required by the Habitats Regulations. The Habitats Regulations set out a stepwise process, including an 'Appropriate Assessment' to consider the impacts and effects of the Proposed Development on the Natura 2000 site.

Box 1: The legislative basis for determining Likely Significant Effect and for subsequent Appropriate Assessment, if required

Habitats Directive 1992

"*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives*."

Article 6 (3)

Conservation of Habitats and Species Regulations 2017

"*A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site or a European Offshore Marine Site (either alone or in combination with other plans or projects) … must make an appropriate assessment of the implications for the site in view of that sites conservation objectives … The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site …*".

Regulation 63

1.2 Overview of HRA Procedure and Context

The Office of Deputy Prime Minister (ODPM) Circular 06/2005 (Biodiversity and Geological Conservation - Statutory Obligations and Their Impact Within the Planning System) provides guidance on how the Regulations should be implemented. This is interpreted and summarised as follows:

- determination of whether the proposal is likely to have a significant effect, either alone or cumulatively (referred to as 'in-combination' in HRA terms) with other plans or projects, on a European site;
- if a significant effect is likely, the competent authority must conduct an Appropriate Assessment of the implications for the site in view of the site's conservation objectives (Natural England, 2008);
- in considering the project's effects on the site's conservation objectives, the competent authority must determine whether it can ascertain that the proposal will not adversely affect the integrity of the site;
- taking account of the way in which works are proposed to be carried-out, and the site conditions or other restrictions;

- being satisfied that there are no alternative solutions which would have a lesser effect on site integrity;
- considering whether there are Imperative Reasons of Overriding Public Interest (IROPI) to justify granting of permission for the development despite a potentially negative effect on site integrity; and
- in the absence of alternatives, and where the importance of the development outweighs the harm to a European site, consideration of proposed compensatory measures (to ensure that the overall coherence of the network of Natura 2000 sites is protected).

A flow chart of the HRA process (showing the decisions that are required at each stage) is provided as Figure 1.1. A four-stage methodology for HRA would therefore include:

- HRA Stage 1: Screening (including a 'likely significant effect' judgement);
- HRA Stage 2: Appropriate Assessment;
- HRA Stage 3: Assessment of Alternative Solutions; and
- HRA Stage 4: Assessment where no alternative solutions exist and where adverse effects remain.

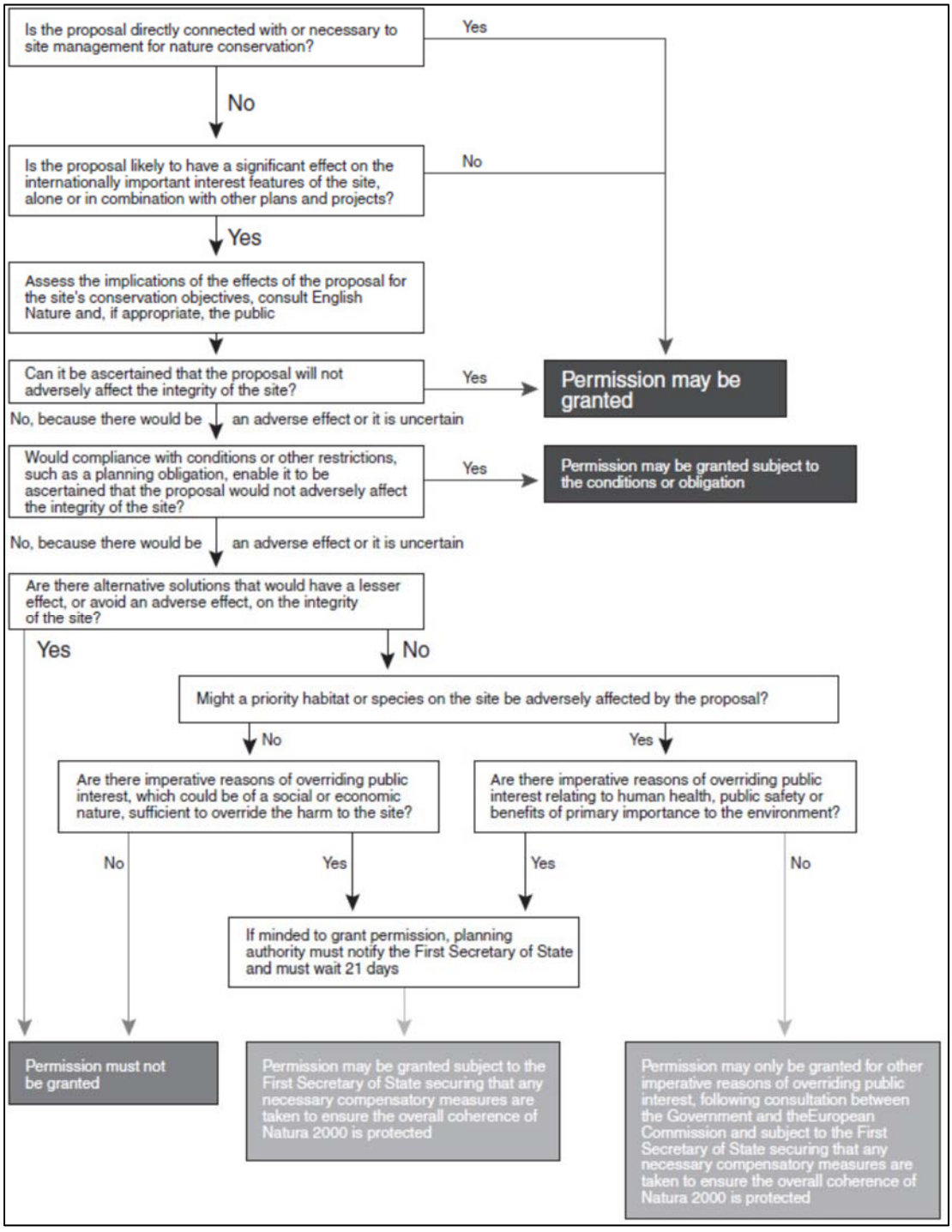
Whilst the Appropriate Assessment and any subsequent assessments are undertaken by a competent authority, the information needed to undertake the assessments is generally provided by the applicant. For the Proposed Development the necessary information is presented within Chapters 8 (Air Quality) and 10 (Ecology and Nature Conservation) of the ES. Information on the Proposed Development is presented in Chapter 4 (The Proposed Development).

The ES concluded that the Proposed Development will not result in any significant adverse effects on the statutory designated sites identified in Section 1.1, although if the Proposed Development installs Selective Catalytic Reduction (SCR) technology then the predicted impact of nitrogen deposition on a small area of the Thorne Moor SAC was predicted to be slightly above the threshold for insignificance.

It should be appreciated that the mechanism for Environmental Impact Assessment (EIA) used in the ES (including how terminology is used, and how the importance of receptors is evaluated) differs from that adopted for HRA. Consequently, whilst it is considered that all the information necessary to undertake an HRA is contained within the ES, a separate process is still required to address the specific obligations of the Habitats Regulations. This is the role that this document seeks to provide by assisting the competent authority in directing them to the necessary information within the ES.

One primary difference between EIA and HRA relates to the context of the assessments. HRA is specifically designed to consider the effects of a plan of project on the integrity of a Natura 2000 site, including its designated features (regardless of whether or not they are geographically located within the site at the time). It considers the whole of the Natura 2000 site in some detail, and by definition focuses on a site acknowledged to be of international importance. EIA, on the other hand, adopts a different perspective. It considers the impacts resulting from a development, and whether they have the potential to affect different receptors. The significance of the effect on any receptor is measured by combining the magnitude of the impact, and the importance and sensitivity of the receptor itself. EIA therefore seeks to establish the level at which significant effects occur, which may include Natura 2000 receptors at less than an international (possibly just at a local) level. This distinction should be noted when applying this signposting document.

Figure 1.1: Consideration of development proposals affecting Internationally Designated Nature Conservation Sites (ODPM, 2005)



2. Baseline Evidence Gathering

2.1 Scheme Description and Alternatives

A detailed description of the Proposed Development is provided in Chapters 3 (Description of the Site) and 4 (The Proposed Development) of the ES.

Consideration of the different alternatives to the Proposed Development is provided in Chapter 4 (The Proposed Development) of the ES.

2.2 The Need for the Proposed Development

A comprehensive description of the project's rationale is presented in Chapter 4 (The Proposed Development) of the ES.

2.3 Consultation with Natural England and/ or General Public

Regulation 63(3) & (4) of the Habitats Regulations refer to the need for, and option of, consultation with Natural England and the public respectively. At the scoping stage, Natural England was consulted on the proposed scope of the ecological impact assessment.

A summary of the comments received from Natural England in respect of the potential for adverse effects on statutory designated sites is provided in Table 10.4 in Chapter 10 (Ecology and Nature Conservation) of the ES.

Natural England has since also taken part in the examination of the DCO application, providing information in relation to the potential ecological effects of the Proposed Development. The public are able to take part and provide their views through the Applicant's pre-application consultation processes (information on responses is set out in the Consultation Report) and throughout the examination.

2.4 Designated Sites Scoped in to HRA Screening

As discussed in Section 1.1 of this signposting document, following comments received from NYCC to the EIA Scoping Report, seven statutory designated Natura 2000 sites and one Ramsar site have been scoped into the assessment. It is a matter of UK Government policy to afford Ramsar sites the same protection as Natura 2000 sites through the Habitats Regulations. Although all eight sites are in excess of 10 km from the Site (10 km being the typically accepted zone of influence in which potential pathways for impacts are considered), NYCC had concerns regarding Atmospheric Nitrogen Deposition (AND) from combustion plants, and considered that the 10 km radius was insufficiently conservative when considering potential effects on habitats susceptible to the effects of AND.

Three of the Natura 2000 sites identified by NYCC support habitats that are vulnerable to the effects of nitrogen deposition and lie broadly downwind (based on the prevailing wind direction) of the Proposed Development Site.

The Proposed Development also has the potential to indirectly affect the Humber Estuary SPA/ SAC/ Ramsar via the River Aire, which flows into the Humber Estuary, on which there will be a cooling water intake/ outfall for the Proposed Development.

A summary of the qualifying features for each of the eight Natura 2000 sites and their distance from the Site is summarised in Table 10H.1 below.

Table 10H.1: Natura 2000 Sites Scoped into HRA Screening

Site	Approx. Distance from Site	Total Area (ha)	Summary of Primary Reasons for Site Selection	Summary of Qualifying Features
Skipwith Common SAC	10.5km NE	294.6	Northern Atlantic wet heaths with *Erica tetralix*	None

Site	Approx. Distance from Site	Total Area (ha)	Summary of Primary Reasons for Site Selection	Summary of Qualifying Features
			European dry heaths	
Thorne Moor SAC	14km S	1,191.02	Degraded raised bogs still capable of natural regeneration	None
Hatfield Moor SAC	14km S	1,359.02	Degraded raised bogs still capable of natural regeneration	None
Humber Estuary SAC	15km E	36,657.15	Estuaries Mudflats and sandflats not covered by seawater at low tide	Sandbanks which are slightly covered by sea water all the time Coastal lagoons Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Dunes with common sea buckthorn (*Hippophae rhamnoides*) River lamprey (Lampetra fluviatilis) Sea lamprey (*Petromyzon marnius*) Grey seal (*Halichoerus grypus*)
Humber Estuary SPA	15km E	37,630.24	Populations of European importance of Annex I and Annex II over-wintering wildfowl and wading birds. Internationally important assemblage of migratory and wintering birds.	N/A
Humber Estuary Ramsar	15km E	37,987.8	Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons. Grey seal Internationally important populations of passage wildfowl and waders.	N/A
Strensall Common SAC	35km E	572	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths	None
North York Moors SAC	60km N	44,053.29	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths	Blanket bogs

2.5 Conservation Objectives

The conservation objectives for each relevant Natura 2000 site are summarised in Table 10H.2 below.

Table 10H.2: Conservation Objectives for Relevant Natura 2000 Sites

Site	Conservation Objectives
Skipwith Common SAC	Ensure that the integrity of the qualifying natural habitat is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of the qualifying natural habitat; • The structure and function (including typical species) of the qualifying natural habitat, and • The supporting processes on which the qualifying natural habitat rely
Thorne Moor SAC	Ensure that the integrity of the qualifying natural habitat is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of the qualifying natural habitat; • The structure and function (including typical species) of the qualifying natural habitat, and • The supporting processes on which the qualifying natural habitat rely
Hatfield Moor SAC	Ensure that the integrity of the qualifying natural habitat is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of the qualifying natural habitat; • The structure and function (including typical species) of the qualifying natural habitat, and • The supporting processes on which the qualifying natural habitat rely
Humber Estuary SAC	Ensure that the integrity of the qualifying natural habitat is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of the qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely • The populations of qualifying species, and • The distribution of qualifying species within the site
Humber Estuary SPA	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; • The extent and distribution of the habitats of the qualifying features • The structure and function of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The populations of each of the qualifying features, and • The distribution of the qualifying features within the site
Humber Estuary Ramsar	Not specifically listed. Assumed as for Humber Estuary SAC and SPA.
Strensall Common SAC	Ensure that the integrity of the qualifying natural habitat is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of the qualifying natural habitat; • The structure and function (including typical species) of the qualifying natural habitat, and • The supporting processes on which the qualifying natural habitat rely
North York Moors SAC	Ensure that the integrity of the qualifying natural habitat is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable

Site	Conservation Objectives
	Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of the qualifying natural habitat; • The structure and function (including typical species) of the qualifying natural habitat, and • The supporting processes on which the qualifying natural habitat rely

3. Stage 1: Screening for Likely Significant Effects on Natura 2000 Sites

3.1 Identification of Potential Impacts

The potential source-receptor pathways by which the Proposed Development could impact the qualifying features of each Natura 2000 site, and which were scoped into the ecological impact assessment are as follows:

- Surface water quality – potential pathways for the surface water pollution to the River Aire, and ultimately to the Humber Estuary SAC/ SPA/ Ramsar into which the river flows during the construction phase of the cooling water intake e.g. sedimentation, vehicle fuel spill; and
- Air quality - potential pathways identified through emissions to air during the operational phase of Proposed Development resulting in nitrogen and acid deposition to susceptible habitats within the North York Moors SAC, Strensall Common SAC, Skipwith Common SAC, Thorne Moor SAC and Hatfield Moor SAC.

No pathways by which underwater noise could give rise to likely significant effects on marine mammals and fish that are part of the Humber Estuary SPA/ SAC/ Ramsar/ SSSI have been identified given that any works associated with the Proposed Development will be 25km from the nearest part of the designated site. Over this distance it is reasonable to conclude that there would be no propagation of underwater noise such that the qualifying features could be affected. This pathway is therefore scoped out.

No pathways by which emissions to air could give rise to likely significant effects on the Humber Estuary SPA/ SAC/ Ramsar have been identified because no habitats susceptible to nitrogen or acid deposition are present. This pathway is therefore scoped out.

Given the distance between the Natura 2000 sites and the Proposed Development there is no pathway that could result in direct habitat loss or direct physical damage to any of the designated habitats. Similarly, there are no groundwater pathways over this distance through which the Proposed Development could give rise to any effects on the groundwater dependent terrestrial ecosystems (GWTEs) of the Natura 2000 sites. These pathways are therefore scoped out.

3.1.1 Potential Surface Water Impacts

The nearest part of the Humber Estuary SPA/ SAC/ Ramsar is approximately 25 km downstream of the cooling water intake from the River Aire for the Proposed Development. There is a risk that, in the absence of appropriate mitigation, there could be surface water pollution to the Aire during the construction or operational phases that could reach the designated features. However, over this distance and even in the absence of mitigation, it is reasonable to assume that any surface water pollution would have significantly diluted over this distance such that it would not pose a risk to designated features. Similarly, the nearest grey seal breeding colony is at Donna Nook on the Lincolnshire coast, which is approximately 80 km from the Proposed Development, and can therefore reasonably considered to be outside the zone of influence of any potential surface water impacts arising from the Proposed Development.

