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19.0 HUMAN HEALTH

19.1 Introduction

- 19.1.1 This chapter of the Environmental Statement (ES) addresses the potential effects of the Proposed Development near Eggborough, North Yorkshire on human health.
- 19.1.2 This chapter is predominantly a summary document, highlighting key aspects of the technical assessments completed and presented elsewhere in the ES. It also presents information on potential electro-magnetic effects, which are not covered elsewhere in the ES.
- 19.1.3 No figures are produced specifically for this chapter; rather figures produced for the purposes of other technical chapters of the ES have been referenced. These are provided in ES Volume II.

19.2 Legislation and Planning Policy Context

Legislative Background

- 19.2.1 The effects on health that have been considered in this ES relate primarily to those arising from emissions to air (Chapter 8: Air Quality), noise and vibration (Chapter 9: Noise and Vibration), traffic (Chapter 14: Traffic and Transport), emissions to water (Chapter 11: Water Resources, Flood Risk and Drainage), waste management (Chapter 17: Waste Management), land quality/ contamination (Chapter 12: Geology, Hydrogeology and Land Contamination) and socio-economics (Chapter 15: Land Use, Agriculture and Socio-Economics). The relevant legislation relating to each of these topics is presented in the respective chapters for these disciplines.

Planning Policy Context

National Planning Policy

- 19.2.2 Given that this chapter is predominantly a summary document, the planning policy related to health impacts is presented in each of the technical chapters described above and in Chapter 7: Legislative Context and Planning Policy Framework.
- 19.2.3 Key issues in the National Policy Statements relating to health are set out below.
- 19.2.4 The Overarching National Policy Statement for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a) begins by describing the process of sustainability appraisal that the Policy Statement was subject to. In relation to positive effects of energy policy for health, EN-1 states:

“The energy NPSs are likely to ... have positive effects for health and well-being in the medium to longer term, through helping to secure affordable supplies of energy and minimising fuel poverty; positive medium and long term effects are also likely for equalities.”

19.2.5 EN-1 also recognises that energy infrastructure can have negative effects for health, stating:

“There may also be cumulative negative effects on water quality, water resources, flood risk, coastal change and health at the regional or sub-regional levels depending upon location and the extent of clustering of new energy and other infrastructure. Proposed energy developments will still be subject to project level assessments, including Environmental Impact Assessment, and this will address locationally specific effects.”

19.2.6 Section 4.13 of EN-1 makes clear that:

“Energy production has the potential to impact on the health and well-being (“health”) of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the production, distribution and use of energy may have negative impacts on some people’s health...Direct impacts on health may include increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation, and increases in pests.”

19.2.7 The NPS also recognises that:

“Open spaces, sports and recreational facilities all help to underpin people’s quality of life and have a vital role to play in promoting healthy living...Green infrastructure ... a network of multi-functional green spaces, both new and existing, both rural and urban, ... is integral to the health and quality of life of sustainable communities.”

19.2.8 The National Policy Statement for Electricity Networks Infrastructure (EN-5) (DECC, 2011b) provides specific policy in relation to electromagnetic fields (EMF) and their known and potential effects on health, stating:

“All overhead power lines produce EMFs, and these tend to be highest directly under a line, and decrease to the sides at increasing distance. Although putting cables underground eliminates the electric field, they still produce magnetic fields, which are highest directly above the cable (see para 2.10.12). EMFs can have both direct and indirect effects on human health. The direct effects occur in terms of impacts on the central nervous system resulting in its normal functioning being affected. Indirect effects occur through electric charges building up on the surface of the body producing a microshock on contact with a grounded object, or vice versa, which, depending on the field strength and other exposure factors, can range from barely perceptible to being an annoyance or even painful.”

19.2.9 NPS EN-5 makes reference to health protection guidelines for public and occupational exposure which are further discussed below (see ‘Other Guidance’).

19.2.10 The National Planning Policy Framework (‘NPPF’) (Department for Communities and Local Government (DCLG), 2012) as described in Chapter 7: Legislative Context and Planning Policy Framework, contains policies that are relevant at a national level and are expanded upon and supported by the Planning Practice Guidance, published in March 2014 (DCLG, 2014).

