Planning Inspectorate

Advice Note 10

Habitats Regulations Assessment

Appendix 2: Drax Repower HRA Integrity Matrices (submitted for Deadline 6~~3~~)

STAGE 2: EFFECTS ON INTEGRITY

Likely significant effects have been identified for the following sites:

- River Derwent SAC
- Lower Derwent Valley Ramsar
- Lower Derwent Valley SAC
- Lower Derwent Valley SPA
- Humber Estuary SAC
- Humber Estuary SPA
- Humber Estuary Ramsar
- Skipwith Common SAC
- Thorne and Hatfield Moors SPA
- Thorne Moors SAC

These sites have been subject to further assessment in order to establish if the NSIP could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below.

Matrix Key

✓ **=** Adverse effect on integrity **cannot** be excluded
✕ **=** Adverse effect on integrity **can** be excluded

C = construction
O = operation
D = decommissioning

HRA Integrity Matrix 1: River Derwent SAC

Name of European site and designation: River Derwent SAC															
EU Code: UK0030253															
Distance to NSIP 0.8 km to the Power Station Site, 1.1km to the Pipeline Area															
European site features	**Adverse effect on integrity**														
Effect	*Species Displacement*			*Habitat Degradation effects (hydrological)*			*Habitat degradation Effects (Air Quality)*			*Direct mortality*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation				**X(a)**	**X(a)**	**X(a)**		**X(d)**						**X(d)**	
1099 River lamprey *Lampetra fluviatilis*				**X(b)**	**X(b)**	**X(b)**		**X(d)**						**X(d)**	
1095 Sea lamprey *Petromyzon marinus*				**X(b)**	**X(b)**	**X(b)**		**X(d)**						**X(d)**	
1163 Bullhead *Cottus gobio*				**X(b)**	**X(b)**	**X(b)**		**X(d)**						**X(d)**	

1355 Otter *Lutra lutra*	**X(c)**		**X(c)**	**X(b)**	**X(b)**	**X(b)**		**X(d)**		**X(c)**		**X(c)**		**X(d)**	

Evidence supporting conclusions

a. No adverse effects on the integrity of the River Derwent SAC habitats are predicted as a result of construction or operational phase hydrological impacts. This is because there is limited potential for any upstream transport of silt or other pollutants from the Proposed Scheme reaching the River Derwent (paragraph 12.3.4 of the Water Resources, Quality and Hydrology ES chapter; Examination Library Ref: APP-080) and due to the presence of the Barmby Tidal barrage at the mouth of the River Derwent, which inhibits upstream flows into the Derwent from the Ouse.

b. As set out in paragraph (a), above, hydrological impacts would lead to no adverse effects on the integrity of the River Derwent SAC habitats and hence their suitability to support SAC fish species or otter. It is however also necessary to consider the potential implications of water quality changes in the River Ouse (downstream of the River Derwent), in relation to SAC fish species and otter. This is because migratory species (river lamprey and sea lamprey) could use the section of the Ouse between the Humber Estuary (downstream of the Proposed Scheme) and the River Derwent SAC (upstream of the Proposed Scheme). Otter have large home ranges and individuals associated with the River Derwent SAC are also likely to use the River Ouse and potentially parts of the Humber Estuary. The proposed CEMP will control potential hydrological impacts during construction and decommissioning, with no deterioration of the WFD status of the River Ouse (located upstream of the Humber Estuary SAC, SPA and Ramsar Site and downstream of the River Derwent SAC) predicted (paragraphs 12.6.13 of the Water Resources, Quality and Hydrology Chapter). During operation, existing and proposed drainage measures would ensure any impacts on water quality within suitable water features for migratory fish species and otters would be negligible (see paragraphs 12.6.50 – 12.6.53 of the ES Water Resources, Quality and Hydrology Chapter). No perceptible changes in the water quality of the Humber Estuary are predicted (paragraph 12.6.13 of the water quality resources chapter).

Bullhead are not expected to be present within the River Ouse downstream or immediately upstream of the Proposed Scheme. This is because bullhead is a freshwater species that does not inhabit tidal waters. The EA identify saline intrusion as a potential water quality issue for groundwater at the Site (paragraph 12.5.15 of the Water Resources, Quality and Hydrology Chapter). Tidal influences also raise the level of the River Ouse by approximately 4.2 m (paragraph 12.5.12 of the Water Resources, Quality and Hydrology Chapter), further confirming tidal influences in the stretch of the Ouse adjacent to and downstream of the Site.

c. Evidence of otter has been recorded along the River Ouse and on some of the smaller watercourses along the route of the Gas Pipeline (paragraphs 9.5.28 – 9.5.32 of the ES Biodiversity Chapter; Examination Library Ref: APP-077). Installation of the Gas Pipeline will result in temporary disturbance of habitats within the Pipeline Area. No watercourses are expected to be directly physically impacted, where the pipeline is installed under watercourses using trenchless techniques (see paragraph 3.3.19 of the ES Site and Project Description Chapter; Examination Library Ref: APP-071). However, where open-cut techniques are used, there may be temporary impacts to otter commuting, foraging and resting habitat. Mitigation will be implemented to negate any potential impacts on commuting or foraging otter. Specifically, the maintenance of adequate channel and bankside habitat during the works to ensure commuting can continue unimpeded (with directional fencing used where necessary); the avoidance of night-time working and lighting; and construction best-practice to ensure otters do not come into contact with open trenches and other areas where otters may be trapped and injured or killed. Current survey data demonstrates that no potential resting sites will be impacted upon. Updated survey data prior to construction will determine whether this situation remains. If resting sites are found during updated survey to be impacted, mitigation will be implemented (comprising replacement habitat) to ensure no net loss and maintenance of the species Favourable Conservation Status. This, in turn will ensure no adverse effects on integrity. Construction of the Gas Pipeline would take up to a year including construction of the Gas Receiving Facility and Above Ground Installation. Installation of the Gas Pipeline only is expected to take approximately four months (see Paragraph 3.3.27 of the ES Site and Project Description Chapter). The Project CEMP would also include measures to limit indirect effects on watercourses (see paragraph 12.6.13 of the ES Water Resources, Quality and Hydrology Chapter) and measures to prevent the incidental mortality of otters (see paragraph 9.6.74 of the ES Biodiversity Chapter) during installation of the pipeline. Given the above measures, any displacement of otters that occurs during construction, operation or decommissioning of the Proposed Scheme would be minor and short term, with no perceptible effect on the SAC population. This would not compromise the favourable conservation status of populations associated with the River Derwent SAC and hence there would be no adverse effect on the integrity of the SAC (see Paragraphs 9.6.80, 9.6.87 and 9.6.90 of the ES Biodiversity Chapter).

d. Chapter 6 of the ES (Air Quality; Examination Library Ref: APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Table 6.16, 6.17, 6.21 and 6.23 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a detailed description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 and 6.23. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) and the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of Chapter 6 of the ES).