Standard environmental measures to control pollution during the construction phase will adequately minimise the risk of pollution entering the River Aire. These measures are required for best practice and to meet the requirements of environmental legislation for construction. A Construction Environmental Management Plan (CEMP) will be prepared for the construction phase setting out how the risk of surface water impacts will be adequately controlled, and an emergency plan developed in

the case of an accidental spillage to minimise impacts on the River Aire. Operationally, cooling towers will be used to control thermal discharges to the river and any pollutant discharges will be monitored, treated and controlled through an Environmental Permit required for the operation of the plant. Operational impacts on the river and thereby on the Estuary are therefore considered to be insignificant.

3.1.2 Potential Air Quality Impacts

There are two measures of particular relevance when considering the potential for likely significant effects to result from changes in air quality arising from the Proposed Development. The first is the concentration of oxides of nitrogen (known as NOx) in the atmosphere. The main importance ecologically is as a source of nitrogen (N), which is then deposited on adjacent habitats either directly (known as dry deposition, including directly onto the plants themselves) or washed out in rainfall (known as wet deposition). The deposited nitrogen can then have a range of effects, primarily growth stimulation or inhibition[1], but also biochemical and physiological effects such as changes to chlorophyll content. NOx may also have some effects which are un-related to its role in total nitrogen intake (such as the acidity of the gas potentially affecting lipid biosynthesis) but the evidence for these effects is limited and they do not appear to occur until high annual concentrations of NOx are reached. The guideline atmospheric concentration of NOx advocated by Government for the protection of vegetation is 30 micrograms per cubic metre (μgm^{-3}), known as the Critical Level (Hall ***et al***., 2006). This is driven by the role of NOx in N deposition and in particular in growth stimulation and inhibition. If the total NOx concentration in a given area is below the critical level, it is unlikely that N deposition will be an issue, unless there are other sources of nitrogen (e.g. ammonia). If it is above the critical level then local N deposition from NOx could be an issue and should be investigated.

The second important metric is a direct determination of the rate of the resulting N deposition, which is habitat specific because different habitats have varying tolerance to nitrogen. For many habitats there are measurable effects in the form of published dose-response relationships for N deposition, which do not exist for NOx. Unlike NOx, the N deposition rate below which current evidence suggests that effects should not arise is different for each habitat. The rate (known as the Critical Load) is provided on the UK Air Pollution Information System website (www.apis.ac.uk) and is expressed as a quantity (kilograms) of nitrogen over a given area (hectare) per year (kg N/ha/yr). More recently, there has also been research compiled that investigates N dose-response relationships in a range of habitats (Caporn *et al*., 2016).

For completeness, rates of acid deposition are also calculated. Acid deposition derives from both sulphur and nitrogen. It is expressed in terms of kiloequivalents (keq) per hectare per year. The thresholds against which acid deposition is assessed are referred to as the Critical Load Function.

For all potential source-receptor pathways identified, the ES concluded that the Proposed Development will not result in any significant effects on designated sites. When considered in HRA terms, the technical assessments undertaken were considered to present sufficient evidence for a conclusion of no likely significant effect (LSE) on any Natura 2000 site.

This screening stage has been revised following queries raised by the ExA particularly regarding the operation of the Proposed Development with SCR technology, should that be required to control NOx emissions from the plant. It also considers a further information (Schedule 5) request from the Environment Agency, in its consideration of the Environmental Permit variation application for the operation of the CCGT. This involves consideration of two scenarios in further detail:

1) The need to apply Selective Catalytic Reduction (SCR) using ammonia (NH_3) to reduce NOx in order to demonstrate the use of Best Available Techniques (BAT) to minimise nitrogen oxide (NOx) emissions from the CCGT stacks, which in turn may result in the potential release of unreacted ammonia to atmosphere. The revised air quality modelling for the Proposed Development when operating with SCR results in a predicted process contribution to the Thorne Moor SAC of slightly above the 1% insignificance screening threshold for no LSE at this SAC. For all other designated sites – and for the operation of the Proposed Development without SCR - the predicted process contribution is below the 1% screening threshold and therefore the results of the previous screening remain valid i.e. no LSE.

[1] The addition of nitrogen is a form of fertilization, which can have a negative effect on habitats over time by encouraging more competitive plant species that can force out the less competitive species that are more characteristic of such habitats.

2) Altered baseline conditions resulting from the cessation of operations at the existing coal-fired power station. The Environment Agency has indicated that it would not grant a permit for the two power stations to operate together, and Requirement 4 of the draft DCO also precludes such a scenario, and therefore the decrease in NOx emissions resulting from the cessation of operations at the existing coal-fired power station has been considered as part of the in-combination effects.

3.2 Summary of HRA Signposting for LSE Screening

Table 10H.3 below presents the signposting to the relevant ES chapters in which detailed assessment of the relevant potential source-receptor pathways identified in Section 3.1 can be found. The main source-receptor pathway identified was in respect of operational emissions to air from the proposed stacks. The Air Quality Chapter (Chapter 8) has assessed a range of scenarios for acid and nitrogen deposition based on the 'Rochdale Envelope' approach, which takes into account the various options being considered for the type and final layout of the Proposed Power Plant. The dispersion modelling used to support Chapter 8 and the Environmental Permit variation application has subsequently been updated following the Schedule 5 request issued by the EA who identified that the initial modelling was overly conservative. The revised modelling results are summarised in the attached Memo (see Appendix H).

Table 10H.3: HRA Signposting for LSE Screening for Relevant Natura 2000 Sites

Qualifying Feature	Potential Impact	Potential Pathway for Effects	Summary of Evidence Presented in ES	ES Reference	Likely Significant Effect Predicted?
Skipwith Common SAC					
Northern Atlantic wet heaths with *Erica tetralix* European dry heaths	Changes in air quality during operational phase	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.	Change is negligible; <1% of critical level and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
		Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage	Change is negligible; <1% of critical load and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
Thorne Moor SAC					
Degraded raised bogs still capable of natural regeneration	<u>Proposed Development without SCR</u> Changes in air quality during operational phase	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.	Change is negligible; <1% of critical level and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
		Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage	Change is negligible; <1% of critical load and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
	<u>Proposed Development with SCR</u> Changes in air quality during operational phase	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.	Decreased NOx emissions due to use of SCR; therefore process contribution is further reduced below 1% screening threshold.	-	No
		Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage.	Increased N deposition due to ammonia slip leading to increased NH_3 emission as part of SCR process. Change is c. 1.1% of critical load and is therefore marginally above	-	Yes

Qualifying Feature	Potential Impact	Potential Pathway for Effects	Summary of Evidence Presented in ES	ES Reference	Likely Significant Effect Predicted?
			the 1% screening threshold for no LSE.		
Hatfield Moor SAC					
Degraded raised bogs still capable of natural regeneration	Changes in air quality during operational phase	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.	Change is negligible; <1% of critical level and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
		Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage	Change is negligible; <1% of critical load and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
Humber Estuary SAC					
Estuaries Mudflats and sandflats not covered by seawater at low tide Sandbanks which are slightly covered by seawater all the time Coastal lagoons *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Surface water pollution during construction and operational phases	Pollution/ siltation of Humber Estuary via River Aire, which will be directly impacted by the Proposed Development.	Standard environmental measures to control pollution during construction phase will adequately minimise risk. Control of pollutant and thermal releases to water through the Environmental Permit. Nearest part of site is 25km downstream, and any pollution would have significantly diluted by the point at which it enters the estuary.	Chapter 11 (Water Resources, Hydrology & Flood Risk) Paragraphs 11.5.8 – 11.5.11	No
Humber Estuary SPA					

Qualifying Feature	Potential Impact	Potential Pathway for Effects	Summary of Evidence Presented in ES	ES Reference	Likely Significant Effect Predicted?
Populations of European importance of Annex I and Annex II over-wintering wildfowl and wading birds. Internationally important assemblage of migratory and wintering birds.	Surface water pollution during construction and operational phases to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via River Aire, which will be directly impacted by the Proposed Development.	Standard environmental measures to control pollution during construction phase will adequately minimise risk. Control of pollutant and thermal releases to water through the Environmental Permit. Nearest part of site is 25km downstream, and any pollution would have significantly diluted by the point at which it enters the estuary.	Chapter 11 (Water Resources, Hydrology & Flood Risk) Paragraphs 11.5.8 – 11.5.11	No
Humber Estuary Ramsar					
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons.	Surface water pollution during construction and operational phases to habitats	Pollution/ siltation of Humber Estuary via River Aire, which will be directly impacted by the Proposed Development.	Standard environmental measures to control pollution during construction phase will adequately minimise risk. Control of pollutant and thermal releases to water through the Environmental Permit. Nearest part of site is 25km downstream, and any pollution would have significantly diluted by the point at which it enters the estuary.	Chapter 11 (Water Resources, Hydrology & Flood Risk) Paragraphs 11.5.8 – 11.5.11	No
Grey seal	Surface water pollution during construction and operational phases to habitats supporting breeding grey seal	Pollution/ siltation of Humber Estuary via River Aire, which will be directly impacted by the Proposed Development.	Standard environmental measures to control pollution during construction phase will adequately minimise risk. Control of pollutant and thermal releases to water through the Environmental Permit. Nearest breeding grey seal colony is at Donna Nook, over 80 km east, and any pollution would have significantly diluted by the point at	Chapter 11 (Water Resources, Hydrology & Flood Risk) Paragraphs 11.5.8 – 11.5.11	No

Qualifying Feature	Potential Impact	Potential Pathway for Effects	Summary of Evidence Presented in ES	ES Reference	Likely Significant Effect Predicted?
			which it enters the estuary.		
Internationally important populations of passage wildfowl and waders.	Surface water pollution during construction and operational phases to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via River Aire, which will be directly impacted by the Proposed Development.	Standard environmental measures to control pollution during construction phase will adequately minimise risk. Control of pollutant and thermal releases to water through the Environmental Permit. Nearest part of site is 25km downstream, and any pollution would have significantly diluted by the point at which it enters the estuary.	Chapter 11 (Water Resources, Hydrology & Flood Risk) Paragraphs 11.5.8 – 11.5.11	No
Strensall Common SAC					
Northern Atlantic wet heaths with *Erica tetralix* European dry heaths	Changes in air quality	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.	Change is negligible; <1% of critical level and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
		Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage	Change is negligible; <1% of critical load and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
North York Moors SAC					
Northern Atlantic wet heaths with *Erica tetralix* European dry heaths	Changes in air quality	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.	Change is negligible; <1% of critical level and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No
		Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on	Change is negligible; <1% of critical load and is not significant.	Chapter 8 (Air Quality) Paragraphs 8.6.25 – 8.6.28	No

Qualifying Feature	Potential Impact	Potential Pathway for Effects	Summary of Evidence Presented in ES	ES Reference	Likely Significant Effect Predicted?
		vegetation assemblage			

3.3 Mitigation

Measures will be implemented throughout the construction phase to ensure legislative compliance with regards to surface water run-off, and these measures will be detailed in the Construction Environmental Management Plan (CEMP). This includes a plan to deal with accidental pollution to be agreed with the Environment Agency. However, such measures are not considered to represent mitigation, as they are provided as a matter of course as 'best practice' for construction regardless of potential effects. Further details are provided in Chapter 11 (Water Resources, Flood Risk & Hydrology). This embedded mitigation will ensure that there is no adverse effect on the River Aire, and thus a negligible risk of affecting downstream habitats within the Humber Estuary SAC/ SPA/ Ramsar.

In addition, the Environmental Permit regime for the Proposed Development will ensure that intake and outfall to the River Aire is carefully managed to avoid any adverse effects on the water quality of the river and downstream habitats. This provides a control mechanism and thus certainty regarding the negligible risk to river habitats during the operational phase of the Proposed Development.

3.4 In-Combination Effects with Other Plans or Projects

Relevant projects considered as part of the cumulative effects assessment undertaken for the ecological impact assessment, along with potential cumulative effect topics of relevance to the HRA in-combination assessment are summarised in Table 10H.4 below, along with the relevant signposting to ES Chapters.

The majority of the schemes identified in Chapter 4 (The Proposed Development) of the ES have been screened out of potential cumulative ecological effects on the basis that there are no pathways by which the schemes could adversely affect ecological receptors within the zone of influence of the Proposed Development, either alone or in-combination. The following schemes have been scoped out on this basis: Solar Farm, Kellingley Colliery Business Park, Yorkshire and Humber CCS (Carbon Capture and Storage) Pipeline, Thorpe Marsh Gas Pipeline and two residential developments at Eggborough. The rationale for this is presented in Chapter 20 (Cumulative and Combined Effects), paragraphs 20.5.43 to 20.5.45.

Following queries raised by the ExA at the examination stage of the DCO, the scope of the in-combination effects screening for HRA has been extended to further consider the potential for cumulative air quality effects on Thorne Moor SAC. It was considered appropriate to focus this search to plans or projects that could result in increased acid and nitrogen deposition onto Thorne Moor SAC e.g. pig/ poultry/ dairy farming operations, other power generating facility applications and proposed major road schemes. The following additional plans or projects were screened for LSE in-combination with the Proposed Development.

- Ferrybridge Multifuel 2 Power Station (DCO made in October 2015, project currently under construction);
- Thorpe Marsh Gas Pipeline (DCO made in March 2016);
- Drax Re-power Project (DCO scoping – application due Q2 2018)[2];
- West Burton C Power Station (DCO scoping – application due Q1 2018);
- Ferrybridge D CCGT Power Station (DCO scoping – application due Q1 2019).

As outlined in Table 10H.4 below, the cumulative impact assessment for air quality has confirmed that, based on the distances and directions from these developments to the Thorne Moor SAC and the heights of the proposed emission stacks, there will be no cumulative effects on any of the Natura 2000 sites as a result of acid and nitrogen deposition resulting from emissions to air. It can therefore be concluded that the Proposed Development will not result in likely significant effects on any Natura 2000 site, in-combination with other plans or projects.