19.2.11 Paragraph 3 of the NPPF makes it clear that the document does not contain specific policies for Nationally Significant Infrastructure Projects (NSIPs) such as the Proposed Development and that applications in relation to NSIPs are to be determined in accordance with the decision making framework set out in the Planning Act 2008 and relevant NPSs, as well as any other matters that are considered both important and relevant. However, paragraph 3 goes on to

confirm that matters that the Secretary of State may consider to be both important and relevant to NSIPs include the NPPF and the policies within it.

- 19.2.12 Policies of particular relevance to the scope of this chapter are those described in the relevant technical chapters (e.g. promoting sustainable transport described in Chapter 14: Traffic and Transportation), but more specifically, Part 8 relates to promoting healthy communities. It states that:

“The planning system can play an important role in facilitating social interaction and creating healthy, inclusive communities... Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities.”

Local Planning Policy

- 19.2.13 Local planning policy relevant to health is as described in chapters on emissions to air (Chapter 8: Air Quality), noise and vibration (Chapter 9: Noise and Vibration), traffic (Chapter 14: Traffic and Transport), emissions to water (Chapter 11: Water Resources, Flood Risk and Drainage), waste management (Chapter 17: Waste Management), land quality/ contamination (Chapter 12: Geology, Hydrogeology and Land Contamination) and socio-economics (Chapter 15: Land Use, Agriculture and Socio-Economics).
- 19.2.14 There are no local policies requiring health impact assessment on a project specific level.

Other Guidance

- 19.2.15 To prevent the known effects of EMF, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) developed health protection guidelines in 1998 (ICNIRP, 1988) for both public and occupational exposure which have been taken into account in assessing the potential for health effects related to EMF.

19.3 Assessment Methodology and Significance Criteria

Impact Assessment and Significance Criteria

- 19.3.1 With the exception of effects relating to EMF, this chapter only summarises health-related effects described elsewhere in the ES (chapters on emissions to air (Chapter 8: Air Quality), noise and vibration (Chapter 9: Noise and Vibration), traffic (Chapter 14: Traffic and Transport), emissions to water (Chapter 11: Water Resources, Flood Risk and Drainage), waste management (Chapter 17: Waste Management) and land quality/ contamination (Chapter 12: Geology, Hydrogeology and Land Contamination)).
- 19.3.2 The methodologies for these assessments, including identification of receptors and their sensitivity, identification of impacts and their magnitude, and assessment of effects, are set out in the relevant technical chapters.
- 19.3.3 Risks associated with EMF have been derived considering the advice provided by Public Health England (PHE) in their response to the Scoping Report (see Consultation section below). Electric and Magnetic Fields and Health websites have been used in order to gather information on the EMF risks associated with the types of infrastructure proposed. ICNIRP

guidelines (ICNIRP, 1988) have been used as the reference for the recommended limits of exposure of the general public, following current Government policy.

19.3.4 The associated reference levels are summarised in Table 19.1 below.

Table 19.1: ICNIRP 1988 electric and magnetic fields reference levels

Reference levels	Electrical field	Magnetic field
Public exposure	5 kV/ m	100 μ T
Occupational exposure	10 kV/ m	500 μ T

Source: ICNIRP, EMF guidelines, Health Physics 74, 494-522 (1998)

19.3.5 The assessment of potential EMF-related effects does not follow the 'standard' EIA methodology of identifying the sensitivity of receptors and magnitude of effects to classify the effect using a matrix. Rather all human receptors located within the electrical field are identified and, with reference to the identified impact avoidance measures, effects are either considered to be significant or not significant.

19.3.6 Standardised terminology is used to describe the relative significance of effects throughout this ES (unless stated otherwise in specific chapters). Effects are described as:

- adverse – detrimental or negative effect to a receptor group; or
- beneficial – advantageous or positive effect to a receptor group; and
- negligible – imperceptible effects to a receptor group;
- minor – slight, very short or highly localised effects of no significant consequence;
- moderate – more than a slight, very short or localised effect (by extent, duration or magnitude), which may be considered significant; or
- major – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

19.3.7 For the purposes of this assessment, moderate and major effects are deemed 'significant'.

Key Parameters for Assessment

19.3.8 The Rochdale Envelope (i.e. the maximum parameters for the Proposed Development and in particular its main buildings and structures) does not affect the assessments presented in this chapter in that the variations in building dimensions or technology presented in Chapter 4: The Proposed Development are unlikely to affect the outcomes of the health assessment. Therefore, no further discussion of the Rochdale Envelope parameters is provided in this chapter.