The air quality modelling shows that the Proposed Scheme will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The River Derwent (and the hydrologically connected downstream River Ouse) is not considered to be sensitive to the effects of nitrogen deposition and associated acidification, due to the River's water quality. Environment Agency (EA) monitoring data indicates that the River Derwent is strongly phosphate limited. In phosphate limited systems, additional inputs of nitrogen have limited effects on plant productivity, as phosphate is the primary limiting nutrient. As such, additional inputs from the Proposed Scheme, both alone or in-combination with other Plans or Projects, would be unlikely to lead to any perceptible eutrophication effects on freshwater habitats within the SAC.

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

It should also be noted that the current condition of the SSSI is favourable, despite the large inputs of nitrogen from existing diffuse agricultural sources. The constituent SSSI Units of the River Derwent SAC (River Derwent SSSI and Newton Mask SSSI) within 15 km of the Project Site, were all assessed as being in 'favourable', 'unfavourable recovering' or 'unfavourable no change' condition when last assessed. A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 5.53% of the River Derwent SSSI was reported as being in 'favourable' condition, 93.69% recorded as being in 'unfavourable – recovering' condition, with the remaining 0.78% classed as 'unfavourable no change'. Unit 21 of this SSSI was classed as 'unfavourable no change' due to ponds having been filled in and scrub management being required. For the Newton Mask SSSI, 100% of the SSSI units are reported to be in 'favourable' condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments of the Site.

In light of the information presented above, no adverse effects to the integrity of the SAC are predicted.

HRA Integrity Matrix 2: Lower Derwent Valley SAC

Name of European site and designation: Lower Derwent SAC												
EU Code: UK0012844												
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area												
European site features	**Adverse effect on integrity**											
Effect	*Habitat degradation*			*Species Displacement*			*Direct mortality*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
6510 Lowland hay meadows *Alopecurus pratensis*, *Sanguisorba officinalis*		**X(a)**									**X(a)**	
91E0 Alluvial forests with Alder *Alnus glutinosa* and Ash *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)		**X(a)**									**X(a)**	
1355 Otter *Lutra lutra*	**X(b)**	**X(a, b)**	**X(b)**	**X(c)**	**X(c)**	**X(c)**	**X(c)**	**X(c)**	**X(c)**		**X(a)**	

a. Chapter 6 of the ES (Air Quality; Examination Library Ref APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

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~~a.~~ Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH_3) will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto the Lower Derwent Valley SAC. There is a maximum modelled process contribution of 0.8% and 0.2% for nitrogen and acid deposition respectively (see Table 6.19 and 6.20 of the ES Air Quality Chapter, respectively). The process contribution from the Proposed Scheme also reduces with increasing distance from the stacks. For example, the maximum process contribution for nitrogen deposition onto the Breighton Meadows SSSI component of the SAC (the closest part of the site), is predicted to be 0.8%. The maximum process contribution for nitrogen deposition onto the Derwent Ings SSSI component of the SAC (approximately 2 km further north than Breighton Meadows SSSI), is predicted to be 0.5%. As the impacts of the Proposed Scheme alone lead to no exceedances of critical levels or process contributions in excess of 1% of critical loads, no adverse effects on the integrity of the SAC are predicted to arise.

Information on the Air Pollution Information Service (APIS) website (Ref 9.54) identifies that the 91E0 Alluvial forests habitat type is not susceptible to the effects of eutrophication or acidification. As such, nitrogen deposition and acidification from the Proposed Scheme is not predicted to have any perceptible effects on this habitat. The SSSI citations for the underpinning SSSI components of the SAC are also identified as being comprised of lowland meadow habitats, with the 91E0 habitat type associated with sections of the SAC in excess of 15 km from the Proposed Scheme. In light of the above, the Proposed Scheme is predicted to have no perceptible air quality impacts on this habitat type.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.6% for nitrogen deposition and 0.~~3~~5% for acidification (see Tables 6.25 and 6.26 of the ES Air Quality Chapter). The cumulative acid deposition impact is predicted to lead to a *de minimus* in-combination effect, which will lead to no perceptible vegetative change of SAC habitats. The cumulative nitrogen deposition impact reduces with increasing distance from site. Whilst a maximum impact of 1.6% of critical load is predicted over the Breighton Meadows SSSI component of the SAC, the maximum impact over the more distant Derwent Ings SSSI component is 1.4%, declining further with increasing distance from the Proposed Scheme. The Breighton Meadows SSSI has an area of 38.79 ha, representing approximately 4.2% by area of the SAC.

The constituent SSSI Units of the Lower Derwent SAC (Breighton Meadows SSSI and Derwent Ings SSSI) within 15 km of the Site, were all assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed despite the large inputs of nitrogen from existing sources (which exceed the lower band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 92.86% of the Breighton Meadows SSSI was reported as being in 'favourable' condition, with the remaining 7.14% recorded as being in 'unfavourable – recovering' condition. For the Derwent Ings SSSI, 59.7% of the SSSI units are reported to be in 'favourable' condition, with the remaining 40.3% of the SSSI units in 'unfavourable – recovering' condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments of the Site.

The contribution of the Proposed Scheme, whether assessed alone (see below) or in combination with other industrial processes, is largely insignificant and a relatively small proportion of the total deposition. The risk of exceedance of critical loads and the level of exceedance of the critical loads is a function of the rates of background deposition rather than the result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of critical loads and levels for the European Sites within 15km of the Proposed Scheme.

- Taking into account the conservatism built into the air quality assessment including:
- Continuous full load operation for the year;

- 70% conversion of NOx to NO2;
- Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum and the presence of particular habitats;
- Assessment against the lower threshold of recommended critical loads;
- Assessment of maximum impacts across 5 modelled years; and
- Emissions continually at the limit set in the IED / Bref Conclusions and or recommended emissions ceiling

The impacts of the Proposed Scheme both alone and in combination with other relevant development proposals will be small overall and likely imperceptible.