[2] This project was not public knowledge when the original HRA screening was completed

Table 10H.4: Summary of Projects Considered in Cumulative Effects Assessment

Project or Plan	Relevant Natura 2000 Site	Potential Cumulative Effects on Natura 2000 Sites	ES Chapter Reference	Likely Significant Effects In-combination with Proposed Development?
Eggborough Coal-Fired Power Station Decommissioning and Demolition	Humber Estuary SPA/ SAC/ Ramsar	No pathways identified. Any works to replace or repair the existing cooling water abstraction intake/ discharge infrastructure is already required as part of the Proposed Development, and the impacts have therefore already been assessed. This is therefore not a potential cumulative effect.	Chapter 20 (Cumulative & Combined Effects) Paragraphs 20.5.46 – 20.5.47	No
	Skipwith Common SAC	No pathways identified. Existing Eggborough Power Station will not be operational at the same time as the Proposed Development, and therefore there is no potential for cumulative air quality impacts.	Chapter 20 (Cumulative & Combined Effects) Paragraphs 20.5.46 – 20.5.47	No
	Hatfield Moor SAC			
	Strensall Common SAC			
	North York Moors SAC			
	Thorne Moor SAC	Reduction in NOx emissions resulting from closure of existing coal-fired power station predicted to reduce process contribution from N deposition by 3% of the critical load at the SAC.	Revised Habitats Air Quality Impact Memo	Yes
Ferrybridge Multifuel 2	Skipwith Common SAC	Cumulative air quality impacts resulting from acid and nitrogen deposition. Assessment has concluded that there will be no cumulative effects on Natura 2000 sites.	Chapter 20 (Cumulative & Combined Effects) Paragraph 20.5.48	No
	Hatfield Moor SAC			
	Strensall Common SAC			
	North York Moors SAC			
	Thorne Moor SAC	No pathway for cumulative effects identified. The Site is approximately 28 km south-east of the Thorne Moor SAC and therefore it is	-	No

Project or Plan	Relevant Natura 2000 Site	Potential Cumulative Effects on Natura 2000 Sites	ES Chapter Reference	Likely Significant Effects In-combination with Proposed Development?
		outside the zone of influence of potential changes in air quality (typically up to 15 km is adopted for a radius in which air quality impacts on designated sites are assessed). The HRA report therefore did not consider pathways for impacts on the Thorne Moor SAC (URS, 2014).		
Knottingley Power Project	Skipwith Common SAC Thorne Moor SAC Hatfield Moor SAC Strensall Common SAC North York Moors SAC	Cumulative air quality impacts resulting from acid and nitrogen deposition. Assessment has concluded that there will be no cumulative effects on Natura 2000 sites. The power station is approximately 18 km north west of the Thorne Moor SAC and therefore it is outside the zone of influence of potential changes in air quality (typically up to 15 km is adopted for a radius in which air quality impacts on designated sites are assessed).	Chapter 20 (Cumulative & Combined Effects) Paragraph 20.5.48	No
Southmoor Energy Centre	Skipwith Common SAC Thorne Moor SAC Hatfield Moor SAC Strensall Common SAC North York Moors SAC	Cumulative air quality impacts resulting from acid and nitrogen deposition. Assessment has concluded that there will be no cumulative effects on Natura 2000 sites based on emission levels and proposed stack heights.	Chapter 20 (Cumulative & Combined Effects) Paragraph 20.5.48	No
Advanced Thermal Treatment Plant	Skipwith Common SAC Thorne Moor SAC Hatfield Moor SAC	Cumulative air quality impacts resulting from acid and nitrogen deposition. Assessment has concluded that there will be no cumulative effects on Natura 2000 sites	Chapter 20 (Cumulative & Combined Effects) Paragraph 20.5.48	No

Project or Plan	Relevant Natura 2000 Site	Potential Cumulative Effects on Natura 2000 Sites	ES Chapter Reference	Likely Significant Effects In-combination with Proposed Development?
	Strensall Common SAC	based on emission levels and proposed stack heights.		
	North York Moors SAC			
Thorpe Marsh CCGT	Skipwith Common SAC	Cumulative air quality impacts resulting from acid and nitrogen deposition. Assessment has concluded that there will be no cumulative effects on Natura 2000 sites as confirmed in the Environmental Information Report submitted in 2016 to support the approved section 36 variation for the proposed power station.	Chapter 20 (Cumulative & Combined Effects) Paragraph 20.5.48	No
	Thorne Moor SAC			
	Hatfield Moor SAC			
	Strensall Common SAC			
	North York Moors SAC			
Chapel Haddlesey Hydroelectric Scheme	Humber Estuary SPA/ SAC/ Ramsar	No pathway for cumulative effects identified. Ecology report submitted in support of the application identifies no adverse effects on ecology features associated with the River Aire as a result of the construction or operation of the scheme. Construction is assumed to have been completed by the time construction of the Proposed Development will occur.	Chapter 10 (Ecology & Nature Conservation) Paragraph 20.5.44	No
Thorpe Marsh Gas Pipeline	Thorne Moor SAC	No pathway for cumulative effects identified. The only potential pathway for air quality effects was as a result of fugitive dust emissions during the construction phase. However, the HRA report scoped out potential air quality effects on the SAC due to distance (ES, 2014). This was on the basis that the consented development was 8.5 km from the SAC and therefore the SAC was outside the zone of influence of dust emissions during construction.	-	No

Project or Plan	Relevant Natura 2000 Site	Potential Cumulative Effects on Natura 2000 Sites	ES Chapter Reference	Likely Significant Effects In-combination with Proposed Development?
Drax Re-power Project	Thorne Moor SAC	The Site is approximately 9 km north of Thorne Moor SAC. An application [for this project] is due to be submitted to the Planning Inspectorate in Q2 2018, and no quantitative air quality modelling has been published to date. The published scoping report confirms that potential air quality impacts on Thorne Moor SAC will be scoped into the EIA (WSP, 2017). However the report makes no reference to the use of SCR or potential emissions of ammonia and therefore on the basis of the information in the public domain no N deposition from ammonia emissions is assumed to occur from that scheme. As has been the case for the Eggborough CCGT, the ES and Habitats Regulations information (as required) for the Drax project will have a duty to consider the effects of its project alone and in-combination with other committed schemes and therefore will need to consider the cumulative effects of its emissions with those from the Eggborough CCGT (and other schemes) based on the data available in the public domain. Based on the above, there will be no cumulative effects on Natura 2000 sites.	-	No[3]
West Burton C Power Station	Thorne Moor SAC	No pathway for cumulative effects identified. The Site is approximately 28 km south-east of	-	No

[3] It is assumed that the Drax Re-power Project will consider potential in-combination air quality effects on Thorne Moor SAC with the Proposed Development, at the time at which that project's HRA is completed, which is assumed will be in 2018 based on the expected timetable published on the PINS website for the scheme.

Project or Plan	Relevant Natura 2000 Site	Potential Cumulative Effects on Natura 2000 Sites	ES Chapter Reference	Likely Significant Effects In-combination with Proposed Development?
		the Thorne Moor SAC and therefore it is outside the zone of influence of potential changes in air quality (typically 15 km is adopted for a radius in which air quality impacts on designated sites are assessed). The published scoping report has therefore not considered pathways for impacts on the Thorne Moor SAC (AECOM, 2017a).		
Ferrybridge D CCGT Power Station	Thorne Moor SAC	No pathway for cumulative effects identified. The Site is approximately 24 km north-east of the Thorne Moor SAC, and therefore is outside the zone of influence of potential changes in air quality (typically 15 km is adopted for a radius in which air quality impacts on designated sites are assessed). The published scoping report has therefore not considered pathways for impacts on the Thorne Moor SAC (AECOM, 2017b).	-	No

4. Stage 2: Appropriate Assessment: Thorne Moor SAC

4.1 Impact Pathways Scoped into Appropriate Assessment

The screening stage has identified only one potential pathway by which the Proposed Development could result in Likely Significant Effects on one European designated site; this is from the operation of the Proposed Development with SCR, resulting in increased nutrient nitrogen deposition on Thorne Moor SAC as a result of the increase in NH_3 emissions.

4.2 Alternatives Assessment

The alternative to the Proposed Development with SCR is the Proposed Development without SCR. As part of its consideration of the Environmental Permit application, the Environment Agency has requested that the use of SCR is considered as part of the BAT assessment for the Proposed Development, because the use of SCR reduces NOx emissions from the stack and may be required to meet the BAT Achievable Emission levels (BAT-AELs) published as part of the revised Large Combustion Plant BAT Reference document conclusions in July 2017. However, the EA are currently considering their regulatory position on whether the use of SCR – and meeting the revised BAT-AELs – is mandated for high efficiency CCGTs such as that proposed for the Proposed Development. Therefore it is not yet determined that the use of SCR represents BAT for the Proposed Development.

SCR requires the input of ammonia (NH_3), which reacts with the NOx in the flue gas to produce N_2 and H_2O. The resultant stack emissions are therefore lower in NOx but can lead to releases of unreacted ammonia ('ammonia slip') and therefore higher in deposited N than without the SCR, since the deposition rate of ammonia is much higher than that of NOx. When this scenario is modelled, the resultant outcome is a process contribution of N deposition of 1.1% to a small part of the Thorne Moor SAC, which is very slightly in excess of the 1% screening insignificance threshold, below which the process contribution is considered by the regulators to be negligible and thus insignificant.

4.3 Consultation with Statutory Bodies

Natural England has been consulted, and is satisfied that with the very small exceedance of the 1% screening threshold for N deposition on the Thorne Moor SAC for the Proposed Development with SCR, there will be no adverse effects on the integrity of the European Site. This section of the HRA signposting report therefore sets out the evidence base to support this conclusion, and to assist the ExA in completing its Report on the Implications for European Sites (RIES) as part of the DCO process.

4.4 Baseline Conditions and Vulnerabilities

The nearest part of the Thorne Moor SAC to the Proposed Development, and the only part of the SAC that is predicted to experience N deposition rates in excess of 1% of the critical load, corresponds broadly to units 1 and 2 of the Thorne, Crowle and Goole Moors SSSI. These describe features attributed to the 'lowland raised bog' habitat type, which is a qualifying habitat of the SAC and which is noted to be particularly sensitive to the effects of N deposition.

The most recent habitat condition report for these two SSSI units notes that they are 'unfavourable no change', largely as a result of scrub encroachment and drying of the peat bog. A Site Improvement Plan (SIP) prepared by Natural England for Thorne Moor SAC identifies the priority issues to address as: drainage, inappropriate scrub control, air pollution (impact of atmospheric nitrogen), public access/ disturbance, planning permission (cumulative effects on nightjar habitats), peat extraction and invasive species (Natural England, 2014).

The Thorne Moor SAC SIP states that "*As with most lowland raised bogs in England, the aerial deposits of nitrogen exceed the threshold limits above which the quality and character of bog vegetation begin to be altered and adversely impacted*". The APIS database states a critical load range of 5 – 10 kg N/ha/yr for the 'degraded raised bogs' habitat feature, with the current deposition range at Thorne Moor SAC stated at 14.6 – 18.8 kg N/ha/yr (average or 15.2 kg N/ha/yr). There is therefore currently a baseline exceedance of up to 13.8 kg N/ha/yr if the maximum deposition rate and minimum critical load value are used.

4.5 Air Quality Impacts on Thorne Moor SAC

Revised air quality modelling has been undertaken by AECOM's air quality specialists for the Proposed Development with SCR, at the request of the EA. The results of the revised modelling are presented in the Revised Habitats Air Quality Impact Memo.

At this point in the assessment, the 1% screening threshold can be discounted, because it is necessary to examine the likely effects of the change in air quality on the designated features of the SAC. This requires examination of the actual predicted annual contribution of the Proposed Development in terms of kg N/ha/yr deposited on the SAC.

The UK's semi-natural habitats exceed their atmospheric N deposition critical load ranges across much of their area, and survey data suggests that this results in measurable adverse effects on vegetation in protected sites, although information from Common Standards Monitoring (CSM) does not appear to identify this as a potential cause of 'unfavourable condition' at many designated sites (Caporn *et al*., 2016). It is therefore not known if the unfavourable condition of the lowland raised bog feature within the northern part of the Thorne Moor SAC is influenced by the high N deposition rates, but it is reasonable to assume that it must be, based on the baseline conditions. However, the degree to which N deposition is influencing any adverse change in the vegetation of the bog habitat cannot be reasonably quantified.

Published dose-response relationships for bog habitats are limited but have shown that the effects of additional nitrogen at existing high background nitrogen rates may be modest compared to those at low background rates, because nitrogen is already in excess and the ability of plants to respond to additional nitrogen is finite. For example, research published by Natural England for 'bogs' with background deposition rates of 15 kg N/ha/yr, the addition of a further 1 kg N/ha/yr decreases forb species richness in bog habitat by 3.9% (Caporn *et al*., 2016). The same research document also states that '*Within the bog habitat, graminoid cover (principally the sedge, Eriophorum vaginatum) was found to increase by 1.5% per additional kg N across the deposition range studied, suggesting that the balance between shrubs, graminoid and moss (mainly Sphagnum spp.) is at risk of moving towards dominance by sedge species'*. To reduce species richness by '1' (i.e. at least one species would be less frequently encountered in a random quadrant of the affected area) the total process contribution would need to be 3.3 kg N/ha/yr. The process contribution from the proposed development with SCR has been modelled at approximately 1.1% of the lower critical load value of 5 kg N/ha/yr, which is approximately 0.055 kg N/ha/yr. This is well below the process contribution that would be reasonably expected to result in a measurable change to the vegetation composition of the SAC, even when the high background N deposition rates are considered.

It can therefore be concluded, taking account of the various uncertainties surrounding the air quality modelling, that the Proposed Development with SCR alone will result in **no adverse effects on the integrity of Thorne Moor SAC**.

4.6 In-combination Effects with Other Plans or Projects

The modelled change in N deposition at the Thorne Moor SAC resulting from the Proposed Development with SCR is less than 100g of N/ha/yr. It is reasonable to consider that at this extremely low level, even in-combination with other plans or projects, there would be no adverse effects on the integrity of the SAC. This is on the basis that to effect a measurable change, other plans or projects would need to combine to contribute 3.2 kg N/ha/yr to the SAC.

A search for schemes that could result in high N deposition rates to the Thorne Moor SAC has been undertaken to inform the HRA report and was updated following queries raised by the ExA at the examination stage of the DCO (see Section 3.4 and Table 10H.4). None of the schemes originally screened for LSE are considered relevant to the in-combination effects assessment for the Proposed Development with SCR. This is because the process contributions resulting from N deposition rates to Thorne Moor SAC for all those considered are below 1% of the critical load threshold. It is therefore reasonable to assume that even in-combination with the Proposed Development, there is no risk that the value of 3.3 kg N/ha/yr required to adversely affect the bog habitat would be met or exceeded, even if the process contribution for all of the projects is at or close to 1% of the critical load for N deposition.

No other large scale power generation, agricultural projects or road schemes that could potentially result in increased nitrogen or acid deposition to the Thorne Moor SAC to that level of effect were identified. There will therefore be no adverse in-combination air quality effects on the Thorne Moor SAC.

Conversely, the closure of the existing Eggborough coal-fired power station will result in a net decrease in the overall process contribution from N deposition to Thorne Moor SAC, in-combination with the Proposed Development. This is because the current process contribution of N to Thorne Moor SAC arising from the operation of Eggborough coal-fired power station has been modelled at up to 3% of the critical load. This net reduction will contribute towards SIP action 3A for Thorne Moor SAC to '*control, reduce and ameliorate atmospheric nitrogen impacts".* The SIP aims to address priority issues that are currently impacting or threatening the condition of the designated features (Natural England, 2014).

It can therefore be concluded that the Proposed Development with SCR alone will result in **no adverse effects on the integrity of Thorne Moor SAC in-combination with other plans or projects**.

5. Conclusions

The completed information to inform the HRA has identified that for the majority of potential pathways for impacts on European sites within the zone of influence, the Proposed Development will result in no likely significant effects on designated features, either alone or in-combination with other plans or projects.

Predicted changes in air quality arising from the Proposed Development with SCR resulted in a screening conclusion of likely significant effects on Thorne Moor SAC. This was due to the predicted process contribution of nitrogen deposition slightly exceeding 1% of the critical load, which is used as a screening threshold for insignificance. For process contributions below the 1% threshold, the predicted change is so small in magnitude as to be deemed insignificant, and this is accepted as sufficient to demonstrate no likely significant effects on European sites. However, an exceedance of the 1% screening threshold does not mean that significant effects will result, but that further examination of the impacts on the integrity of the European site is required in the form of an 'appropriate assessment'.

Following the completion of the appropriate assessment of impacts on Thorne Moor SAC, the HRA has concluded that the Proposed Development with SCR will not result in any adverse effects on the integrity of the SAC either alone or in-combination with other plans or projects. The inclusion of the closure of the existing coal-fired power station into the in-combination effects assessment actually results in a small beneficial effect on Thorne Moor SAC associated with emissions from the Eggborough power station site, as a result of the reduction in process contribution of nitrogen deposition to the SAC.