Extent of Study Area

19.3.9 The definition of the Study Area relevant to each of the health-related assessments in Chapters 8: Air Quality, 9: Noise and Vibration, 14: Traffic and Transport, 11: Water Resources, Flood Risk and Drainage, 17: Waste Management, 12: Geology, Hydrogeology and Land Contamination, and 15: Land Use, Agriculture and Socio-Economics are set out in each chapter.

The study areas are a function of the nature of the impacts and the locations of potentially affected receptors.

- 19.3.10 For the definition of the baseline for health of the local population in Section 19.4, the study area is as defined for the socio-economics assessment in Chapter 15: Land Use, Agriculture and Socio-Economics.
- 19.3.11 Health profiles produced by the PHE provide baseline data on the health of people within the local area, to compare with average values for all areas of England. Data for Selby District and surrounding local authorities including Leeds, Wakefield, Doncaster, East Riding of Yorkshire, York and Harrogate has been used. By virtue of the geographical scale of these datasets, they include a much broader population than is predicted to receive direct or indirect impacts associated with the Proposed Development. This allows data for Selby (within which any impacts would be expected to occur) to be compared with other neighbouring authorities within the region, so that any particular local trends or inequalities can be more readily identified.
- 19.3.12 To determine the study area in respect of EMF, it is necessary to consider where exposure to EMF is likely, considering the Proposed Development. EMF comprises electric and magnetic fields, the magnitude of which is defined by the design characteristics of the sources. It is recognised that there are potential health impacts associated with electrical and magnetic fields around substations and the connecting cables and power lines.
- 19.3.13 As described in Chapter 4: The Proposed Development, the Proposed Development will comprise a CCGT power station and associated buildings, structures and plant, including new below ground electrical cables to connect to the existing National Grid 400 kV sub station within the existing coal-fired power station site. In addition, a smaller new sub station is proposed as shown on Figure 4.1a and Figure 4.1b in ES Volume II. No new overhead power lines are proposed.
- 19.3.14 The DECC Demonstrating Compliance with EMF public exposure guidelines – a voluntary code of practice (DECC, 2012b) advises that the Energy Networks Association will maintain a publicly-available list on its website of types of equipment where the design is such that it is not capable of exceeding the ICNIRP exposure guidelines. This obligation is implemented through the industry web site (www.emfs.info), which lists compliant equipment.
- 19.3.15 The usual way of expressing the field from an EMF source, and thereby determining the potential exposure area, is to show how the field reduces with distance. For large sub stations where 400 kV lines are switched and electricity is transformed down to the next voltage, 132 kV, it is reported that a receptor would need to be within metres or perhaps tens of metres of the perimeter to receive an elevated field (www.emfs.info). As the National Grid sub station already exists, there will be no new EMF effects associated with its use for the Proposed Development. For the smaller proposed sub station, it is reported that the field will only be elevated within a few metres of its perimeter, but to adopt a conservative approach, the study area in respect of the proposed new sub-station has been set at a 100 m radius.
- 19.3.16 In relation to the new sections of underground cables that will connect into the existing 400 kV sub station and proposed new 132 kV sub-station, research suggests that underground cables do not produce any external electric fields and that ground-level magnetic fields from underground cables fall much more rapidly with distance than those from a corresponding overhead line. However, magnetic fields can be higher at small distances from the cable and,

overall, fields reduce to background concentrations at distances of around 20 m. To adopt a conservative approach, the study area in respect of the underground cables has been set at a 50 m linear distance from the centre line of the cables. The indicative routes for the cables are shown on Figures 4.1a and 4.1b in ES Volume II.

Sources of Information/ Data

- 19.3.17 The data sources and methods used in surveys are set out in each of the chapters on emissions to air (Chapter 8: Air Quality), noise and vibration (Chapter 9: Noise and Vibration), traffic (Chapter 14: Traffic and Transport), emissions to water (Chapter 11: Water Resources, Flood Risk and Drainage), waste management (Chapter 17: Waste Management), land quality/contamination (Chapter 12: Geology, Hydrogeology and Land Contamination) and socio-economics (Chapter 15: Land Use, Agriculture and Socio-Economics).
- 19.3.18 The health profiles produced annually by PHE have been utilised in the assessment. Data for 2016 has been used, representing the most up to date information (PHE, 2016). Furthermore, data on five indicators of mental health has been sourced for the relevant Clinical Commissioning Areas in order to determine the baseline status of the population in this respect (PHE, 2016).