Given the conservatism of the air quality modelling and the low magnitude of the cumulative air quality impacts, no adverse effects to the integrity of the Lower Derwent Valley SAC are predicted to arise.

b. As set out in paragraph (a), above, no adverse effects on the integrity of the River Derwent SAC habitats and hence their suitability to support otter are predicted as a result of hydrological impacts. It is also necessary to consider the potential implications of water quality changes in the River Ouse (downstream of the River Derwent), in relation to otter. This is because otter have large home ranges (see paragraph 9.6.77 – 9.6.78 of the Biodiversity Chapter of the ES; Examination Library Ref: APP-077) and individuals associated with the River Derwent SAC are also likely to use the River Ouse and potentially parts of the Humber Estuary. The proposed CEMP will control potential hydrological impacts during construction and decommissioning, with no deterioration of the WFD status of the River Ouse (located upstream of the Humber Estuary SAC, SPA and Ramsar Site and downstream of the River Derwent SAC) predicted (paragraphs 12.6.13 of the Water Resources, Quality and Hydrology Chapter; Examination Library Ref: APP-080). During operation, existing and proposed drainage measures would ensure any impacts on water quality within suitable water features for otters would be negligible (see paragraphs 12.6.50 – 12.6.53 of the ES Water Resources, Quality and Hydrology Chapter). As such, no adverse effects on the otter population associated with the Lower Derwent Valley SAC are predicted to arise.

c. Evidence of otter has been recorded along the River Ouse and on some of the smaller watercourses along the route of the Gas Pipeline (paragraphs 9.5.28 – 9.5.32 of the ES Biodiversity Chapter). Installation of the Gas Pipeline will result in temporary disturbance of habitats within the Pipeline Area. No watercourses are expected to be directly physically impacted, where the pipeline is installed under watercourses using trenchless techniques (see paragraph 3.3.19 of the ES Site and Project Description Chapter; Examination Library Ref: APP-071). However, where open-cut techniques are used, there may be temporary impacts to otter commuting, foraging and resting habitat. Mitigation will be implemented to negate any potential impacts on commuting or foraging otter. Specifically, the maintenance of adequate channel and bankside habitat during the works to ensure commuting can continue unimpeded (with directional fencing used where necessary); the avoidance of night-time working and lighting; and construction best-practice to ensure otters do not come into contact with open trenches and other areas where otters may be trapped and injured or killed. Current survey data demonstrates that no potential resting sites will be impacted upon. Updated survey data prior to construction will determine whether this situation remains. If resting sites are found during updated survey to be impacted, mitigation will be implemented (comprising replacement habitat) to ensure no net loss and maintenance of the species Favourable Conservation Status. This, in turn will ensure no adverse effects on integrity. Construction of the Gas Pipeline would take up to a year including construction of the Gas Receiving Facility and Above Ground Installation. Installation of the Gas Pipeline only is expected to take approximately four months (see Paragraph 3.3.27 of the ES Site and Project Description Chapter). The Project CEMP would also include measures to limit indirect effects on watercourses (see paragraph 12.6.13 of the ES Water Resources, Quality and Hydrology Chapter). Measures to prevent the incidental mortality of otters and allow their continued movement along watercourses within the Pipeline Area during construction (see paragraph 9.6.74 of the ES Biodiversity Chapter) would also be included. Given the above, any displacement of otters that occurs during construction, operation or decommissioning of the Proposed Scheme would be minor and short term, with negligible effects on the SAC population. This would not compromise the favourable conservation status of populations associated with the Lower Derwent Valley SAC and hence there would be no adverse effect on the integrity of the SAC (see Paragraphs 9.6.80, 9.6.87 and 9.6.90 of the ES Biodiversity Chapter).

HRA Integrity Matrix 3: Lower Derwent Valley SPA

Name of European site and designation: Lower Derwent Valley SPA						
EU Code: UK9006092						
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat Degradation (air quality)*			*In combination effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
Supporting populations of the following Annex I species; <u>Breeding Season</u>: shoveler *Anas clypeata;* <u>Over winter</u>*: Euarasian wigeon* Anas penelope Bewick's Swan *Cygnus columbianus bewickii*, Golden Plover *Pluvialis apricaria*, Ruff *Philomachus pugnax*		**X(a)**			**X(a)**	

Supporting populations of following migratory species; Over winter: Teal *Anas crecca*		**X(a)**			**X(a)**	
Waterbird assemblage		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality; Examination Library Ref: APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH_3) will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto the Lower Derwent Valley SPA. There is a maximum modelled process contribution of 0.8% and 0.2% for nitrogen and acid deposition respectively (see Table 6.19 and 6.20 of the ES Air Quality Chapter, respectively). The process contribution from the Proposed Scheme also reduces with increasing distance from the stacks. For example, the maximum process contribution for nitrogen deposition onto the Breighton Meadows SSSI component of the SPA (the closest part of the site), is predicted to be 0.8%. The maximum process contribution for nitrogen deposition onto the Derwent Ings SSSI component of the SPA (approximately 2 km further north than Breighton Meadows SSSI), is predicted to be 0.5%. As the impacts of the Proposed Scheme alone lead to no exceedances of critical levels or process contributions in excess of 1% of critical loads, no adverse effects on the integrity of the SAC are predicted to arise.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.6% for nitrogen deposition and 0.~~3~~5% for acidification (see Tables 6.24 and 6.25 of the ES Air Quality Chapter) for the neutral grassland habitats assessed. The cumulative acid deposition impact is predicted to lead to a *de minimus* in-combination effect, which would lead to no perceptible vegetative change of SPA habitats and hence their role supporting SPA bird species. The cumulative nitrogen deposition impact also reduces with increasing distance from site. Whilst a maximum impact of 1.6% of critical load (Process Contribution from the Proposed Scheme up to 0.8~~6~~%) is predicted over the Breighton Meadows SSSI component of the SPA, the maximum impact over the more distant Derwent Ings SSSI component is 1.4% (Process Contribution from the Proposed Scheme up to 0.5~~4~~%), with the Process Contribution from the Proposed Scheme declining further with increasing distance from the Proposed Scheme. The Breighton Meadows SSSI has an area of 38.79 ha, representing approximately 4.2% by area of the SPA.

The constituent SSSI Units of the Lower Derwent SPA (Breighton Meadows SSSI and Derwent Ings SSSI) within 15 km of the Project Site, were all assessed as being in ‘favourable’ or ‘unfavourable recovering’ condition when last assessed despite the large inputs of nitrogen from existing sources (which exceed the upper band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 92.86% of the Breighton Meadows SSSI was reported as being in ‘favourable’ condition, with the remaining 7.14% recorded as being in ‘unfavourable – recovering’ condition. For the Derwent Ings SSSI, 59.7% of the SSSI units are reported to be in ‘favourable’ condition, with the remaining 40.3% of the SSSI units in ‘unfavourable – recovering’ condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments.