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Appendix A Skipwith Common SAC Citation

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Skipwith Common
Unitary Authority/County:	North Yorkshire
SAC status:	Designated on 1 April 2005
Grid reference:	SE668362
SAC EU code:	UK0030276
Area (ha):	295.20
Component SSSI:	Skipwith Common SSSI

Site description:
The wet heath at Skipwith Common is the most extensive of its type in the north of England. The *Erica tetralix – Sphagnum compactum* community is dominated by cross-leaved heath *Erica tetralix* and purple moor-grass *Molinia caerulea*. There is a small population of marsh gentian *Gentiana pneumonanthe*. The wet heath is part of transitions from open water, fen, reed and swamp to dry heaths and other habitats. The dry heath element is a representative of *Calluna vulgaris – Deschampsia flexuosa* heath dominated by heather *Calluna vulgaris*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- European dry heaths
- Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath)

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030276
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

Appendix B Thorne Moor SAC Citation

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Thorne Moor
Unitary Authority/County:	Doncaster, East Riding of Yorkshire, North Lincolnshire
SAC status:	Designated on 1 April 2005
Grid reference:	SE728163
SAC EU code:	UK0012915
Area (ha):	1909.38
Component SSSI:	Thorne, Crowle and Goole Moors SSSI

Site description:
Thorne Moor is England's largest area of raised bog, lying a few kilometres from the smaller Hatfield Moors, both within the former floodplain of the rivers feeding the Humber estuary (Humberhead Levels), and includes the sub-components Goole Moors and Crowle Moors. Although management has increased the proportion of active raised bog at Thorne Moors, the inclusion of Goole Moors, where peat-extraction has now ceased, means that the site is still predominantly degraded raised bog. The restored secondary surface is rich in species of bog-mosses *Sphagnum* spp., common and hare's-tail cottongrasses *Eriophorum angustifolium* and *E. vaginatum*, heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, round-leaved sundew *Drosera rotundifolia*, cranberry *Vaccinium oxycoccos* and bog-rosemary *Andromeda polifolia*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Degraded raised bogs still capable of natural regeneration

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0012915
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

Appendix C Hatfield Moor SAC Citation

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name: Hatfield Moor

Unitary Authority/County: Doncaster, North Lincolnshire

SAC status: Designated on 1 April 2005

Grid reference: SE699057

SAC EU code: UK0030166

Area (ha): 1363.55

Component SSSI: Hatfield Moors SSSI

Site description:
Hatfield Moors is a remnant of an extensive lowland raised bog which once occupied the Humberhead levels. Hatfield is unique in having developed directly upon nutrient deficient gravels without an initial reed-swamp phase. Much of the bog has been cut for peat yet a restricted representative flora and fauna persists within a mosaic of mire and dry heath habitats beneath birch scrub. The mire communities are dominated by cottongrasses *Eriophorum vaginatum* and *E. angustifolium*, cross-leaved heath *Erica tetralix* and bog-mosses *Sphagnum* spp., but include locally rare species such as cranberry *Vaccinium oxycoccus*, bog myrtle *Myrica gale* and bog rosemary *Andromeda polifolia*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Degraded raised bogs still capable of natural regeneration

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030166
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

Appendix D Humber Estuary SPA/ SAC/ Ramsar Citations

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Humber Estuary
Unitary Authority/County:	City of Kingston upon Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire
SAC status:	Designated on 10 December 2009
Grid reference:	TA345110
SAC EU code:	UK0030170
Area (ha):	36657.15
Component SSSI:	Humber Estuary

Site description:
The Humber is the second largest coastal plain **Estuary** in the UK, and the largest coastal plain estuary on the east coast of Britain. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seals, vascular plants and invertebrates.

The Humber is a muddy, macro-tidal estuary, fed by a number of rivers including the Rivers Ouse, Trent and Hull. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. This is the northernmost of the English east coast estuaries whose structure and function is intimately linked with soft eroding shorelines. The extensive mud and sand flats support a range of benthic communities, which in turn are an important feeding resource for birds and fish. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers.

Habitats within the Humber Estuary include **Atlantic salt meadows** and a range of sand dune types in the outer estuary, together with **Sandbanks which are slightly covered by sea water all the time**, extensive intertidal mudflats, ***Salicornia* and other annuals colonising mud and sand**, and **Coastal lagoons**. As salinity declines upstream, reedbeds and brackish saltmarsh communities fringe the estuary. These are best-represented at the confluence of the Rivers Ouse and Trent at Blacktoft Sands.

Upstream from the Humber Bridge, the navigation channel undergoes major shifts from north to south banks, for reasons that have yet to be fully explained. This section of the estuary is also noteworthy for extensive mud and sand bars, which in places form semi-permanent islands. The sand dunes are features of the outer estuary on both the north and south banks particularly on Spurn peninsula and along the Lincolnshire coast south of Cleethorpes. Examples of both **Fixed dunes with herbaceous vegetation (`grey dunes`)** and **Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes)** occur on both banks of the estuary and along the coast. Native sea buckthorn **Dunes with *Hippophae rhamnoides*** also occurs on both sides of the estuary.

Significant fish species include **river lamprey** *Lampetra fluviatilis* and **sea lamprey** *Petromyzon marinus* which breed in the River Derwent, a tributary of the River Ouse. **Grey seals** *Halichoerus grypus* come ashore in autumn to form breeding colonies on the sandy shores of the south bank at Donna Nook.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Coastal lagoons*
- Dunes with *Hippophae rhamnoides*
- Embryonic shifting dunes
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Fixed dunes with herbaceous vegetation (`grey dunes`)*
- *Salicornia* and other annuals colonising mud and sand
- Sandbanks which are slightly covered by sea water all the time
- Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes')

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Grey seal *Halichoerus grypus*
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*

Annex I priority habitats are denoted by an asterisk (*)

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030170
Date of registration:10 December 2009

Signed: [redacted]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

EC Directive 79/409 on the Conservation of Wild Birds
Special Protection Area (SPA)

Name: Humber Estuary

Unitary Authorities/Counties: City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire

Component SSSIs: The SPA encompasses all or parts of the following Sites of Special Scientific Interest (SSSIs): Humber Estuary SSSI, North Killingholme Haven Pits SSSI, Saltfleetby-Theddlethorpe Dunes SSSI, and The Lagoons SSSI.

Site description: The Humber Estuary is located on the east coast of England, and comprises extensive wetland and coastal habitats. The inner estuary supports extensive areas of reedbed, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. On the north Lincolnshire coast, the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. Parts of the estuary are owned and managed by conservation organisations. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the migration periods and in winter. In summer, it supports important breeding populations of bittern *Botaurus stellaris*, marsh harrier *Circus aeruginosus*, avocet *Recurvirostra avosetta* and little tern *Sterna albifrons*.

Size of SPA: The SPA covers an area of 37,630.24 ha.

Qualifying species:
The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Annex I species	Count and season	Period	% of GB population
Avocet *Recurvirostra avosetta*	59 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7%
Bittern *Botaurus stellaris*	4 individuals – wintering	5 year peak mean 1998/99 – 2002/03	4.0%
Hen harrier *Circus cyaneus*	8 individuals – wintering	5 year peak mean 1997/98 – 2001/02	1.1%
Golden plover *Pluvialis apricaria*	30,709 individuals – wintering	5 year peak mean 1996/97 – 2000/01	12.3%
Bar-tailed godwit *Limosa lapponica*	2,752 individuals – wintering	5 year peak mean 1996/97 – 2000/01	4.4%
Ruff *Philomachus pugnax*	128 individuals – passage	5 year peak mean 1996-2000	1.4%
Bittern *Botaurus stellaris*	2 booming males – breeding	3 year mean 2000-2002	10.5%
Marsh harrier *Circus aeruginosus*	10 females – breeding	5 year mean 1998-2002	6.3%
Avocet *Recurvirostra avosetta*	64 pairs – breeding	5 year mean 1998 – 2002	8.6%
Little tern *Sterna albifrons*	51 pairs – breeding	5 year mean 1998-2002	2.1%

The site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season:

Migratory species	Count and season	Period	% of subspecies/ population
Shelduck *Tadorna tadorna*	4,464 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.5% Northwestern Europe (breeding)
Knot *Calidris canutus*	28,165 individuals – wintering	5 year peak mean 1996/97 – 2000/01	6.3% *islandica*
Dunlin *Calidris alpina*	22,222 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7% *alpina*, Western Europe (non-breeding)
Black-tailed godwit *Limosa limosa*	1,113 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.2% *islandica*
Redshank *Tringa totanus*	4,632 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.6% *brittanica*
Knot *Calidris canutus*	18,500 individuals – passage	5 year peak mean 1996 – 2000	4.1% *islandica*
Dunlin *Calidris alpina*	20,269 individuals – passage	5 year peak mean 1996 – 2000	1.5% *alpina*, Western Europe (non-breeding)
Black-tailed godwit *Limosa limosa*	915 individuals – passage	5 year peak mean 1996 – 2000	2.6% *islandica*
Redshank *Tringa totanus*	7,462 individuals – passage	5 year peak mean 1996 – 2000	5.7% *brittanica*

Bird counts from: Wetland Bird Survey (WeBS) database and *The Humber Estuary: A comprehensive review of its nature conservation interest* (Allen *et al.* 2003).

Assemblage qualification:
The site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season:

In the non-breeding season, the area regularly supports 153,934 individual waterbirds (five year peak mean 1996/97 – 2000/01), including dark-bellied brent goose *Branta bernicla bernicla*, shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, mallard *Anas platyrhynchos*, pochard *Aythya ferina*, scaup *Aythya marila*, goldeneye *Bucephala clangula*, bittern *Botaurus stellaris*, oystercatcher *Haematopus ostralegus*, avocet *Recurvirostra avosetta*, ringed plover *Charadrius hiaticula*, golden plover *Pluvialis apricaria*, grey plover *P. squatarola*, lapwing *Vanellus vanellus*, knot *Calidris canutus*, sanderling *C. alba*, dunlin *C. alpina*, ruff *Philomachus pugnax*, black-tailed godwit *Limosa limosa*, bar-tailed godwit *L. lapponica*, whimbrel *Numenius phaeopus*, curlew *N. arquata*, redshank *Tringa totanus*, greenshank *T. nebularia* and turnstone *Arenaria interpres*.

Non-qualifying species of interest: The SPA is used by non-breeding merlin *Falco columbarius*, peregrine *F. peregrinus* and short-eared owl *Asio flammeus*, and breeding common tern *Sterna hirundo* and kingfisher *Alcedo atthis* (all species listed in Annex I to the EC Birds Directive) in numbers of less than European importance (less than 1% of the GB population).

Status of SPA:
1) Humber Flats, Marshes and Coast (Phase 1) SPA was classified on 28 July 1994.
2) The extended and renamed Humber Estuary SPA was classified on 31 August 2007.

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK9006111
Date of registration: 31 August 2007

Signed: [redacted]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

Appendix E Strensall Common SAC Citation

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Strensall Common
Unitary Authority/County:	York
SAC status:	Designated on 1 April 2005
Grid reference:	SE651598
SAC EU code:	UK0030284
Area (ha):	569.63
Component SSSI:	Strensall Common SSSI

Site description:
Strensall Common is an example of acidic lowland heath represented predominantly by *Erica tetralix – Sphagnum compactum* wet heath, although its extent has been reduced by drainage. It is a noted locality for marsh gentian *Gentiana pneumonanthe*, narrow buckler-fern *Dryopteris carthusiana* and the dark-bordered beauty moth *Epione vespertaria* as it is associated with creeping willow *Salix repens* on the wet heath.

There is also a complex mosaic of wet heaths with *Erica tetralix* and dry heath elements. The *Calluna vulgaris – Deschampsia flexuosa* dry heath is noted for petty whin *Genista anglica* and bird's-foot *Ornithopus perpusillus*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- European dry heaths.
- Northern Atlantic wet heaths with *Erica tetralix* (wet heathland with cross-leaved heath).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030284
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

Appendix F North York Moors SAC Citation

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	North York Moors
Unitary Authority/County:	North Yorkshire, Redcar and Cleveland
SAC status:	Designated on 1 April 2005
Grid reference:	NZ711021
SAC EU code:	UK0030228
Area (ha):	44082.25
Component SSSI:	North York Moors SSSI

Site description:
This site in north-east Yorkshire within the North York Moors National Park contains the largest continuous tract of upland heather moorland in England. Dry heath covers over half the site and forms the main vegetation type on the western, southern and central moors where the soil is free-draining and has only a thin peat layer. The principal type present is heather – wavy hair-grass (*Calluna vulgaris – Deschampsia flexuosa*) heath, with some heather – bell heather *Erica cinerea* heath on well-drained areas throughout the site, and large areas of heather – bilberry *Vaccinium myrtillus* heath on steeper slopes.

Cross-leaved heath – bog-moss (*Erica tetralix – Sphagnum compactum*) wet heath is the second most extensive vegetation type on the site and is predominantly found on the eastern and northern moors where the soil is less free-draining. Purple moor-grass *Molinia caerulea* and heath rush *Juncus squarrosus* are also common within this community. In the wettest stands bog-mosses, including *Sphagnum tenellum*, occur, and the nationally scarce creeping forget-me-not *Myosotis stolonifera* can be found in acid moorland streams and shallow pools.

Blanket mire occurs in small amounts along the main watershed of the high moors where deep peat has accumulated. These areas are dominated by heather and cross-leaved heath with frequent hare's-tail cottongrass *Eriophorum vaginatum* and common cottongrass *E. angustifolium*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Blanket bogs*
- European dry heaths
- Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath)

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030228
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

Appendix G Report on the Implications for European Sites

Planning Inspectorate

Advice Note 10

Habitats Regulations Assessment

Eggborough CCGT – Report on the Implications for European Sites

REV02 December 2017

Potential Impacts

Potential impacts upon the European site(s)* that were scoped into the likely significant effects screening within the submitted Habitats Regulations Assessment Signposting report (ES Volume III, Chapter 10: Appendix 10H) [**NB: now revised**] are provided in the Stage 1 matrix tables below. These include six Special Areas of Conservation (SAC), one Special Protection Area (SPA) and one Ramsar site covering a total of six sites (the SAC, SPA and Ramsar designations overlap for the Humber Estuary European site).

Only the Proposed Development with Selective Catalytic Reduction (SCR) for NOx abatement was identified as having the potential to result in likely significant effects on Thorne Moor SAC. Further 'appropriate assessment' of this potential pathway was therefore undertaken in the revised HRA report (and informed by additional air quality modelling) to examine whether this impact would result in any adverse effects on the integrity of the SAC. The need for SCR will be dependent on what is required to meet Best Available Technique (BAT) requirements for the environmental permit, which is granted by the Environment Agency. A summary of this assessment and signposting to the relevant assessment documents is provided in the Stage 2 matric tables.

The Proposed Development without SCR will result in no likely significant effects on Thorne Moor SAC, either alone or in-combination with other plans or projects. The Stage 2 matrices have therefore not been completed for that scheme option.

* As defined in Advice Note 10.

Potential Impacts considered within the Stage 1 Screening Matrices

Designation	Impacts in submission information	Presented in screening matrices as
Skipwith Common SAC	• Changes in air quality during operational phase	• Changes in air quality during operational phase
Thorne Moor SAC	• Changes in air quality during operational phase	• Changes in air quality during operational phase
Hatfield Moor SAC	• Changes in air quality during operational phase	• Changes in air quality during operational phase
Humber Estuary SAC	• Surface water pollution during construction phase	• Surface water pollution during construction phase
Humber Estuary SPA	• Surface water pollution during construction phase to habitats supporting internationally important bird populations	• Surface water pollution during construction phase to habitats supporting internationally important bird populations
Humber Estuary Ramsar	• Surface water pollution during construction phase to habitats • Surface water pollution during construction phase to habitats supporting breeding grey seal • Surface water pollution during construction phase to habitats supporting internationally important bird populations	• Surface water pollution during construction phase to habitats • Surface water pollution during construction phase to habitats supporting breeding grey seal • Surface water pollution during construction phase to habitats supporting internationally important bird populations
Strensall Common SAC	• Changes in air quality during operational phase	• Changes in air quality during operational phase

Designation	Impacts in submission information	Presented in screening matrices as
North York Moors SAC	• Changes in air quality during operational phase	• Changes in air quality during operational phase

Potential Impacts considered within the Stage 2 Integrity Matrices

Designation	Impacts in submission information	Presented in integrity matrices as
Thorne Moor SAC	• Changes in air quality during operational phase for CCGT with SCR	• Changes in air quality during operational phase for CCGT with SCR

STAGE 1: SCREENING MATRICES

The European Sites included within the assessment presented in the Environmental Statement (ES) are:

- Skipwith Common SAC
- Thorne Moor SAC
- Hatfield Moor SAC
- Humber Estuary SAC
- Humber Estuary SPA
- Humber Estuary Ramsar
- Strensall Common SAC
- North York Moors SAC

The rationale for scoping these six European sites into the assessment is provided in the Ecology chapter (ES Volume I, Chapter 10: Section 10.4) and the HRA Screening report (ES Volume II, Chapter 10: Appendix H). The location of the European sites in relation to the proposed development is shown on Figure 10H.1 (ES Volume III, Chapter 10: Appendix 10H).