Consultation

- 19.3.19 A summary of consultation undertaken in the preparation of this assessment is set out in Table 19.2 below. As explained in Chapter 1: Introduction, pre-application consultation has also been documented within the Consultation Report (Application Document Ref. No. 5.1).

Table 19.2: Consultation summary table

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/how comments have been addressed
Public Health England	September 2016 (EIA Scoping Opinion)	Stated that there should be a specific section of the ES which provides a focus to ensure that public health is given adequate consideration. The section should summarise key information, risk assessments, proposed mitigation measures, conclusions and residual impacts relating to human health. Compliance with the requirements of National Policy Statements and relevant guidance and standards should also be highlighted.	A Health chapter was included in the ES in response to this comment. This chapter summarises the health related impacts detailed across all ES technical chapters, with reference to National Policy Statements, guidance and standards.
		Assessments undertaken to	The assessments

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
		<p>inform the ES should be proportionate to the potential impacts of the proposal (with respect to health impacts) and that the rationale for the methodology of assessments (e.g. quantitative vs. qualitative or assessments scoped in vs. scoped out) should be fully explained in the ES.</p>	<p>presented in the ES have been scoped through a formal EIA Scoping process and are considered to be proportionate to the potential effects of the Proposed Development.</p>
		<p>It should be confirmed either that the proposed development does or does not include or impact upon any potential sources of EMF; or ensure that an adequate assessment of the possible impacts is undertaken and included in the ES.</p>	<p>Potential EMF effects from the Proposed Development are assessed in this chapter.</p>
		<p>A detailed appendix outlining general areas that should be addressed by all promoters when preparing an ES for inclusion within an NSIP submission was also provided, setting out detailed advice in relation to each of the risks to human health, including EMF.</p>	<p>Detailed appendix noted and taken into account during preparation of ES.</p>
<p>Health and Safety Executive (HSE)</p>	<p>September 2016 (EIA Scoping Opinion)</p>	<p>The development falls within HSE’s Consultation Distance of Air Liquide UK Limited (HSE Ref. 3279). It is unlikely that the HSE would advise against the development, subject to the assumption that when the development is completed the workplaces will contain less than 100 occupants in each building and have less than three occupied storeys.</p>	<p>Comments noted. It is confirmed that there will be less than 100 occupants per building.</p>
		<p>The presence of hazardous substances on, over or under land at or above set threshold</p>	<p>A Hazardous Substances Consent and Lower Tier Control</p>

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
		<p>quantities (Controlled Quantities) may require Hazardous Substances Consent. The developer is advised to consider whether storage of hazardous substances is required and, if so, whether Hazardous Substances Consent would be required.</p>	<p>of Major Accidents and Hazards (COMAH) licence may be required, particularly if Selective Catalytic Reduction (SCR) technology is considered to represent Best Available Technology (BAT) for the Proposed Development (due to the potential storage of ammonia on the Site). The HSC application is anticipated to be made Q3 2017, with the lower tier COMAH licence application (if required) proposed to be submitted during the construction phase of the Proposed Development, prior to storage of the hazardous materials.</p>
		<p>The proposed development does not impinge on any licensed explosives sites as there are none in the vicinity.</p>	<p>Comment noted.</p>
	<p>February 2017 (Preliminary Environmental Information (PEI) Report Consultation Response)</p>	<p>The Stage 2 submission does not contain any information on the extent and severity of known hazards from the proposed generating station, with the potential to impact on local populations, and/or the adjacent major hazard installation(s). The loss of fuel gas containment may give rise to vapour cloud explosion, or flash fire. This may in turn escalate to adjacent plant. The need for this consideration, at this stage of the development,</p>	<p>As noted above, a Hazardous Substances Consent and Lower Tier Control of Major Accidents and Hazards (COMAH) licence may be required and will be applied for in the timescales identified above. A hazard identification study (HAZID) will be undertaken to inform these applications, and the HSE will be</p>

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
		<p>was supported by the Secretary of State for Energy and Climate Change in a ruling on a recent power plant order application. This ruling also noted that the preparation and approval of a high level assessment need not have a significant impact on project timescales, since at this stage this does not need the detailed design or detailed risk assessment to be considered. HSE suggests the Applicant should provide such information before the project is accepted for examination.</p>	<p>consulted in due course. Risks associated with the gas pipeline will be managed in accordance with the Gas Safety (Management) Regulations 1996 with all appropriate risk assessments completed as necessary prior to commissioning of the gas pipeline.</p>