The Site relevant critical loads page for the Lower Derwent Valley SPA (reference 9.54 of the ES Biodiversity Chapter) includes advice on the application of critical loads and levels to several of the bird species for which the SPA is designated (golden plover, tundra swan, ruff and Eurasian teal). The advice on critical loads identifies that ‘*no expected negative impact on species due to impacts on the species’ broad habitat’* for Eurasian teal and Ruff. For tundra swan a potential negative impact is identified for standing water habitats, dependent on whether waterbodies are nitrogen or phosphate-limited. Environment Agency (EA) monitoring data indicates that the River Derwent is strongly phosphate limited. In phosphate limited systems, additional inputs of nitrogen have limited effects on plant productivity, as phosphate is the primary limiting nutrient. As such, additional inputs would be unlikely to lead to any perceptible eutrophication effects on standing water habitats within the SPA. For golden plover APIS identifies the Critical Load for neutral grassland habitats as being appropriate, due to the species' use of this habitat type.

Given the above, no adverse effects to the integrity of the Lower Derwent Valley SPA are predicted to arise.

HRA Integrity Matrix 4: Lower Derwent Valley Ramsar

Name of European site and designation: Lower Derwent Valley Ramsar						
EU Code: N/A						
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat Degradation (air quality)*			*In combination effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
The river and flood meadows play a substantial role in the hydrological and ecological functioning of the Humber Basin		**X(a)**			**X(a)**	
Rich assemblage of wetland invertebrates		**X(a)**			**X(a)**	

including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates as well as a leafhopper, *Cicadula ornate* for which Lower Derwent Valley is the only known site in Great Britain.						
Staging post for passage birds in spring. Of particular note are the nationally important numbers of Ruff, *Philomachus pugnax* and Whimbrel, *Numenius phaeopus*.		**X(a)**			**X(a)**	
Regularly supports 20,000 or more waterbirds		**X(a)**			**X(a)**	
Regularly supports 1% of the individuals in a population of the following species or subspecies of waterbird: Eurasian wigeon , *Anas Penelope* and Eurasian teal , *Anas crecca*		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality; Examination Library Ref: APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling

demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH_3) will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto the Lower Derwent Valley Ramsar Site. There is a maximum modelled process contribution of 0.8% and 0.2% for nitrogen and acid deposition respectively (see Table 6.19 and 6.20 of the ES Air Quality Chapter, respectively). The process contribution from the Proposed Scheme also reduces with increasing distance from the Proposed Scheme stacks. For example, the maximum process contribution for nitrogen deposition onto the Breighton Meadows SSSI component of the Ramsar Site (the closest part of the site), is predicted to be 0.8%. The maximum process contribution for nitrogen deposition onto the Derwent Ings SSSI component of the Ramsar Site (approximately 2 km further north than Breighton Meadows SSSI), is predicted to be 0.5%. As the impacts of the Proposed Scheme alone lead to no exceedances of critical levels or process contributions in excess of 1% of critical loads, no adverse effects on the integrity of the SAC are predicted to arise.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.6% for nitrogen deposition and 0.~~3~~5% for acidification (see Tables 6.24 and 6.25 of the ES Air Quality Chapter) for the neutral grassland habitats assessed. The cumulative acid deposition impact is predicted to lead to a *de minimus* in-combination effect, which will lead to no perceptible vegetative change of Ramsar Site habitats. The cumulative nitrogen deposition impact also reduces with increasing distance from the Proposed Scheme. Whilst a maximum impact of 1.6% of critical load (Process Contribution from the Proposed Scheme up to 0.8~~6~~%) is predicted over the Breighton Meadows SSSI component of the Ramsar Site, the maximum impact over the more distant Derwent Ings SSSI component is 1.4% (Process Contribution from the Proposed Scheme up to 0.5~~4~~%), with the Process Contribution from the Proposed Scheme declining further with increasing distance from the Proposed Scheme. The Breighton Meadows SSSI has an area of 38.79 ha, representing approximately 4.2% by area of the Ramsar Site.

The constituent SSSI Units of the Lower Derwent SPA (Breighton Meadows SSSI and Derwent Ings SSSI) within 15 km of the Project Site, were all assessed as being in ‘favourable’ or ‘unfavourable recovering’ condition when last assessed despite current inputs of nitrogen from existing sources (which exceed the site relevant critical load in the equivalent area of SPA). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 92.86% of the

Breighton Meadows SSSI was reported as being in ‘favourable’ condition, with the remaining 7.14% recorded as being in ‘unfavourable – recovering’ condition. For the Derwent Ings SSSI, 59.7% of the SSSI units are reported to be in ‘favourable’ condition, with the remaining 40.3% of the SSSI units in ‘unfavourable – recovering’ condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments of the Site.

The Site relevant critical loads page for the Lower Derwent Valley SPA (reference 9.54 of the ES Biodiversity Chapter) includes advice on the application of critical loads and levels to several of the bird species for which the SPA is designated (golden plover, tundra swan, ruff and Eurasian teal). Ruff and Eurasian teal are also listed in the citation for the Lower Derwent Valley Ramsar Site. The advice on APIS on critical loads identifies that ‘*no expected negative impact on species due to impacts on the species’ broad habitat’* for Ruff. Environment Agency (EA) monitoring data also indicates that the River Derwent is strongly phosphate limited. In phosphate limited systems, additional inputs of nitrogen have limited effects on plant productivity, as phosphate is the primary limiting nutrient. As such, additional inputs would be unlikely to lead to any perceptible eutrophication effects on standing water habitats within the Ramsar Site.

Given the above and the conservatism of the air quality modelling (see paragraphs 6.5.19 and 6.10.2 of Chapter 6 of the ES), no adverse effects to the integrity of the Lower Derwent Valley SPA are predicted to arise.