The Stage 1 screening for each European site is presented in Matrices A to H in this Appendix. Evidence for likely significant effects on their qualifying features is detailed within the footnotes to the screening matrices below, which provides signposting to the relevant information in chapters in Volume I of the ES, and supporting technical appendices in Volume III of the ES as appropriate.

Likely significant effects arising from decommissioning have been scoped out for all European sites and are therefore greyed out in the matrices in this appendix. This is because the gas connection pipeline, cooling water abstraction pipeline and the intake and outfall structures on the River Aire will remain *in-situ*.

Matrix Key:

✓ = Likely significant effect **cannot** be excluded
✗ = Likely significant effect **can** be excluded

C = construction
O = operation
D = decommissioning

Where effects are not applicable to a particular feature they are greyed out.

A separate matrix for in-combination effects has been provided for each European site. The rationale for scoping plans or projects into the in-combination effects assessment is presented in ES Volume I, Chapter 20 (Cumulative and Combined Effects). Plans or projects scoped into the in-combination effects screening were as follows:

- Eggborough Coal-Fired Power Station Decommissioning and Demolition
- Ferrybridge Multifuel 2
- Knottingley Power Project
- Southmoor Energy Centre
- Advanced Thermal Treatment Plant
- Thorpe Marsh CCGT
- Chapel Haddlesey Hydroelectric Scheme

The Stage 2 Integrity Matrices as set out in Planning Inspectorate Advice Habitats Regulations Assessment Note 10 Appendix 2 (Template for Integrity Matrices) have been completed for Thorne Moor SAC because the Stage 1 screening could not exclude likely significant effects arising from air quality impacts either alone or in-combination with other plans or projects. For all other European designated sites, the Stage 1 screening has not identified any likely significant effects designated features.

Stage 1 Matrix A: Skipwith Common SAC

MATRIX A1: Likely Effects Screening												
Name of European site: Skipwith Common SAC												
Distance to NSIP: Approximately 10.5 km												
European site features	**Likely Effects of NSIP**											
	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.			Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage								
	C	O	D	C	O	D						
Northern Atlantic wet heaths with *Erica tetralix*	×	×**a**	×	×	×**b**	×						
European dry heaths	×	×**a**	×	×	×**b**	×						
Evidence supporting likely effects screening conclusions **a.** Change is negligible; <1% of critical level and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28. **b.** Change is negligible; <1% of critical load and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28.												

MATRIX A2: Likely In-combination Effects Screening												
Name of European site: Skipwith Common SAC												
Distance to NSIP: Approximately 10.5 km												
European site features	**Likely In-Combination Effects of NSIP**											
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D
Northern Atlantic wet heaths with *Erica tetralix*	×	×	×	×	×**a**	×	×	×**a**	×	×	×**a**	×
European dry heaths	×	×	×	×	×**a**	×	×	×**a**	×	×	×**a**	×
European site features	**Likely In-Combination Effects of NSIP**											
	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified					
	C	O	D	C	O	D	C	O	D			
Northern Atlantic wet heaths with	×	×**a**	×	×	×**a**	×	×	×	×			

Erica tetralix												
European dry heaths	×	×**a**	×	×	×**a**	×	×	×	×			

Evidence supporting in-combination screening conclusions

a. Air Quality Assessment has concluded that there will be no cumulative effects on Natura 2000 sites. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraph 20.5.48.

Stage 1 Matrix B: Thorne Moor SAC

MATRIX B1: Likely Effects Screening												
Name of European site: Thorne Moor SAC												
Distance to NSIP: Approximately 14 km												
European site features	**Likely Effects of NSIP**											
	NOx deposition from Proposed Power Plant stacks **without SCR** resulting in changes to critical levels and potential effects on vegetation assemblage.			Nutrient nitrogen deposition from Proposed Power Plant stacks **without SCR** resulting in changes to critical loads and potential effects on vegetation assemblage			NOx deposition from Proposed Power Plant stacks **with SCR** resulting in changes to critical levels and potential effects on vegetation assemblage.			Nutrient nitrogen deposition from Proposed Power Plant stacks **with SCR** resulting in changes to critical loads and potential effects on vegetation assemblage		
	C	O	D	C	O	D	C	O	D	C	O	D
Degraded raised bogs still capable of natural regeneration	×	×**a**	×	×	×**b**	×	×	×**c**	×	×	✓**d**	×

Evidence supporting likely effects screening conclusions

a. Change is negligible; <1% of critical level and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28.

b. Change is negligible; <1% of critical load and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28.

c. Use of SCR reduces NOx emissions further, so overall change is negligible; <1% of critical load and is not significant (see Appendix H).

d. Use of SCR results in increased NH_3 used to reduce NOx emissions, which results in higher N emissions from the stack. Overall change is modelled at 1.1%, which is above the 1% of the critical load screening threshold. Likely significant effects therefore cannot be excluded at this stage (see Appendix H).

MATRIX B2: Likely In-combination Effects Screening (CCGT WITHOUT SCR)												
Name of European site: Thorne Moor SAC												
Distance to NSIP: Approximately 14 km												
European site features	**Likely In-Combination Effects of NSIP**											
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D
Degraded raised bogs still capable of natural regeneration	×	×	×	×	×**a**	×	×	×**a**	×	×	×**a**	×
European site features	**Likely In-Combination Effects of NSIP**											
	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified					

	C	O	D	C	O	D	C	O	D			
Degraded raised bogs still capable of natural regeneration	×	×**a**	×	×	×**a**	×	×	×	×			
Evidence supporting in-combination screening conclusions **a.** Air Quality Assessment has concluded that there will be no cumulative effects on Natura 2000 sites. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraph 20.5.48.												

MATRIX B3: Likely In-combination Effects Screening (CCGT WITH SCR)												
Name of European site: Thorne Moor SAC												
Distance to NSIP: Approximately 14 km												
European site features	**Likely In-Combination Effects of NSIP**											
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D
Degraded raised bogs still capable of natural regeneration	×	×**a**	×	×	×**b**	×	×	×**b**	×	×	×**b**	×
European site	**Likely In-Combination Effects of NSIP**											

features	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified			West Burton C Power Station No pathways identified		
	C	O	D	C	O	D	C	O	D	C	O	D
Degraded raised bogs still capable of natural regeneration	×	×**b**	×	×	×**b**	×	×	×	×	×	×**c**	×
European Site Features	**Likely In-Combination Effects of NSIP**											
	Thorpe Marsh Gas Pipeline No pathways identified			Ferrybridge D CCGT Power Station No pathways identified			Drax Re-power Project Insufficient information to scope project into assessment					
	C	O	D	C	O	D	C	O	D			
Degraded raised bogs still capable of natural regeneration	×	×**d**	×	×	×**e**	×	×	×**f**	×			

Evidence supporting in-combination screening conclusions

a. Decommissioning of Eggborough coal-fired power station results in a reduction in nitrogen deposition at the SAC by around 3% of the process contribution. The in-combination effect with the Proposed Development is therefore a net reduction in nitrogen deposition (see Appendix H).

b. Air Quality Assessment has concluded that there will be no cumulative effects on Natura 2000 sites. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraph 20.5.48.

c. Proposed CCGT is c. 28 km away from the SAC and therefore the SAC is outside the zone of influence for changes in air quality arising from the CCGT (AECOM, 2017a). There is therefore no potential for in-combination effects with the Proposed Development.

d. HRA for the scheme did not identify any pathways for effects on the SAC (Environ, 2014). There is therefore no potential for in-combination effects with the Proposed Development.

e. Proposed CCGT is c. 24 km away from the SAC and therefore the SAC is outside the zone of influence for changes in air quality arising from the CCGT (AECOM, 2017b). There is therefore no potential for in-combination effects with the Proposed Development.

f. No air quality modelling has yet been completed for this project, and therefore there is insufficient information to scope it into the in-combination effects assessment for the Proposed Development. The Scoping Report for the project confirms that potential impacts on Thorne Moor SAC alone and in-combination with other plans or projects will be completed as part of the EIA (WSP, 2017).

Stage 1 Matrix C: Hatfield Moor SAC

MATRIX C1: Likely Effects Screening												
Name of European site: Hatfield Moor SAC												
Distance to NSIP: Approximately 14 km												
European site features	**Likely Effects of NSIP**											
	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.			Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage								
	C	O	D	C	O	D						
Degraded raised bogs still capable of natural regeneration	×	×**a**	×	×	×**b**	×						
Evidence supporting likely effects screening conclusions **a.** Change is negligible; <1% of critical level and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28. **b.** Change is negligible; <1% of critical load and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28.												

MATRIX C2: Likely In-combination Effects Screening													
Name of European site: Hatfield Moor SAC													
Distance to NSIP: Approximately 14 km													
European site features	**Likely In-Combination Effects of NSIP**												
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D	
Degraded raised bogs still capable of natural regeneration	×	×	×	×	×**a**	×	×	×**a**	×	×	×**a**	×	
European site features	**Likely In-Combination Effects of NSIP**												
	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified						
	C	O	D	C	O	D	C	O	D				
Degraded raised bogs still capable of natural regeneration	×	×**a**	×	×	×**a**	×	×	×	×				

Evidence supporting in-combination screening conclusions

a. Air Quality Assessment has concluded that there will be no cumulative effects on Natura 2000 sites. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraph 20.5.48.

Stage 1 Matrix D: Humber Estuary SAC

MATRIX D1: Likely Effects Screening												
Name of European site: Humber Estuary SAC												
Distance to NSIP: Approximately 15 km												
European site features	**Likely Effects of NSIP**											
	Surface water pollution during construction phase											
	C	O	D									
Estuaries	×**a**	×	×									
Mudflats and sandflats not covered by seawater at low tide	×**a**	×	×									
Sandbanks which are slightly covered by seawater all the time	×**a**	×	×									
Coastal lagoons	×**a**	×	×									
Salicornia and other annuals colonising mud and sand	×**a**	×	×									

Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)*	×**a**	×	×									

Evidence supporting likely effects screening conclusions

a. Standard environmental measures to control pollution during construction phase will adequately minimise risk. Nearest part of site is 25km downstream, and any pollution would have significantly diluted by the point at which it enters the estuary. See ES Volume I, Chapter 11 (Water Resources, Hydrology & Flood Risk), paragraphs 11.5.8 – 11.5.11

MATRIX D2: Likely In-combination Effects Screening

Name of European site: Humber Estuary SAC

Distance to NSIP: Approximately 15 km

European site features	**Likely In-Combination Effects of NSIP**											
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D
Estuaries	×**a**	×	×	×	×	×	×	×	×	×		×
Mudflats and sandflats not covered by seawater at low tide	×**a**	×	×	×	×	×	×	×	×	×	×	×

Sandbanks which are slightly covered by seawater all the time	×**a**	×	×	×	×	×	×	×	×	×	×	×
Coastal lagoons	×**a**	×	×	×	×	×	×	×	×	×	×	×
Salicornia and other annuals colonising mud and sand	×**a**	×	×	×	×	×	×	×	×	×	×	×
Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)*	×**a**	×	×	×	×	×	×	×	×	×	×	×
European site features	**Likely In-Combination Effects of NSIP**											
	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified					
	C	O	D	C	O	D	C	O	D			
Estuaries	×	×	×	×	×	×	×**b**	×	×			
Mudflats and sandflats not covered by seawater at low tide	×	×	×	×	×	×	×**b**	×	×			
Sandbanks which are slightly covered by seawater all the time	×	×	×	×	×	×	×**b**	×	×			

Coastal lagoons	×	×	×	×	×	×	×**b**	×	×			
Salicornia and other annuals colonising mud and sand	×	×	×	×	×	×	×**b**	×	×			
Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)*	×	×	×	×	×	×	×**b**	×	×			

Evidence supporting in-combination screening conclusions

a. Any works to decommission/ remove the existing cooling water abstraction intake/ discharge infrastructure is already required as part of the Proposed Development, and the impacts have therefore already been assessed. This is therefore not a potential cumulative effect. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraphs 20.5.46 – 20.5.47.

b. Ecology report submitted in support of the application identifies no adverse effects on ecology features associated with the River Aire as a result of the construction or operation of the scheme. Construction is assumed to have been completed by the time construction of the Proposed Development will occur. See ES Volume I, Chapter 10 (Ecology & Nature Conservation), paragraph 20.5.44.

Stage 1 Matrix E: Humber Estuary SPA

MATRIX E1: Likely Effects Screening												
Name of European site: Humber Estuary SPA												
Distance to NSIP: Approximately 15 km												
European site features	**Likely Effects of NSIP**											
	Surface water pollution during construction phase to habitats supporting internationally important bird populations											
	C	O	D									
Populations of European importance of Annex I and Annex II over-wintering wildfowl and wading birds.	×**a**	×	×									
Internationally important assemblage of migratory and wintering birds.	×**a**	×	×									

Evidence supporting likely effect screening conclusions
a. Standard environmental measures to control pollution during construction phase will adequately minimise risk. Nearest part of site is 25km downstream, and any pollution would have significantly diluted by the point at which it enters the estuary. See ES Volume I, Chapter 11 (Water Resources, Hydrology & Flood Risk), paragraphs 11.5.8 – 11.5.11.

MATRIX E2: Likely In-combination Effects Screening												
Name of European site: Humber Estuary SPA												
Distance to NSIP: Approximately 15 km												
European site features	**Likely In-Combination Effects of NSIP**											
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of Annex I and Annex II over-wintering wildfowl and wading birds.	×**a**	×	×	×	×	×	×	×	×	×	×	×

Internationally important assemblage of migratory and wintering birds.	×**a**	×	×	×	×	×	×	×	×	×	×	×
European site features	**Likely In-Combination Effects of NSIP**											
	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified					
	C	O	D	C	O	D	C	O	D			
Populations of European importance of Annex I and Annex II over-wintering wildfowl and wading birds.	×	×	×	×	×	×	×**b**	×	×			
Internationally important assemblage of migratory and wintering birds.	×	×	×	×	×	×	×**b**	×	×			

Evidence supporting in-combination screening conclusions

a. Any works to decommission/ remove the existing cooling water abstraction intake/ discharge infrastructure is already required as part of the Proposed Development, and the impacts have therefore already been assessed. This is therefore not a potential cumulative effect. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraphs 20.5.46 – 20.5.47

b. Ecology report submitted in support of the application identifies no adverse effects on ecology features associated with the River Aire as a result of the construction or operation of the scheme. Construction is assumed to have been completed by the time construction of the Proposed Development will occur. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraph 20.5.44.