19.3.20 For each of the other technical assessments, where effects on health are considered, consultation has been undertaken with the relevant Local Authorities and Health Authorities, and the findings of the Scoping Opinion and PEIR taken into account within the assessments. The consultation outcomes are set out in each of these chapters (Chapter 8: Air Quality, Chapter 9: Noise and Vibration, Chapter 14: Traffic and Transportation, Chapter 11: Water Resources, Flood Risk and Drainage, Chapter 17: Waste Management, Chapter 12: Geology, Hydrogeology and Land Contamination and Chapter 15: Land Use, Agriculture and Socio-Economics).

Summary of Key Changes to Chapter 19 since Publication of the Preliminary Environmental Information (PEI) Report

19.3.21 The PEI Report was published for statutory consultation in January 2017, allowing consultees the opportunity to provide informed comment on the Proposed Development, the assessment process and preliminary findings through a consultation process prior to the finalisation of this ES.

19.3.22 The key changes since the PEI Report was published are summarised in Table 19.3 below.

Table 19.3: Summary of key changes to Chapter 19 since publication of the PEI Report

Summary of change since PEI Report	Reason for change	Summary of change to chapter text in the ES
Rather than a signposting document as provided in the PEI Report, the ES chapter now includes a summary of health-related impacts described in each of the relevant technical chapters in the ES	To provide an accessible summary of all health-related effects in one chapter of the ES.	Additional information from other technical chapters summarised in this Health chapter.

19.4 Baseline Conditions

Existing Baseline

19.4.1 This section considers the community profile in the study area (as defined for the socio-economics assessment in Chapter 15: Land Use, Agriculture and Socio-Economics) including the current health and mental health status of the population.

Public Health

19.4.2 The location of the existing local population within a 2 km study area has been described earlier in this ES (see Chapter 3: Description of the Site). This comprises a number of isolated residential properties, clusters of properties and villages in the area surrounding the Proposed Development. The towns of Knottingley and Selby lie approximately 5.7 km and 5.0 km to the west and north-east of the Proposed Development respectively.

19.4.3 Health profiles produced annually by PHE provide a summary of the health of people within local authority areas and a comparison of local health with average values for all areas of England. Health profiles for 2016 have been obtained for the local authority area of Selby, within which the Site is located, as well as those for surrounding local authorities including Harrogate, York, East Riding of Yorkshire, Leeds, Wakefield and Doncaster (PHE, 2016). These predominantly report data for the 2012 – 2014 period. In the absence of more recent published data, these are assumed to represent the ‘current baseline’.

19.4.4 These show that the Selby District Council area has the smallest population of the local authorities within the study area, with just 85,000 people resident. The average life expectancy for people living within Selby and surrounding local authorities varies when compared to the national average (see Table 19.4). In the Selby district, life expectancy for both men and women is similar to the national average.

Table 19.4: Life expectancy and health inequalities within Selby and surrounding local authority areas

Location	Population	Female average (years)	Male average (years)	Difference in life expectancy between most and least deprived areas (female years)	Difference in life expectancy between most and least deprived areas (male years)	Average
England	54,316,600	83.2	79.5			
Harrogate	157,000	84.3	81.1	-	5.2	-
York	204,000	83.5	80.1	5.1	6.5	5.8
Selby	85,000	83.7	79.9	5.5	4.1	4.8
East Riding of Yorkshire	337,000	83.2	80.3	4.6	6.4	5.5
Leeds	766,000	82.4	78.4	8.4	11.0	9.7
Wakefield	331,000	82.0	78.2	7.8	8.5	8.2
Doncaster	304,000	81.6	77.5	7.1	10.7	8.9

^a values at birth (2012-2014) sourced from the Health Profile for the individual local authority