HRA Integrity Matrix 5: Humber Estuary SAC

Name of European site and designation: Humber Estuary SAC									
EU Code: UK9006111									
Distance to NSIP: 6.0 km to the Power Station Site, 6.0 km to the Pipeline Area									
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat Degradation (hydrology)*			*Habitat Degradation (air quality)*			*In-combination effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
1130 Estuaries					**X(b)**			**X(b)**	
1330 Atlantic salt meadows and a range of other sand dune types (H1110 Sandbanks which are slightly covered by sea water all the time; H1140 Mudflats and sandflats not covered by seawater at low tide; H1310 Salicornia and other annuals colonising mud and sand; and 1150 coastal lagoons)					**X(b)**			**X(b)**	
1140 Mudflats and sandflats not covered by seawater at low tide					**X(b)**			**X(b)**	
1110 Sandbanks which are slightly covered by sea water all the time					**X(b)**			**X(b)**	
1150 Coastal lagoons * Priority					**X(b)**			**X(b)**	

feature									
1310 Salicornia and other annuals colonizing mud and sand					**X(b)**			**X(b)**	
1330 Atlantic salt meadows *Glauco-Puccinellietalia maritimae*					**X(b)**			**X(b)**	
2110 Embryonic shifting dunes					**X(b)**			**X(b)**	
2120 "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")					**X(b)**			**X(b)**	
2130 "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature					**X(b)**			**X(b)**	
2160 Dunes with *Hippopha rhamnoides*					**X(b)**			**X(b)**	
1095 Sea lamprey *Petromyzon marinus*	**X(a)**	**X(a / b)**	**X(a)**		**X(b)**			**X(b)**	
1099 River lamprey *Lampetra fluviatilis*	**X(a)**	**X(a / b)**	**X(a)**		**X(b)**			**X(b)**	
1364 Grey seal *Halichoerus grypus*					**X(b)**			**X(b)**	

a. No perceptible changes in the water quality of the Humber Estuary are predicted (paragraph 12.6.13 of the water quality resources chapter; Examination Library Ref: APP-080). It is however necessary to consider the potential implications of water quality changes in the River Ouse upstream of the estuary in relation to SAC fish species. This is because river lamprey and sea lamprey could use the section of the Ouse between the Humber Estuary SAC (downstream of the Proposed Scheme) and the River Derwent SAC (upstream of the Proposed Scheme). There are likely to be population linkages between lamprey using habitats within the Humber Estuary SAC, River Ouse, and upstream River Derwent SAC.

The proposed CEMP will control potential hydrological impacts during construction and decommissioning, with no deterioration of the WFD status of the River Ouse (located upstream of the Humber Estuary SAC, SPA and Ramsar Site and downstream of the River Derwent SAC) predicted (paragraphs 12.6.13 of the Water Resources, Quality and Hydrology Chapter). During operation, existing and proposed drainage measures would ensure any impacts on water quality within suitable water features for migratory fish species would be negligible (see paragraphs 12.6.50 – 12.6.53 of the ES Water Resources, Quality and Hydrology Chapter).

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

b. Chapter 6 of the ES (Air Quality; Examination Library Ref: APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH3) will not lead to any exceedances of AQ standards for NOx or NH3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen deposition onto the Humber Estuary SAC. There is a maximum modelled process contribution of 0.3% for nitrogen deposition (see Table 6.19 and 6.20 of the ES Air Quality Chapter). Humber Estuary habitats occurring within 15 km of the Proposed Scheme are not considered to be sensitive to acidification.

The maximum predicted cumulative deposition impact of the Proposed Scheme would be 0.9% for nitrogen deposition. As stated above, Humber Estuary habitats are not considered to be sensitive to acidification and there would be no exceedances of any critical levels.

Given the conservatism of the air quality modelling (see paragraphs 6.5.19 and 6.10.2 of Chapter 6 of the ES) and the low magnitude of the cumulative air quality impacts, no adverse effects to the integrity of the Humber Estuary SAC are predicted to arise.

HRA Integrity Matrix 6: Humber Estuary Ramsar Site

Name of European site and designation: Humber Estuary Ramsar Site						
EU Code: UK11031						
Distance to NSIP: 6.5 km to the Power Station Site, 6.0 km to the Pipeline Area						
European site features	**Likely effects of NSIP**					
Stage of Development	Habitat Degradation			In Combination Effects		
	C	O	D	C	O	D
Ramsar Criterion 1: The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes,		**x (b)**			**x (b)**	

and coastal brackish/saline lagoons.						
Ramsar criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*.		**x (b)**			**x (b)**	
Ramsar criterion 5 Assemblages of international importance:		**x (b)**			**x (b)**	

153,934 waterfowl, non-breeding season						
Ramsar criterion 6 – species/populations occurring at levels of international importance: Eurasian golden plover, *Pluvialis apricaria* Altifrons; Red knot, *Calidris canutus*; Dunlin, *Calidris alpina* Alpine; Black-tailed godwit, *Limosa limosa* Islandica; Common redshank, *Tringa totanus* Brittanica; Common shelduck, *Tadorna tadorna*; Bar-tailed godwit , *Limosa lapponica Lapponica*;		**x (b)**			**x (b)**	
Ramsar criterion 8 The Humber Estuary acts as an important	**x (a)**	**x (a / b)**	**x (a)**		**x (b)**	

migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.						

a. No perceptible changes in the water quality of the Humber Estuary are predicted (paragraph 12.6.13 of the water quality resources chapter; Examination Library Ref: APP-080). It is however necessary to consider the potential implications of water quality changes in the River Ouse upstream of the estuary in relation to SAC fish species. This is because river lamprey and sea lamprey could use the section of the Ouse between the Humber Estuary SAC (downstream of the Proposed Scheme) and the River Derwent SAC (upstream of the Proposed Scheme). There are likely to be population linkages between lamprey using habitats within the Humber Estuary SAC, River Ouse, and upstream River Derwent SAC.

The proposed CEMP will control potential hydrological impacts during construction and decommissioning, with no deterioration of the WFD status of the River Ouse (located upstream of the Humber Estuary SAC, SPA and Ramsar Site and downstream of the River Derwent SAC) predicted (paragraphs 12.6.13 of the Water Resources, Quality and Hydrology Chapter). During operation, existing and proposed drainage measures would ensure any impacts on water quality within suitable water features for migratory fish species would be negligible (see paragraphs 12.6.50 – 12.6.53 of the ES Water Resources, Quality and Hydrology Chapter).

b. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH3) will not lead to any exceedances of AQ standards for NOx or NH3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen deposition onto the Humber Estuary Ramsar site. There is a maximum modelled process contribution of 0.3% for nitrogen deposition (see Table 6.19 and 6.20 of the ES Air Quality Chapter). Humber Estuary habitats occurring within 15 km of the Proposed Scheme are not considered to be sensitive to acidification.

The maximum predicted cumulative deposition impact of the Proposed Scheme would be 0.9% for nitrogen deposition and as such no significant in-combination effects are predicted. As stated above, Humber Estuary habitats are not considered to be sensitive to acidification and there would be no exceedances of any critical levels.