Stage 1 Matrix F: Humber Estuary Ramsar

MATRIX F1: Likely Effects Screening												
Name of European site: Humber Estuary Ramsar												
Distance to NSIP: Approximately 15 km												
European site features	**Likely Effects of NSIP**											
	Surface water pollution during construction phase to habitats											
	C	O	D	C	O	D	*C*	*O*	*D*	*C*	*O*	*D*
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons.	×**a**	×	×									
Grey seal	×**b**	×	×									
Internationally important populations of passage wildfowl and waders.	×**a**	×	×									

Evidence supporting likely effects screening conclusions

a. Standard environmental measures to control pollution during construction phase will adequately minimise risk. Nearest part of site is 25km downstream, and any pollution would have significantly diluted by the point at which it enters the estuary. See ES Volume I, Chapter 11 (Water Resources, Hydrology & Flood Risk), paragraphs 11.5.8 – 11.5.11

b. Standard environmental measures to control pollution during construction phase will adequately minimise risk. Nearest breeding grey seal colony is at Donna Nook, over 80 km east, and any pollution would have significantly diluted by the point at which it enters the estuary. See ES Volume I, Chapter 11 (Water Resources, Hydrology & Flood Risk), paragraphs 11.5.8 – 11.5.11

MATRIX F2: Likely In-combination Effects Screening

Name of European site: Humber Estuary Ramsar

Distance to NSIP: Approximately 15 km

European site features	**Likely In-Combination Effects of NSIP**											
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons.	×**a**	×	×	×	×	×	×	×	×	×	×	×

Grey seal	×**a**	×	×	×	×	×	×	×	×	×	×	×
Internationally important populations of passage wildfowl and waders.	×**a**	×	×	×	×	×	×	×	×	×	×	×
European site features	**Likely In-Combination Effects of NSIP**											
	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified					
	C	O	D	C	O	D	C	O	D			
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons.	×	×	×	×	×	×	×**b**	×	×			
Grey seal	×	×	×	×	×	×	×**b**	×	×			
Internationally important populations of passage wildfowl and waders.	×	×	×	×	×	×	×**b**	×	×			

Evidence supporting in-combination screening conclusions

a. Any works to decommission/ remove the existing cooling water abstraction intake/ discharge infrastructure is already required as part of the Proposed Development, and the impacts have therefore already been assessed. This is therefore not a potential cumulative effect. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraphs 20.5.46 – 20.5.47

b. Ecology report submitted in support of the application identifies no adverse effects on ecology features associated with the River Aire as a result of the construction or operation of the scheme. Construction is assumed to have been completed by the time construction of the Proposed Development will occur. See ES Volume I, Chapter 10 (Ecology & Nature Conservation), paragraph 20.5.44.

Stage 1 Matrix G: Strensall Common SAC

MATRIX G1: Likely Effects Screening												
Name of European site: Strensall Common SAC												
Distance to NSIP: Approximately 35 km												
European site features	**Likely Effects of NSIP**											
	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.			Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage								
	C	O	D	C	O	D						
Northern Atlantic wet heaths with *Erica tetralix*	×	×**a**	×	×	×**b**	×						
European dry heaths	×	×**a**	×	×	×**b**	×						
Evidence supporting conclusions **a.** Change is negligible; <1% of critical level and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28. **b.** Change is negligible; <1% of critical load and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28.												

MATRIX G2: Likely In-combination Effects Screening												
Name of European site: Strensall Common SAC												
Distance to NSIP: Approximately 35 km												
European site features	**Likely In-Combination Effects of NSIP**											
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D
Northern Atlantic wet heaths with *Erica tetralix*	×	×	×	×	×**a**	×	×	×**a**	×	×	×**a**	×
European dry heaths	×	×	×	×	×**a**	×	×	×**a**	×	×	×**a**	×
European site features	**Likely In-Combination Effects of NSIP**											
	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified					
	C	O	D	C	O	D	C	O	D			
Northern Atlantic wet heaths with	×	×**a**	×	×	×**a**	×	×	×	×			

Erica tetralix												
European dry heaths	×	×**a**	×	×	×**a**	×	×	×	×			

Evidence supporting in-combination screening conclusions

a. Air Quality Assessment has concluded that there will be no cumulative effects on Natura 2000 sites. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraph 20.5.48.

Stage 1 Matrix H: North York Moors SAC

MATRIX H1: Likely Effects Screening												
Name of European site: North York Moors SAC												
Distance to NSIP: Approximately 60 km												
European site features	**Likely Effects of NSIP**											
	NOx deposition from Proposed Power Plant stacks resulting in changes to critical levels and potential effects on vegetation assemblage.			Nutrient nitrogen deposition from Proposed Power Plant stacks resulting in changes to critical loads and potential effects on vegetation assemblage								
	C	O	D	C	O	D						
Northern Atlantic wet heaths with *Erica tetralix*	×	×**a**	×	×	×**b**	×						
European dry heaths	×	×**a**	×	×	×**b**	×						
Evidence supporting conclusions **a.** Change is negligible; <1% of critical level and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28. **b.** Change is negligible; <1% of critical load and is not significant. See ES Volume I, Chapter 8 (Air Quality), paragraphs 8.6.25 – 8.6.28.												

MATRIX H2: Likely In-combination Effects Screening												
Name of European site: North York Moors SAC												
Distance to NSIP: Approximately 60 km												
European site features	**Likely In-Combination Effects of NSIP**											
	Eggborough Coal-Fired Power Station Decommissioning and Demolition No pathways identified			Ferrybridge Multifuel 2 Cumulative air quality impacts resulting from acid and nitrogen deposition			Knottingley Power Project Cumulative air quality impacts resulting from acid and nitrogen deposition			Southmoor Energy Centre Cumulative air quality impacts resulting from acid and nitrogen deposition		
	C	O	D	C	O	D	C	O	D	C	O	D
Northern Atlantic wet heaths with *Erica tetralix*	×	×	×	×	×**a**	×	×	×**a**	×	×	×**a**	×
European dry heaths	×	×	×	×	×**a**	×	×	×**a**	×	×	×**a**	×
European site features	**Likely In-Combination Effects of NSIP**											
	Advanced Thermal Treatment Plant Cumulative air quality impacts resulting from acid and nitrogen deposition.			Thorpe Marsh CCGT Cumulative air quality impacts resulting from acid and nitrogen deposition.			Chapel Haddlesey Hydroelectric Scheme No pathways identified					
	C	O	D	C	O	D	C	O	D			

Northern Atlantic wet heaths with *Erica tetralix*	×	×**a**	×	×	×**a**	×	×	×	×			
European dry heaths	×	×**a**	×	×	×**a**	×	×	×	×			
Evidence supporting in-combination screening conclusions **a.** Air Quality Assessment has concluded that there will be no cumulative effects on Natura 2000 sites. See ES Volume I, Chapter 20 (Cumulative & Combined Effects), paragraph 20.5.48.												

STAGE 2: EFFECTS ON INTEGRITY

One European site has been identified for which likely significant air quality effects could not be excluded at Stage 1 of the HRA:

- Thorne Moor SAC

Only the Proposed Development with Selective Catalytic Reduction (SCR) for NOx abatement was identified as having the potential to result in likely significant effects on Thorne Moor SAC. Further 'appropriate assessment' of this potential pathway was therefore undertaken in the revised HRA report (and informed by additional air quality modelling) to examine whether this impact would result in any adverse effects on the integrity of the SAC. The need for SCR will be dependent on what is required to meet Best Available Technique (BAT) requirements for the environmental permit, which is granted by the Environment Agency.

The Proposed Development without SCR will result in no likely significant effects on Thorne Moor SAC, either alone or in-combination with other plans or projects. The Stage 2 matrices have therefore not been completed for that scheme option.
Appropriate Assessment: Alone

Only one plan or project has been identified that has the potential to result in in-combination effects with the Proposed Development on Thorne Moor SAC:

- Decommissioning and demolition of Eggborough coal-fired power station

All other plans or projects that could potentially combine with the Proposed Development to result in cumulative effects on Thorne Moor SAC were screened out for likely significant in-combination effects at Stage 1.

Evidence for the conclusions reached on integrity is detailed within the footnotes to the Stage 2 matrices below.

Matrix Key

✓ = Adverse effect on integrity cannot be excluded
× = Adverse effect on integrity can be excluded

C = construction
O = operation
D = decommissioning

Stage 2 Matrix A: Thorne Moor SAC

MATRIX A1: Appropriate Assessment of Adverse Effects on Integrity												
Name of European site: Thorne Moor SAC												
Distance to NSIP: Approximately 14 km												
European site features	**Adverse Effects on Integrity**											
	NOx deposition from Proposed Power Plant stacks **with SCR** resulting in changes to critical levels and potential effects on vegetation assemblage.			Nutrient nitrogen deposition from Proposed Power Plant stacks **with SCR** resulting in changes to critical loads and potential effects on vegetation assemblage								
	C	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**
Degraded raised bogs still capable of natural regeneration	×	×**a**	×	×	×**b**	×						
Evidence supporting appropriate assessment conclusions **a.** Use of SCR reduces NOx emissions further, so overall change will result in beneficial effects on the designated site. There will therefore be no adverse effects on the integrity of the SAC (see Appendix H). **b.** Use of SCR results in increased NH_3 used to reduce NOx emissions, which results in higher N emissions from the stack. Overall change is modelled at 1.1%, which is above the 1% of the critical load screening threshold. However, change is still so small as to be insignificant and there will be no adverse effects on the integrity of the SAC (see Appendix H).											

MATRIX A2: Appropriate Assessment of In-combination Effects on Integrity (CCGT WITH SCR)													
Name of European site: Thorne Moor SAC													
Distance to NSIP: Approximately 14 km													
European site features	**In-Combination Effects on Integrity**												
	Eggborough Coal-Fired Power Station Decommissioning and Demolition Cumulative air quality impacts												
	C	O	D										
Degraded raised bogs still capable of natural regeneration	×	×**a**	×										

Evidence supporting in-combination appropriate assessment conclusions

a. Decommissioning of Eggborough coal-fired power station results in a cumulative net reduction in nitrogen deposition at the SAC by around 3% of the process contribution. The in-combination effect with the Proposed Development therefore results in a beneficial effect and will not result in adverse effects on the integrity of the SAC (see Appendix H).

REFERENCES

AECOM (2017a) *West Burton C Power Station Environmental Impact Assessment Scoping Report April 2017*. Prepared for EDF Energy by AECOM, Leeds.

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European Commission (2007) *Guidance Document on Article 6(4) of the 'Habitats Directive' 92/43/EEC*. Published on the internet at:

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Environ (2014) *Thorpe Marsh Gas Pipeline NSIP Habitats Regulations Statement – No Significant Effects Report October 2014*. Prepared for Thorpe Marsh Power Limited by Environ, Birmingham.

European Commission (2001) *Assessment of plans and projects significantly affecting Natura 2000 sites*. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

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WSP (2017) *Drax Re-power Project Environmental Impact Assessment Scoping Report September 2017*. Prepared for Drax Power Ltd by WSP, Leeds.

Appendix H Memo: Environment Agency Schedule 5 Request for Further Information – Point 8 Habitats Assessment

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Project name:
Eggborough Power CCGT

Project ref:
EP Variation – EPR/VP3930LH/V011

To:

From:
AECOM: Helen Watson, Richard Lowe

CC:
Eggborough Power Limited

Date:
5 January 2018

Memo: Environment Agency Schedule 5 Request for Further Information – Point 8 - Habitats Assessment

1. Introduction

The following information is presented in response to the Environment Agency's Environmental Permit Schedule 5 Notice of Request for More Information, issued on 11th December 2017, in relation to the recently submitted Environmental Permit Variation for Eggborough Power Limited (Application number EPR/VP3930LH/V011).

The Environment Agency (EA) has requested that a revised assessment be provided of the impact of aerial emissions on the relevant habitats sites in the modelling scenario when SCR is employed. They consider that the assessment presented within the Environmental Permit variation was overly conservative, and that a number of assumptions made in the original assessment have led to an over-estimation of the predicted impacts.

A number of revised model scenarios have been completed in order to demonstrate that the results presented in the Environmental Permit variation application were overly conservative, and that the anticipated actual impacts are lower than those originally presented. The revised modelling assumptions and results are presented below.

2. Revised Modelling Data

In order to address the potential overestimation of the impacts at habitat sites in the original modelling, a number of revisions to the modelled data and model assumptions have been considered for this revised assessment.

In the Schedule 5 notice the EA detail a number of model assumptions that they consider may have led to the over-estimation, and therefore these have been considered in the revised assessment. Where it has not been deemed appropriate to include the EA's recommendations in the reassessment, this has also been discussed below.

Modelling of CCGT Emissions

- The original assessment modelled ammonia slip at a concentration of 5mg/Nm^3. It is recognised that the BAT-AEL for ammonia is also provided as a range of 3 - 10mg/Nm^3 and that the lower end of this

range is associated with gas-fired plant. Therefore, ammonia slip has been reassessed at a concentration of 3mg/Nm^3.

- In addition to the point raised by the EA above, the long-term process contributions had originally been based on assuming 100% load and operation of all three CCGTs over an annual period. This is considered to be an over-estimation, as the plant will not be operational at full load all year round, as regular maintenance activities will result in some plant down-time. Therefore in the reassessment, the annual impacts have been factored to take account of expected annual mean plant Load Factor, which has been assumed to be 8,000 hours/ year (or 91%). This remains conservative, as this still assumes that the plant would be operating at 100% load over this time period, where actual average loads may be lower than this. The long term Load Factor (running regime) of the plant is also unlikely to be baseload (operating all year round) over its life and a more likely running regime would be for the plant to shut down at times of low electricity demand during the day.

Modelling of Peaking Plant Emissions

- The emissions for the reciprocating engines had previously been modelled at an ELV of 100mg/Nm^3, however for the reassessment they have been modelled at an ELV of 75mg/Nm^3 as this is the upper limit for such plant presented in the Large Combustion Plant BAT Conclusions.
- The long-term process contributions had originally been based on assuming 100% load and operation of the peaking plant. It is anticipated that actual operating hours of this plant will be less than 1,500 hours per year, and therefore the annual impacts have been factored to take account of an expected annual mean plant Load Factor, assumed to be 1,500 hours/year (17%).

General Model Changes

- In the original assessment nitrogen and acid deposition had been based on deposition of NO_x, however the EA have advised that this should be assessed as NO_2, and therefore a 70% conversion factor has been applied in the revised assessment to account for NO_x to NO_2 conversion in the long term.
- The original assessment had calculated deposition values based on post model calculations of the predicted PCs with the deposition rates and nitrogen conversion factors detailed in the AQTAG06 guidance. However, at the recommendation of the EA, the reassessment has included dry deposition directly within the model set-up, which enables the model to factor in the effect of plume depletion.
- Modelling has been undertaken using the commercially available Gaussian modelling software ADMS. Alternative modelling software is also available such as AERMOD. It is generally considered that ADMS leads to higher predicted impacts than AERMOD under many scenarios. In addition, Gaussian dispersion models are generally used to a range of 15 km from the source; at this distance and beyond the uncertainty in the results from the model increases, since they are intended for 'near field' impact assessment. The models assume steady state atmospheric conditions across the entire model domain and do not take into account changes in wind direction or strength caused by terrain features; or changes in atmospheric conditions caused by non-homogenous surface characteristics such as water bodies or heat sources such as large roads and conurbations, meaning a plume is assumed to travel to infinite distance within 1-hour ("light-house beam" effect). Model uncertainty is far higher than 1% of the model result at these distances, with a typical uncertainty of 10% in the long-term predicted averages at 10km from a buoyant elevated plume [1]. The results from the modelling assessment undertaken are therefore considered by the Applicant to be at the higher end of the uncertainty range for the predicted impact and the EA has concurred with that view when reviewing the Environmental Permit application submission.

[1] European Environment Agency, 2008, Guidance report on preliminary assessment under EC air quality directives, Annex 5.3 Limitations and uncertainties in meteorological estimates using dispersion models

3. European Designated Sites

The air quality impact assessment submitted with the Environment Permit variation application describes the potential impacts at identified protected conservation areas. European designated sites have been identified through application of the EA guidance criterion of 15km from the power station source, and nationally designated sites (SSSIs) within 10km of the Installation. Since the Environmental Permit variation application was submitted, at the request of North Yorkshire Country Council the study area has been extended to beyond 15km to include several additional European designated sites and therefore additional results for the revised assessment have been presented for new receptors E13 to E15. The identified sites, together with the features for which they are designated, are described in Table 1 below.