- 19.4.5 Both the male and female average life expectancy values for Selby, Harrogate, York and East Riding of Yorkshire local authority areas shown in Table 19.4 are equal to or better than the average life expectancy for males and females in England as a whole.
- 19.4.6 By contrast, Leeds' female population has a life expectancy just 8 months less than the England average. However, Leeds' male population and the male and female populations of Wakefield and Doncaster have life expectancies 1 -2 years less than national average.
- 19.4.7 Within each local authority, health inequalities exist, marked by the variance in life expectancy for men and women in the most deprived, compared to the least deprived areas. Data available on health inequalities is reported. Where a dash (-) is shown in Table 19.4, data is not available.
- 19.4.8 The most deprived areas within Leeds City Council administrative area have an average life expectancy that is 11.0 years shorter for men in the most deprived areas compared to the least deprived areas. The equivalent difference for women is 8.4 years. The least marked disparities are found in the Selby District (4.1 years for men and 5.5 years for women), indicating that health inequalities are less apparent in the Selby District, compared to surrounding local authorities.
- 19.4.9 Various factors contribute to mortality and indices are reported for eight factors which can be used to determine health inequalities of a local area, when compared to national average and neighbouring authorities. These are presented in Table 19.5 below.

19.4.10 The health outcomes for people, when contrasted against the England average, show that the Selby District performs well for all indices measured, with the exception of death from road injuries and excess winter deaths. In respect of the latter, the Office for National Statistics (ONS, 2015) reports that respiratory diseases were the underlying cause of death in more than a third of all excess winter deaths in 2014/15 nationwide. Despite appearing high for Selby, the excess winter mortality index was joint lowest in Yorkshire and The Humber and Wales. Fuel poverty is often a key factored attributed to causes of winter deaths. However, it is reported that Selby has one of the lowest proportions of fuel poverty within North Yorkshire.

Table 19.5: Baseline mortality rates within Selby and surrounding local authority areas

Community	Infant Deaths^a	Road injuries and deaths^b	Suicide rate^c	Early deaths: Drug misuse^b	Deaths from Smoking^d	Early Deaths: cardiovascular^b	Early Death: Cancer^b	Excess Winter Death^e
England	4.0	39.3	10.0	3.4	274.8	75.7	141.5	15.6
Harrogate	4.2	67.0	9.4	X2	225.3	57.9	113.6	16.7
York	2.9	30.3	11.1	X2	284.8	69.4	140.0	14.9
Selby	2.9	62.2	X2	X2	266.8	75.5	135.3	21.5
East Riding of Yorkshire	2.8	56.1	9.1	X2	270.0	71.8	133.6	13.1
Leeds	3.6	40.8	10.3	3.7	340.2	89.1	160.2	18.1
Wakefield	3.8	43.8	9.5	3.7	330.6	86.9	162.1	17.0
Doncaster	4.7	37.7	10.3	6.8	371.1	89.4	177.3	19.4

^a rate per 1,000 live births 2012-2014 sourced from the Health Profile for the individual local authority.

^b values expressed as per 100,000 population

^c values expressed as per 100,000 population (aged 10+)

^d values expressed as per 100,000 population age 35+

^e ratio of excess winter deaths to average non-winter deaths Aug 11 – Jul 14.

X2 – value cannot be calculated as number of cases (13) is too small

- 19.4.11 A topic specific review of the health indicators within the local population is undertaken for administrative areas by Joint Strategic Needs Authorities. Selby lies within the scope of the North Yorkshire County Council (NYCC) Joint Strategic Needs Assessment (JSNA). The latest report on the health and well-being of the local population was published in 2014/2015 (Annual Update) (NYCC, 2015). This report largely confirms the data reported above. Additional data relating to non-mortality indices of health is presented in the report, including the prevalence of asthma and chronic obstructive pulmonary disease, for which prevalence information is based on quality and outcomes data. This showed the prevalence of both diseases as significantly higher than national average for Selby.

Mental Health

- 19.4.12 Eggborough is located within the Vale of York Clinical Commissioning Group. Data published on mental health within this, and surrounding Clinical Commissioning Group areas, is provided in Table 19.6 below (NYCC, 2015).

Table 19.6: Clinical Commissioning Group report on common mental health disorders

Clinical Commissioning Group	Socio-economic deprivation overall indices of multiple deprivation Score	People estimated to have any common mental health disorder ¹	Long term mental health problems among GP survey respondents
England	21.5	15.62	4.6
Harrogate and Rural District	10.4	13.36	4.2
Vale of York	12.5	12.90	4.4
Doncaster	30.2	15.46	4.5
East Riding of Yorkshire	16.2	12.33	3.1
Leeds South and East	34.3	18.78	4.7
Wakefield	26.0	17.28	5.1