Given the conservatism of the air quality modelling (see paragraphs 6.5.19 and 6.10.2 of Chapter 6 of the ES) and the low magnitude of the cumulative air quality impacts, no adverse effects to the integrity of the Humber Estuary Ramsar site are predicted to arise.

HRA Integrity Matrix 7: Humber Estuary SPA

Name of European site and designation: Humber Estuary SPA						
EU Code: UK9006111						
Distance to NSIP: 6 km to the Power Station Site, 6.0 km to the Pipeline Area						
European site features	**Likely effects of NSIP**					
Stage of Development	Habitat Degradation			In Combination Effects		
	C	O	D	C	O	D
Used regularly by 1% or more of the Great Britain populations of the following Annex I species: Eurasian teal *Anas crecca,* Eurasian wigeon *Anas Penelope*, mallard *Anas platyrhynchos*, turnstone *Arenaria interpres*, common pochard *Aythya farina*, greater scaup *Aythya marila*, Brent goose *Branta*		**x (a)**			**× (a)**	

bernicla bernicla, common goldeneye *Bucephala clangula,* sanderling *Calidris alba,* avocet *Recurvirostra avosetta* Bittern *Botaurus stellaris*, Hen harrier *Circus cyaneus,* Golden plover *Pluvialis apricaria*, Bar-tailed godwit *Limosa lapponica*, Ruff *Philomachus pugnax*, Bittern *Botaurus stellaris*, Marsh harrier *Circus aeruginosus*, Little tern *Sterna albifrons,* common ringed plover *Charadrius hiaticula,* Eurasian curlew *Numenius arquata,* whimbrel *Numenius Phaeopus,* greenshank *Tringa nebularia,* lapwing *Vanellus vanellus.*						

Used regularly by 1% or more of the biogeographical populations of the following migratory species: Shelduck *Tadorna tadorna,* Knot *Calidris canutus,* Dunlin *Calidris alpina* (passage and wintering), Redshank *Tringa totanus*, Black-tailed godwit *Limosa limosa,* Eurasian oystercatcher *Haematopus ostralegus,* grey plover *Pluvialis squatarola*		**x (a)**			**×(a)**	
Assemblage qualification under article 4.2 or use of over 20,000 waterbirds in any season.		**x (a)**			**× (a)**	

a. Chapter 6 of the ES (Air Quality; Examination Library REF: APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH3) will not lead to any exceedances of AQ standards for NOx or NH3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen deposition onto the Humber Estuary SPA. There is a maximum modelled process contribution of 0.3% for nitrogen deposition (see Table 6.19 and 6.20 of the ES Air Quality Chapter). Humber Estuary habitats (and their supporting role for SPA bird species) occurring within 15 km of the Proposed Scheme are not considered to be sensitive to acidification.

The maximum predicted cumulative deposition impact of the Proposed Scheme would be 0.9% for nitrogen deposition and as such no significant in-combination effects are predicted. As stated above, Humber Estuary habitats are not considered to be sensitive to acidification and there would be no exceedances of any critical levels.

Given the conservatism of the air quality modelling (see paragraphs 6.5.19 and 6.10.2 of Chapter 6 of the ES) and the low magnitude of the cumulative air quality impacts, no adverse effects to the integrity of the Humber Estuary Ramsar site are predicted to arise.

HRA Integrity Matrix 8: Skipwith Common SAC

Name of European site and designation: Skipwith Common SAC						
EU Code: UK0030276						
Distance to NSIP: 8.0 km to the Power Station Site, 8.0 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat Degradation (air quality)*			*In-combination Effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
4010 Northern Atlantic wet heaths with *Erica tetralix*		**X(a)**			**X(a)**	
4030 European dry heaths		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality; Examination Library Ref: APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.18 to 6.22 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.23 to 6.27. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations, both alone and in-combination with other plans or projects (see tables 6.18 and 6.23 in Chapter 6 of the ES). The Proposed Scheme would generate a maximum Process Contribution of 0.4% of the critical level for NH3. This is in the context of an existing exceedance of 242% of critical level, with the Proposed Scheme equivalent to up to 0.17% of background levels. There are no exceedances of critical levels for NOx, either alone or in-combination with other plans or projects (see tables 6.19 and 6.20, and 6.24 and 6.25 of the ES Air Quality Chapter). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto Skipwith Common SAC. There is a maximum modelled process contribution of 0.4% and 0.3% for nitrogen and acid deposition respectively (see Table 6.21 and 6.22 of the ES Air Quality Chapter, respectively). The process contribution also reduces with increasing distance from the Proposed Scheme. As such, air quality impacts of the Proposed Scheme alone are not predicted to lead to adverse effects to the integrity of the European Site.

The maximum predicted cumulative impact of the Proposed Scheme would be 2.7% of the critical level for NH3, with the Proposed Scheme contributing up to 0.4% of this. There would be a cumulative impact of up to 1.9% of critical load for nitrogen deposition and up to 1.6% for acidification, with the Proposed Scheme contributing 0.4% and 0.3% respectively. The cumulative impacts on NH_3 concentrations and nitrogen and acid deposition therefore exceed 1% of critical load / critical levels (see paragraphs 6.6.35 to 6.6.39 of the ES Air Quality Chapter).

To support this assessment, published research into the effects of nitrogen deposition on heathland habitats was reviewed. This included a review of existing scientific knowledge covering several studies (Caporn *et al.,* 2016 (reference 9.52)) and a study of how ecosystem functions could be used as indicators for heathland response to nitrogen deposition (Bahring *et al.,* 2017 (Ref. 9.55)). These studies suggest that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because where nitrogen is already in excess the plants present within the habitats have limited capacity to respond. In the Natural England study (Caporn *et al*., (2016)), with background deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Skipwith common SAC of 19.2 kgN/ha/yr), adding a further 1 kg N/ha/yr was shown to decrease species richness by between 1.4% and 1.9%. Graminoid (grass) cover was found to increase by between 0.8% and 1.1%. The maximum species richness recorded across the studies examined in Caporn *et al.,* (2016) varied between 16 and 32.

Taking a worst-case species richness from the above of 16, an impact equivalent to 3.26 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted cumulative impact of the Proposed Scheme with other plans and projects is 0.19 kgN/ha/yr, equivalent to approximately 6% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls well within the bounds of natural between-years variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case cumulative impact of acid deposition is marginally above 1% (1.6%), with the contribution from the Proposed Scheme decreasing with increasing distance from stacks. No perceptible vegetative change of SAC habitats is predicted to arise from this level of deposition.