Table 1: Statutory Designated Sites with Potential for Air Quality Impacts

ID	Receptor name	Receptor type	Habitat for which statutory designation applies (most sensitive within 15km study area)[1]	Grid Reference		Distance (km) and direction from proposed power plant stacks	
				x	y		
E1	Burr Closes	SSSI	Neutral grassland, low and medium altitude hay meadows	459650	433900	10.2	N
E2	Eskamhorn Meadows	SSSI	Neutral grassland, low and medium altitude hay meadows	466300	423766	8.7	E
E3	Went Ings Meadows	SSSI	Neutral grassland, low and medium altitude hay meadows	464800	418300	9.1	SE
E4	Forlorn Hope Meadow	SSSI	Neutral grassland, low and medium altitude hay meadows	454450	417190	7.4	SW
E5	Brockadale	SSSI	Meso- and eutrophic *Quercus* woodland	450530	417690	9.4	SW
E6*	Humber Estuary	SAC	Estuaries; Mudflats and sandflats not covered by seawater at low tide; Atlantic salt meadows	473400	426200	16.0	E
E7*	Skipwith Common	SAC	Northern Atlantic wet heaths with *Erica tetralix*; European dry heaths	464900	436600	14.6	NE
E8*	Thorne Moor	SAC	Degraded bogs still capable of natural regeneration	472350	419350	15.4	SE
E9	Selby canal and towpath	SINC	-	457600	428300	4.4	N
E10	Burn disused airfield	SINC	-	460000	427600	4.4	NE
E11	Eggborough disused pit	SINC	-	458100	422800	1.2	S
E12*	River Derwent	SAC	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	467800	428700	11.3	NE
E13*	Strensall Common	SAC	Northern Atlantic wet heaths with *Erica tetralix*; European dry heaths	463600	458500	35.0	N
E14*	North York Moors	SAC	Blanket bog; Northern Atlantic wet heaths with *Erica tetralix*; European dry heaths	457600	488500	65.0	N
E15*	Hatfield Moor	SAC	Degraded bogs still capable of natural regeneration	469900	408300	20.0	SE

Taken from APIS and Defra Magic mapping data; * indicates European designated site

4. Assessment Criteria

Critical Levels are defined in EA Guidance as "*concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as…ecosystems…may occur according to present knowledge*". Critical Levels relate to the gaseous concentration of a pollutant in the air and may be applied to any of the identified protected conservation areas.

Critical Loads are defined as "*a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge*". Critical Loads relate to the quantity of pollutant deposited from air to the ground and Critical Load ranges (reflecting variation in ecosystem response across Europe) are defined for specific sensitive species or habitat types within an identified protected conservation area, typically only for national or European designated sites.

Critical Loads for acid deposition take into consideration the buffering capacity of soils and include contributions from sulphur (as sulphate) and nitrogen (as nitrate, ammonium and nitric acid). The acidity Critical Load function tool on APIS has been employed in the assessment of acid deposition impacts. Baseline Critical Loads and other pollutant concentrations have been obtained from APIS[2].

The assessment has been conducted in accordance with Environment Agency significance criteria which state that:

PCs [Process Contributions] are considered insignificant if the long-term process contribution is less than 1% of the relevant EQS [Environmental Quality Standard]. The long-term 1% process contribution insignificance threshold is based on the judgements that it is unlikely that an emission at this level will make a significant contribution to air quality and the threshold provides a substantial safety margin to protect health and the environment.

A PC which is not screened out as insignificant must then be considered in combination with the existing baseline to determine whether there is a likelihood of the EQS being exceeded.

The application of Critical Loads to Blanket Bogs and Raised Bogs has been made with reference to the APIS guidance, which states that the lower Critical Load should be applied where Conservation Objectives are not currently met (a site in unfavourable condition). This precautionary approach has also been used in assessment of the other sites, through application of the lower Critical Load in each case.

Due to the potential over-estimation in the impacts, the original air quality impact assessment submitted with the Environment Permit variation application indicated that impacts at a number of the receptors was over 1% of the N-Deposition lower critical load when the CCGT was operated with SCR, at a NO_x ELV of 30mg/Nm^3 and ammonia slip was assessed at 5mg/Nm^3.

No exceedances of the 1% insignificance threshold for Critical Loads are predicted at any European designated site if the plant operates without SCR (at the higher IED ELV of 50mg/Nm^3); it is the nitrogen deposition associated with the ammonia slip that dominates the modelled process contribution. The remainder of this memo therefore focusses on predicted impacts if the plant was to install and operate SCR.

[2] Centre for Ecology and Hydrology and APIS (2016) Critical Load Function Tool. [Online]. [Accessed December 2017]. Available from: http://www.apis.ac.uk

5. Impacts Associated with SCR Use to Achieve BAT-AEL

5.1 Critical Levels

The maximum daily mean NO_x process contribution associated with emissions of NO_x at the BAT-AEL, at any of the designated sites, was predicted to be less than 10% of the daily mean Critical Level (75µg/m^3), in the original impact assessment, and decreases in the revised assessment, as shown in Table 2. Impacts of daily NO_x at all receptors are therefore considered to be insignificant.

Table 2: Predicted Daily Mean NO_x Concentrations at Ecological Sites (Critical Level 75µg/m^3)

Receptor ID	Original Impact Assessment			Revised Assessment		
	Daily mean PC (µg/m^3)	Daily mean PC / Critical Level	PC > insignificance threshold?[1]	Daily mean PC (µg/m^3)	Daily mean PC / Critical Level	PC > insignificance threshold?[1]
E1	1.8	2.3%	No	1.4	1.8%	No
E2	3.1	4.1%	No	2.4	3.2%	No
E3	1.3	1.8%	No	1.1	1.4%	No
E4	2.3	3.0%	No	1.8	2.4%	No
E5	1.9	2.6%	No	1.5	2.0%	No
E6*	1.5	1.9%	No	1.1	1.5%	No
E7*	1.8	2.4%	No	1.4	1.9%	No
E8*	1.7	2.3%	No	1.4	1.8%	No
E9	2.8	3.8%	No	2.2	3.0%	No
E10	4.1	5.4%	No	3.2	4.3%	No
E11	3.8	5.1%	No	3.2	4.3%	No
E12*	1.8	2.4%	No	1.4	1.9%	No
E13*	-	-	-	0.5	0.7%	No
E14*	-	-	-	0.3	0.4%	No
E15*	-	-	-	0.8	1.1%	No

* Indicates European designated site.

Short-term baseline assumed to be twice the annual average baseline.

EA short-term significance criteria: Insignificant <10% of short-term Critical Level.

The maximum annual mean NO_x process contribution at any of the designated sites was predicted to be less than 1% of the annual mean Critical Level (30µg/m^3) in the original assessment and reduces slightly in the revised assessment, as shown in Table 3. The annual average process contribution of NO_x at the designated sites has therefore been determined to be insignificant.

Table 3: Predicted Annual Mean NO_x Concentrations at Ecological Sites (Critical Level 30µg/m^3)

Receptor ID	Original Impact Assessment			Revised Assessment		
	Annual mean (µg/m^3)	Annual mean PC / Critical Level	PC > insignificance threshold?[1]	Annual mean PC (µg/m^3)	Annual mean PC / Critical Level	PC > insignificance threshold?[1]
E1	0.1	0.4%	No	0.1	0.4%	No

Receptor ID	Original Impact Assessment			Revised Assessment		
	Annual mean (µg/m^3)	Annual mean PC / Critical Level	PC > insignificance threshold?[1]	Annual mean PC (µg/m^3)	Annual mean PC / Critical Level	PC > insignificance threshold?[1]
E2	0.2	0.8%	No	0.2	0.7%	No
E3	0.1	0.2%	No	<0.1	0.2%	No
E4	<0.1	0.1%	No	<0.1	0.1%	No
E5	<0.1	0.1%	No	<0.1	0.1%	No
E6*	0.1	0.4%	No	0.1	0.4%	No
E7*	0.1	0.3%	No	<0.1	0.3%	No
E8*	0.1	0.4%	No	0.1	0.4%	No
E9	0.1	0.4%	No	0.1	0.3%	No
E10	0.2	0.5%	No	0.1	0.5%	No
E11	<0.1	0.1%	No	<0.1	0.1%	No
E12*	0.2	0.5%	No	0.2	0.5%	No
E13*	-	-	-	<0.1	0.2%	No
E14*	-	-	-	<0.1	0.1%	No
E15*	-	-	-	<0.1	0.1%	No

* Indicates European designated site

Long-term significance criteria: Insignificant / imperceptible<1% of long-term Critical Level.

The original impact assessment predicted that the process contribution of ammonia on ecological receptors was a maximum of 2% of the Critical Level of 1µg/m^3 (defined for lichens and bryophytes) at the E8 receptor (Thorne Moor SAC). Two other sites were predicted to have impacts slightly over the 1% threshold of insignificance. The revised assessment shows reduced impacts, with only the E8 (Thorne Moor SAC) receptor predicted to experience a process contribution over the insignificance criteria, and this has reduced to only 0.1% over the insignificance criteria. Given the conservative assumptions still applied within the model and the model uncertainty, it is considered that the impacts of ammonia are insignificant at all habitat receptors.

Table 4: Predicted Annual Mean NH_3 Concentrations at Ecological Sites (Critical Level 3 / 1 µg/m^3)

Receptor ID	Habitat specific Critical Level (µg/m^3)	Original Impact Assessment			Revised Assessment		
		Annual mean (µg/m^3)	Annual mean PC / Critical Level	PC > insignificance threshold?[1]	Annual mean PC (µg/m^3)	Annual mean PC / Critical Level	PC > insignificance threshold?[1]
E1	3	0.02	<1%	No	0.01	0.4%	No
E2	3	0.03	1.1%	Yes	0.02	0.7%	No
E3	3	0.01	<1%	No	0.01	0.2%	No
E4	3	0.01	<1%	No	<0.01	0.1%	No
E5	1	<0.01	<1%	No	<0.01	0.2%	No
E6*	3	0.02	<1%	No	0.1	0.4%	No
E7*	1	0.01	1.4%	Yes	0.01	0.8%	No
E8*	1	0.02	1.9%	Yes	0.01	1.1%	Yes
E9	3	0.02	<1%	No	0.1	0.3%	No

Receptor ID	Habitat specific Critical Level (µg/m^3)	Original Impact Assessment			Revised Assessment		
		Annual mean (µg/m^3)	Annual mean PC / Critical Level	PC > insignificance threshold?[1]	Annual mean PC (µg/m^3)	Annual mean PC / Critical Level	PC > insignificance threshold?[1]
E10	3	0.02	<1%	No	0.1	0.4%	No
E11	3	0.01	<1%	No	<0.01	0.1%	No
E12*	3	0.02	<1%	No	0.01	0.5%	No
E13*	1	-	-	-	<0.01	0.5%	No
E14*	1	-	-	-	<0.01	0.3%	No
E15*	1	-	-	-	<0.01	0.3%	No

* Indicates European designated site
Long-term significance criteria: Insignificant <1% of long-term Critical Level.
Critical load of 1µg/m^3 for habitats with lichens / bryophytes; 3µg/m^3 for all higher plants

5.2 Critical Loads

The original impact assessment predicted that the process contribution of N-deposition on ecological receptors was a maximum of 3.4% of the Lower Critical Load of 5kg N/Ha/Yr at the E8 receptor (Thorne Moor SAC). In addition, three other ecological receptors were predicted to have impacts over the 1% threshold of insignificance.

The revised assessment shows significantly reduced impacts, as shown in Table 5, mainly due to the lower ammonia emission concentration, and also due to the factored running hours and plume depletion. Only the E8 (Thorne Moor SAC) receptor is predicted to experience a process contribution over the insignificance criteria at 1.1% of the Lower Critical Load or 0.6% of the Upper Critical Load at the worst-affected location within the site; APIS advises that the Lower Critical Loads should be applied as the overall site condition is currently *unfavourable recovering*.

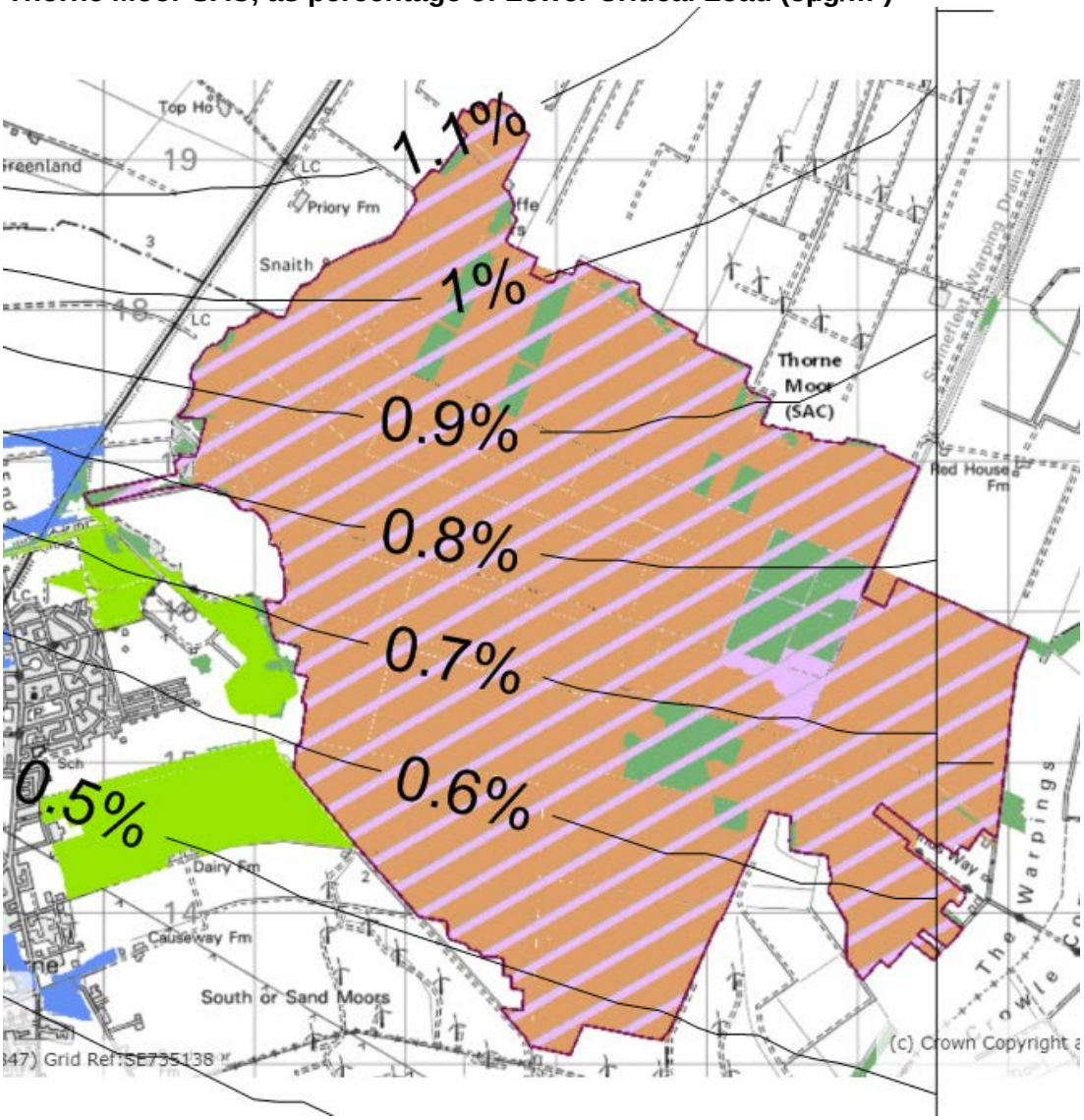
Figure 1 shows the isopleths of process contributions (from use of SCR) to nitrogen deposition at the Thorne Moor SAC, and demonstrates that the area where the Critical Load is 0.1% over the threshold for insignificance is very small, with the majority of the site at 1% or less of the Lower Critical Load, using the worst-case meteorological data year (2011).