In addition, the constituent SSSI Units of the Skipwith Common SAC within 15 km of the Proposed Scheme were also assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed in 2014 despite current levels of nitrogen input from other sources (which exceed the lower band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 47.96% of the constituent SSSI units were reported as being in 'favourable' condition, the remaining value of 52.04% was recorded as being in 'unfavourable – recovering' condition, suggesting the condition of these areas in relation to their target condition is being achieved or improving.

As well as the ecological factors considered above, future national emissions ceilings are likely to reduce emissions of both NOx and ammonia levels and subsequently deposition in the medium to long term. For example, The National Emissions Ceilings Regulations (2018) commit the UK to reducing ammonia emissions by 8% between 2020 and 2029 and by 16% from 2030 onwards (see paragraph 6.6.40 of the ES Air Quality Chapter). Government policy and socioeconomic factors are also promoting the uptake of ultra-low and zero emission vehicles. Current government policy is for all new car and van sales from 2040 onwards to be of ultra-low and zero-emission vehicles, with new conventional diesel and petrol-fuelled vehicles banned from sale (see paragraph 9.6.9 of the ES Biodiversity Chapter; Examination Library Ref: APP-077). Data on APIS (Ref. 9.56) indicates that approximately 8.6% of nitrogen deposition onto Skipwith Common SAC arises from road transport. Future reductions in emissions from the UK vehicle fleet would therefore reduce and likely eventually eliminate these inputs. For comparison, the source attribution data on APIS identifies the Existing Drax Power Station Complex as contributing approximately 1.5% of total nitrogen deposition.

Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme, either alone or in combination with other Plans and Projects.

HRA Integrity Matrix 9: Thorne Moor SAC

Name of European site and designation: Thorne Moor SAC						
EU Code: UK9005171						
Distance to NSIP: 9.3 km to the Power Station Site, 7.6 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat degradation (air quality)*			*In-combination Effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
7120 Degraded raised bogs still capable of natural regeneration		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality; Examination Library Ref: APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.18 to 6.22 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.23 to 6.27. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling

demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations, both alone and in-combination with other plans or projects (see tables 6.18 and 6.23 in Chapter 6 of the ES). The Proposed Scheme would generate a maximum Process Contribution of 0.45% of the critical level for NH3. This is in the context of an existing exceedance of 239% of critical level, with the process contribution from the Proposed Scheme equivalent to approximately 0.2% of background levels. There are no exceedances of critical levels for NOx, either alone or in-combination with other plans or projects (see tables 6.19 and 6.20, and 6.24 and 6.25 of the ES Air Quality Chapter). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto Thorne Moor SAC. There is a maximum modelled process contribution of 0.8% and 0.6% for nitrogen and acid deposition respectively (see Table 6.21 and 6.22 of the ES Air Quality Chapter, respectively). The process contribution also reduces with increasing distance from the Proposed Scheme. As such, air quality impacts of the Proposed Scheme alone are not predicted to lead to adverse effects to the integrity of the European Site.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.3% of the critical level for NH_3, with the Proposed Scheme contributing up to 0.45% of this. The contribution from the Proposed Scheme to cumulative NH_3 also decreases with increasing distance from the stacks. Given the cumulative exceedance is only marginally above 1% of critical level at the point of greatest predicted impact, no perceptible effects on SAC vegetation are predicted to arise. There would be a cumulative impact of up to 2.67% of critical load for nitrogen deposition and up to 2.01% for acidification, with the Proposed Scheme contributing 0.8% and 0.6% respectively. The cumulative impacts on nitrogen and acid deposition therefore exceed 1% of critical load (see paragraphs 6.6.35 to 6.6.39 of the ES Air Quality Chapter).

To support this assessment, published research into the effects of nitrogen deposition on bog habitats was reviewed. This included a review of existing scientific knowledge covering several studies (Caporn *et al.,* 2016 (reference 9.52)) and a study of how ecosystem functions could be used as indicators for heathland response to nitrogen deposition (Bahring *et al.,* 2017 (Ref. 9.55)). These studies suggest that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because nitrogen is already in excess, with the plants present having limited capacity to respond. In the Natural England study (Caporn *et al*., (2016)), with background deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Thorne Moor SAC of 19.2 kgN/ha/yr), adding a further 1 kg N/ha/yr was shown to decrease species richness by circa

0.7%. Graminoid (grass) cover was found to increase by 1.5%. The maximum species richness recorded across the studies examined in Caporn *et al.,* (2016) was 32.

Taking a species richness from the above of 32, an impact equivalent to 3.3 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted cumulative impact of the Proposed Scheme with other plans and projects is 0.13 kgN/ha/yr, equivalent to approximately 3.9% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls within the bounds of natural variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case cumulative impact of acid deposition is marginally above 1% (2.01%), with the contribution from the Proposed Scheme decreasing with increasing distance from stacks. Again, no perceptible vegetative change of SAC habitats are predicted to arise from this level of deposition, in the context of the baseline deposition levels. There is also evidence from a study completed by the Centre for Ecology and Hydrology (2015, Ref. 9.57) that suggests levels of acid deposition across Thorne Moor are reducing, with evidence of a downward trend between 2012 and 2014.

The constituent SSSI Units of the Thorne Moor SAC within 15 km of the Project Site, were assessed as being in 'favourable', 'unfavourable recovering', 'unfavourable no change' and 'unfavourable declining' condition when last assessed despite current inputs of nitrogen from other sources (which exceed the upper band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 3.85% of the Thorne Crowle and Gool Moors SSSI was reported as being in 'favourable' condition, with 91.97% recorded as being in 'unfavourable – recovering' condition. 2.94% was assessed as 'unfavourable no change' with 1.24% 'unfavourable declining'. The majority of the SAC is considered to be in 'unfavourable – recovering' condition by NE. NE identify initiatives to control scrub and manage water balance as the main factors leading to improvements (see Appendix 3).

As well as the ecological factors considered above, future national emissions ceilings are also likely to reduce emissions of both NOx and ammonia levels and subsequently deposition in the medium to long term. For example, The National Emissions Ceilings Regulations (2018), commit the UK to reducing ammonia emissions by 8% between 2020 and 2029 and by 16% from 2030 onwards (see paragraph 6.6.40 of the ES Air Quality Chapter). Government policy and socioeconomic factors are also promoting the uptake of ultra-low and zero emission vehicles. Current government policy is for all new car and van sales from 2040 onwards to be of ultra-low and zero-emission vehicles, with new conventional diesel and petrol-fuelled vehicles banned from sale (see paragraph 9.6.9 of the ES Biodiversity Chapter). Data on APIS (Ref. 9.58) indicates that approximately 10.3% of nitrogen deposition onto Thorne Moor SAC arises from road transport. Future reductions in emissions from the UK vehicle fleet would therefore reduce and eventually eliminate these inputs.

For comparison, the source attribution data on APIS identifies the existing Drax Power Station complex as contributing approximately 1.9% of total nitrogen deposition.

Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme, either alone or in combination with other Plans and Projects.

HRA Integrity Matrix 10: Thorne and Hatfield Moor SPA

Name of European site and designation: Thorne and Hatfield Moor SPA						
EU Code: UK0012915						
Distance to NSIP: 9.3 km to the Power Station Site, 7.6 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat degradation (air quality)*			*In-combination Effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
Supporting populations of the following Annex I species; Breeding Season: Nightjar *Caprimulgus eurpaeus*		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality; Examination Library Ref: APP-074) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.18 to 6.22 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.23 to 6.27. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

Air Quality modelling was updated at Deadline 5 to reflect a marginal increase in the proposed stack heights (see the Applicants Air Quality Technical Note; Examination Library Ref: REP5-019). The updated air quality modelling

demonstrated that the change in stack height had a negligible effect on air quality impacts. The Assessment of the effects of air quality impacts on European Sites therefore remains unchanged from that previously presented.

The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations, both alone and in-combination with other plans or projects (see tables 6.18 and 6.23 in Chapter 6 of the ES). The Proposed Scheme would generate a maximum Process Contribution of 0.~~5~~4% of the critical level for NH3. This is in the context of an existing exceedance of 239% of critical level, with the process contribution from the Proposed Scheme equivalent to approximately 0.2% of background levels. There are no exceedances of critical levels for NOx, either alone or in-combination with other plans or projects (see tables 6.19 and 6.20, and 6.24 and 6.25 of the ES Air Quality Chapter). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto Thorne Moor SPA. There is a maximum modelled process contribution of 0.8% and 0.6% for nitrogen and acid deposition respectively (see Table 6.21 and 6.22 of the ES Air Quality Chapter, respectively). The process contribution also reduces with increasing distance from the Proposed Scheme. As such, air quality impacts of the Proposed Scheme alone are not predicted to lead to adverse effects to the integrity of the European Site.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.3% of the critical level for NH_3, with the Proposed Scheme contributing up to 0.4~~5~~% of this. The contribution from the Proposed Scheme to cumulative NH_3 also decreases with increasing distance from the stacks. Given the cumulative exceedance is only marginally above 1% of critical level at the point of greatest predicted impact, no perceptible effects on SAC vegetation are predicted to arise. As such, the suitability of the habitats present to support nightjar is not expected to be subject to perceptible change. There would be a cumulative impact of up to 2.6~~7~~% of critical load for nitrogen deposition and up to 2.0~~1~~% for acidification, with the Proposed Scheme contributing 0.8% and 0.6% respectively. The cumulative impacts on nitrogen and acid deposition therefore exceed 1% of critical load (see paragraphs 6.6.35 to 6.6.39 of the ES Air Quality Chapter).

To support this assessment, published research into the effects of nitrogen deposition on bog habitats was reviewed. This included a review of existing scientific knowledge covering several studies (Caporn *et al.,* 2016 (reference 9.52)) and a study of how ecosystem functions could be used as indicators for heathland response to nitrogen deposition (Bahring *et al.,* 2017 (Ref. 9.55)). These studies suggest that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because nitrogen is already in excess, with the plants present having limited capacity to respond. In the Natural England study (Caporn *et al*., (2016)), with background deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Thorne Moor SAC of 19.2 kgN/ha/yr), adding a further 1 kg N/ha/yr was shown to decrease species richness by between

0.7%. Graminoid (grass) cover was found to increase by 1.5%. The maximum species richness recorded across the studies examined in Caporn *et al.,* (2016) was 32.

Taking a species richness from the above of 32, an impact equivalent to 3.3 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted cumulative impact of the Proposed Scheme with other plans and projects is 0.13 kgN/ha/yr, equivalent to approximately 3.9% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls within the bounds of natural variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case cumulative impact of acid deposition is marginally above 1% (2.0~~1~~%), with the contribution from the Proposed Scheme decreasing with increasing distance from stacks. Again, no perceptible vegetative change of SAC habitats are predicted to arise from this level of deposition. There is also evidence from a study completed by the Centre for Ecology and Hydrology (2015, Ref. 9.57) that suggests levels of acid deposition across Thorne Moor are reducing, with evidence of a downward trend between 2012 and 2014.

The constituent SSSI Units of the Thorne Moor SAC within 15 km of the Project Site, were assessed as being in ‘favourable’, ‘unfavourable recovering’, ‘unfavourable no change’ and ‘unfavourable declining’ condition when last assessed despite current inputs of nitrogen from other sources (which exceed the upper band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 3.85% of the Thorne, Crowle and Gool Moor SSSI was reported as being in ‘favourable’ condition, with 91.97% recorded as being in ‘unfavourable – recovering’ condition. 2.94% was assessed as ‘unfavourable no change’ with 1.24% ‘unfavourable declining’. The majority of the SAC is considered to be in ‘unfavourable – recovering’ condition by NE. NE identify initiatives to control scrub and manage water balance as the main factors leading to improvements in habitat condition (see Appendix 3).

As well as the ecological factors considered above, future national emissions ceilings are also likely to reduce emissions of both NOx and ammonia levels and subsequently deposition in the medium to long term. For example, The National Emissions Ceilings Regulations (2018), commit the UK to reducing ammonia emissions by 8% between 2020 and 2029 and by 16% from 2018 onwards (see paragraph 6.6.40 of the ES Air Quality Chapter). Government policy and socioeconomic factors are also promoting the uptake of ultra-low and zero emission vehicles. Current government policy is for all new car and van sales from 2040 onwards to be of ultra-low and zero-emission vehicles, with new conventional diesel and petrol-fuelled vehicles banned from sale (see paragraph 9.6.9 of the ES Biodiversity Chapter). Data on APIS (Ref. 9.58) indicates that approximately 10% of nitrogen deposition onto Thorne Moor SPA arises from road transport.

Future reductions in emissions from the UK vehicle fleet would therefore reduce and eventually eliminate these inputs. For comparison, the source attribution data on APIS identifies the existing Drax Power Station complex as contributing approximately 1.7% of total nitrogen deposition.

Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme, either alone or in combination with other Plans and Projects.