Table 5: Nutrient Nitrogen Deposition (as kg N/Ha/Yr) at Designated Habitat Sites

ID	Receptor name (Critical Load Class: most sensitive species)	Critical Load	2013 Deposition Baseline	Baseline / LCL	Original Assessment		Revised Assessment		
					Annual mean PC [Total]	PC / LCL	Annual mean PC [NO_x : NH_3][1]	PC / LCL	Annual mean PEC/ Critical Load (lower)
E1	Burr Closes SSSI (Low and medium altitude hay meadows)	20-30	20.0	100%	0.18	0.9%	0.06 [0.01 : 0.04]	0.3%	100%
E2	Eskamhorn Meadows SSSI (Low and medium altitude hay meadows)	20-30	17.8	89%	0.30	1.5%	0.1 [0.02 : 0.08]	0.5%	89%
E3	Went Ings Meadows SSSI (Low and medium altitude hay meadows)	20-30	17.6	88%	0.09	0.5%	0.03 [0.006 : 0.02]	0.2%	88%
E4	Forlorn Hope Meadow SSSI (Low and medium altitude hay meadows)	20-30	19.6	98%	0.06	0.3%	0.02 [0.004 : 0.01]	0.1%	98%
E5	Brockadale SSSI (Meso- and eutrophic Quercus woodland)	15-20	31.8	**212%**	0.03	0.2%	0.01 [0.002 : 0.01]	0.1%	**212%**
E6*	Humber Estuary SAC (Estuaries- Pioneer low-mid, mid-upper salt marshes)	20-30	18.6	93%	0.17	2.2%	0.06 [0.01 : 0.05]	0.3%	93%
E7*	Skipwith Common SAC (Northern wet heath: Erica tetralix)	10-20	18.2	**182%**	0.13	1.3%	0.04 [0.008 : 0.03]	0.4%	**182%**
E8*	Thorne Moor SAC (Raised and Blanket Bogs)	5-10	14.6	**292%**	0.17	3.4%	0.06 [0.01 : 0.04]	1.1%	**292%**
E9-E12: No published data									
E13*	Strensall Common (Northern wet heath: Erica tetralix)	10-20	18.2	**216%**	-	-	0.02 [0.005 : 0.02]	0.2%	**216%**
E14*	North York Moors (Raised and Blanket Bogs)	5-10	21.6	**398%**	-	-	0.01 [0.003 : 0.008]	0.2%	**398%**
E15*	Hatfield Moor (Raised and Blanket Bogs)	5-10	19.9	**350%**	-	-	0.01 [0.003 : 0.008]	0.2%	**350%**

Notes: * Indicates European designated site.
LCL = Lower Critical Load; PC = Process Contribution; PEC = Predicted Environmental Concentration (PC + baseline).
[1] [Relative N deposition contributions from NO_2 : NH_3].

Figure 1: Isopleths of Process Contribution from the Revised Assessment to N-deposition at Thorne Moor SAC, as percentage of Lower Critical Load (5µg/m^3)



The original assessment predicted a process contribution of acid deposition (resulting from nitrogen and ammonia contributions) at the European designated site E8 as 2.6% of the maximum Critical Load of nitrogen function identified for the most sensitive species within the habitat site. A further two sites also had impacts that were 0.1% over the insignificance threshold.

The revised assessment results in reduced impacts, as shown in Table 6, which are all below the 1% threshold for insignificance.

As the existing baseline acid deposition levels at European designated sites are very high, the process contribution to acid deposition from the SCR scenario does not represent a significant proportion of the overall deposition rate, nor does the additional process contribution result in an exceedance at a site that was not already occurring as a result of other sources.

Table 6: Acid Deposition (as keq /Ha/Yr) at Designated Habitat Sites

ID	Receptor name (Critical Load Class: most sensitive species)	$CL_{min}N$-$_{max}N$	$CL_{min}S$	Total Baseline N:S	Baseline/ $CL_{max}N$	Original Assessment			Revised Assessment		
						Annual mean PC [NO_x : NH_3][1]	PC/ $CL_{max}N$	PEC_{IED} / $CL_{max}N$	Annual mean PC [NO_x : NH_3][1]	PC/ $CL_{max}N$	PEC/ $CL_{max}N$
E1	Burr Closes SSSI (Low and medium altitude hay meadows)	0.44-1.25	0.81	1.43:0.39	**146%**	0.012 [0.002:0.011]	1%	**147%**	0.004 [0.001:0.003]	0.3%	**146%**
E2	Eskamhorn Meadows SSSI (Low and medium altitude hay meadows)	0.44-2.00	1.56	1.27:0.38	83%	0.021 [0.003:0.018]	1.1%	84%	0.007 [0.001:0.006]	0.4%	83%
E3	Went Ings Meadows SSSI (Low and medium altitude hay meadows)	0.44-2.80	1.57	1.26:0.41	60%	0.007 [0.001:0.006]	0.2%	60%	0.002 [0.0004:0.002]	0.1%	60%
E4	Forlorn Hope Meadow SSSI (Low and medium altitude hay meadows)	0.44-1.26	0.82	1.40:0.47	**149%**	0.002 [0.001:0.003]	0.3%	**149%**	0.0021 [0.0003:0.001]	0.1%	**149%**
E5	Brockadale SSSI (Meso- and eutrophic Quercus woodland)	0.14-1.75	1.57	2.27:0.53	**160%**	0.002 [0.001:0.002]	0.1%	**160%**	0.0001 [0.0002:0.001]	0.1%	**160%**
E6*	Humber Estuary SAC	No sensitive habitats in study area									
E7*	Skipwith Common SAC (Northern wet heath: Erica tetralix)	0.64-0.82	0.16	1.30:0.40	**207%**	0.009 [0.001:0.008]	1.1%	**208%**	0.003 [0.001:0.002]	0.3%	**208%**
E8*	Thorne Moor SAC (Raised and Blanket Bogs)	0.32-0.46	0.14	1.04:0.30	**290%**	0.012 [0.002:0.010]	2.6%	**293%**	0.004 [0.001:0.003]	**0.9%**	**291%**
E9-E12: No published data											
E13*	Strensall Common (Northern wet heath: Erica tetralix)	0.71-1.51	0.80	1.54:0.34	**124%**	-	-	-	0.001 [0.0003:0.001]	0.1%	**124%**
E14*	North York Moors (Raised and Blanket Bogs)	0.32-0.54	0.18	1.42:0.36	**330%**	-	-	-	0.001 [0.0002:0.0006]	0.2%	**330%**
E15*	Hatfield Moor (Raised and Blanket Bogs)	0.32-0.48	0.15	1.25:0.43	**354%**	-	-	-	0.001 [0.0002:0.001]	0.2%	**354%**

Notes: * Indicates European designated site.
CL = Critical Load; PC = Process Contribution; PEC = Predicted Environmental Concentration (PC + baseline).
[1] [Relative N deposition contributions from NO_x : NH_3]; sulphur contribution from Proposed Development assumed to be zero

6. Additional Considerations

6.1 Existing Impacts from the Coal-Fired Power Station

It should be noted that the current background concentrations at all the habitat sites include process contributions from the existing Eggborough coal-fired power station, which will cease operation prior to the operation of the new CCGT plant.

Table 7 compares the emissions of the existing coal-fired plant with the proposed CCGT power station, and it can clearly be seen that although the generating capacity of the proposed CCGT plant is higher than the existing plant, due to the lower NO_x emission concentrations from the more modern gas-fired plant, total annual emissions of NO_x and total nitrogen will reduce significantly, to approximately a quarter of that produced by the existing coal-fired power station. It is therefore considered, that although the impacts of the existing plant were not assessed as part of the Environmental Permit variation application, the replacement of the existing coal-fired plant with the new CCGT plant would result in a reduction in environmental impacts from the Eggborough power station site.

Indicative modelling of the impacts of the existing coal-fired operations has predicted nitrogen deposition at the Thorne Moor SAC at peak load to be in the region of3% of the Lower Critical Load, and this figure is also comparable to the APIS source attribution data used in the determination of the baseline levels for nitrogen and acid deposition. The revised assessment demonstrates that potential future nitrogen deposition from the operation of the CCGT power station with SCR, would be 1.1% at this receptor and therefore this represents a reduction in the level of impact experienced at this receptor from the existing operational coal-fired power station.

Table 7: Comparison of Proposed CCGT Plant Against Existing Coal Fired Plant

Parameter	Worst-case CCGT power plant (3 units, total emission)	Existing Coal-fired power plant (2 units in operation, based on recent plant regime)	Existing coal-fired power plant, peak output (4 units)
Nominal generation capacity (MW)	2,500	1,000	2,000
Assumed maximum operating hours / year [ii]	8,100 (for annual impacts) 8,760 for short term impacts	(Maximum 17,500 hours from 01/01/16 – 31/12/23)	(Maximum 17,500 hours from 01/01/16 – 31/12/23)
Concentration of NO_x) (mg/m^3)	30 [iii]	400 [iv]	400 [iv]
Nominal annual emission NO_x (tonnes)	3,300 [ii]	13,370	26,740
Nominal annual emission SO_2 (tonnes)	Negligible	10,740	21,480
Nominal annual emission as N (tonnes)	1,400 (of which 250 from NH_3)	4,000	8,000

i. Tabulated data for the proposed CCGT plant is taken from permit variation air impact assessment.
ii. Assuming the maximum possible operation 24 hours/day, 365 days/year.
iii. Assuming SCR is applied
iv. Existing permitted Base-load operation.
v. Reference conditions: 273 K, 15 % O_2, dry.
vi. Reference conditions: 273 K, 6 % O_2, dry.
vii. IED ELV = EU Industrial Emissions Directive, Emission Limit Value.

6.2 Deposition Rates of Ammonia

The original and revised assessments were both based on a deposition rate of ammonia of 0.02m/s, which is included in the AQTAG06 guidance for deposition of ammonia on grassland. A literature search of ammonia deposition rates has been carried out and it is considered that the rate of 0.02m/s applied in the assessment is conservative.

A review of Land Use Specific Ammonia Deposition Velocities: a Review of Recent Studies (2004 – 2013) by Schrader *et al.* suggests that for non-woodland sites, average and median deposition velocities are 0.01m/s and 0.004m/s [3] respectively. Using an ammonia deposition rate of 0.01m/s would significantly reduce the predicted impacts associated with SCR use, as the ammonia deposition rate is more than 10 times that of NO_2 and the contribution to N deposition at Thorne Moor from process contributions of ammonia is five times that of NO_2 assuming the deposition rate of 0.02m/s. The less conservative assumption of 0.01m/s for ammonia deposition rate would reduce the impacts at Thorne Moor still further, to below the insignificance threshold.

7. Summary and Conclusions

A revised assessment of the impact of aerial emissions of the relevant habitats sites in the modelling scenario when SCR is present has been carried out, as the EA consider that the assessment presented within the Environmental Permit variation was overly conservative.

A number of revised model scenarios have been completed in order to demonstrate that the results presented in the Environmental Permit variation application were very conservative, and that the anticipated actual impacts are likely to be lower than those originally presented.

The results from the reassessment take into account:

- Factoring of emissions from the CCGTs and peaking plant for annual operation;
- A reduction in the emission concentrations of NO_x from the reciprocating engines in line with BAT-AELs;
- A reduction in the emission concentrations of NH_3 from the CCGTs in line with BAT-AELs;
- A NO_x to NO_2 conversion factor of 70% has been applied to the nitrogen deposition figures; and
- The model has been run with plume depletion included.

The revised assessment demonstrates a marked reduction in predicted impacts at the identified Habitat receptors, leading to impacts that can largely be considered as insignificant according to the EA's assessment criteria. Where predicted impacts are over the threshold of insignificance, this is only by 0.1% and occurs only within a small area of one designated site – E8 Thorne Moor SAC. An isopleth figure (Figure 1) of the predicted nitrogen deposition in relation to the lower critical load demonstrates that the area where the insignificance threshold is predicted to be exceeded is small (around 6% of the area of the designated site), and that the majority of the site experiences impacts that are considered to be insignificant.

Although the reassessment aims to represent a more realistic operational scenario for the CCGT plant operating with SCR present than the worst case scenario assessed in the original assessment, it is still considered that a number of conservative assumptions remain within the assessment. The conservative assumptions are mainly in respect to dispersion modelling parameters.

The principal uncertainty associated with the dispersion modelling results arises from the inter-annual variation in meteorological conditions. The assessment described in the Environmental Permit variation

[3] Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4176955/

application and the revised assessment present here is based on the worst-case predicted results from 5-years of meteorological data.

In addition, the model has been run assuming a surface roughness of 0.2m for the surrounding area, and it is considered that although this is representative of the majority of the surrounding land use, between the power station site and Thorne Moor there are areas that would have increased surface roughness, such as the M62 motorway and areas of habitation, including numerous small towns and villages. These areas would increase ground resistance and turbulence leading to increased plume depletion and dispersion before the Thorne Moor site. The model also does not take into account changes in wind direction or strength caused by these terrain features; or changes in atmospheric conditions caused by non-homogenous surface characteristics such as water bodies or large roads, which are likely to result in lower predicted concentrations at the receptor.

Modelling has been undertaken using the commercially available Gaussian modelling software ADMS. Alternative modelling software is also available such as AERMOD. It is generally considered that ADMS leads to higher predicted impacts than AERMOD under many scenarios. In addition, Gaussian dispersion models are generally used to a range of 15 km from the source; at this distance and beyond the uncertainty in the results from the model increases, since they are intended for ‘near field’ impact assessment. Model uncertainty is far higher than 1% of the model result at these distances.

Given the conservative assumptions remaining in the reassessment, it is considered that the presented results are at the upper end of uncertainty of the model and therefore remain very conservative. Actual impacts are therefore likely to be lower than those presented in the revised assessment.

It is recognised that within the Conservation Objectives for designated European sites there is a requirement to prevent deterioration of a site’s qualifying features, and to maintain or restore the supporting processes on which qualifying natural habitats rely; and that the purpose of an Appropriate Assessment is to ascertain whether the CCGT power station with SCR would or would not have an adverse effect on the integrity of the European Site in view of such Conservation Objectives. It is predicted that the nitrogen deposition will decrease with the operation of the CCGT in comparison with the current operation of the coal-fired power station.

Given the net reduction in process contribution from the Eggborough power station site, the conservative assumptions used in the assessment, and the insignificant long-term and short-term impacts predicted at all European designated sites (with the exception of a small area of the Thorne Moor SAC), in the event that SCR is determined to be BAT for the site it is considered that the CCGT power station is unlikely to have significant adverse effects on a European designated site.

Figure 10H.1 International Nature Conservation Designations

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North York Moors (SAC & SPA)

Strensall Common (SAC)

River Derwent (SAC)

Skipwith Common (SAC)

Thorne & Hatfield Moors (SAC & SPA)

Humber Estuary (Ramsar, SAC and SPA)

LEGEND

- DCO Application Site
- 10km Study Area
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Ramsar

2 0 2 4 6 8 10 km

Project Title: EGGBOROUGH CCGT DCO	Client: EGGBOROUGH POWER LTD	AECOM, Scott House, Alençon Link, Basingstoke, Hampshire, RG21 7PP, Telephone (01256) 310200, Fax (01256) 310201, www.aecom.com
Drawing Title: INTERNATIONAL NATURE CONSERVATION DESIGNATIONS	Drawn: CN; Checked: JW; Approved: SW; Date: 11/05/2017; Scale @ A3: 1:225,000; Purpose of Issue: Environmental statement; Drawing Number: FIGURE 10H.1; Rev: 01	

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