¹. Estimated % of population aged 16 - 74

- 19.4.13 Table 19.6 shows that the Vale of York compares favourably in relation to mental health, when compared to national average statistics and to some neighbouring Clinical Commissioning Group areas. A lower percentage of the population (12.9 %) is estimated to have common mental health disorders, some 2.7 % lower than the national average (15.6 %) and almost 5.4 % lower than the neighbouring Leeds South and East area, where almost 19 % of the population are estimated to have common mental health disorders.
- 19.4.14 Those with long term mental health problems in the Vale of York area are also slightly less than the national average (4.4 % compared to a national average of 4.6 %), comparing similarly to neighbouring areas including Harrogate and Rural District and Doncaster. Only the East Riding of Yorkshire compares considerably better (3.1 %).

Future Baseline

19.4.15 'Future baseline' conditions are predicted for each topic in the relevant technical chapters of this ES, whereby the conditions anticipated to prevail if the Proposed Development was not to be progressed are identified for comparison with the predicted conditions with the Proposed Development. For example, potential future changes in air quality, which may affect human health, are described in Chapter 11: Air Quality.

19.4.16 Chapter 15: Land Use, Agriculture and Socio-Economics assesses that population growth in the Direct Impact Area is expected to be positive up to 2037, with growth driven by the 65+ age bracket and the working age population dropping markedly, whilst in the 0 to 15 age group, a slight fall is predicted.

Public Health

19.4.17 Changes to public health and inequalities are not straightforward to predict. NYCC sets out its priorities for future health as follows:

"To improve and protect the nation's health and wellbeing, and improve the health of the poorest fastest."

19.4.18 There are two key outcomes measured for the whole public health system:

- increased healthy life expectancy, *i.e.* taking account of the health quality as well as the length of life; and
- reduced differences in life expectancy and healthy life expectancy between communities (through greater improvements in more disadvantaged communities).

19.4.19 No specific predictions for future baseline public health are available for the local area. However, the King's Fund (www.kingsfund.org.uk/time-to-think-differently/trends) publishes analysis of future trends in health nationally which can be used to provide broad statements about potential health changes expected in the medium to longer term within the region.

19.4.20 The Kings Fund reports that life expectancy has increased dramatically over the previous century and is predicted to continue to increase. Whereas in 2012, men could expect to live for just over 79 years and women to 83 years, by 2032 this is expected to increase to 83 years and 87 years respectively. Healthy life expectancy is growing at a similar rate, suggesting that the extra years of life will not necessarily be years of ill health. However, it is noted that medical advances, future patterns of disease and population behaviour could all have a significant impact on life expectancy and either drive it up or down.

19.4.21 The Kings Fund predicts that the number of people with diseases will double over the next 20 years, for example, by 2030 there will be 3 million with cancer, but states that many diseases will be easier to treat.

19.4.22 It forecasts that significant health inequalities are likely to persist, with people in more deprived populations having higher rates of disease and more than one disease. It suggests that population lifestyles will be a critical determinant of future patterns of disease and as such, a change in population lifestyles offers the greatest opportunity to reduce the burden of chronic disease.

- 19.4.23 On this basis, future baseline conditions in 2019 - 2022 for public health are not anticipated to be significantly different to the existing baseline conditions, although within the local Direct Impact Area (reported in Chapter 15: Land Use, Agriculture and Socio-Economics), population growth is expected, with the highest growth increases being in the older population. This aligns with the national trend.
- 19.4.24 Future baseline conditions in 2037 for public health are expected to include improved healthy life expectancy (based on the Kings Fund predictions), but with a large number of potential factors influencing public health, this cannot be quantified for the Study Area.

Mental Health

- 19.4.25 The Kings Fund analysis of mental health recognises that physical health problems significantly increase the risk of poor mental health, and vice versa, stating that approximately 30% of all people with a long-term physical health condition also have a mental health problem, most commonly depression/ anxiety.
- 19.4.26 It states that adult mental health has remained relatively stable over the last 20 years. However, looking to the future, it recognises that prolonged economic instability can be expected to increase demand for mental health services, as there is a close link between unemployment, debt and mental health problems – particularly depression and anxiety.
- 19.4.27 Future baseline conditions in 2019 - 2022 for mental health are not anticipated to be significantly different to the existing baseline conditions.
- 19.4.28 If economic instability prevails, there is the potential for prevalence of mental health conditions to increase by 2037, whereas if there is a greater increase in economic security, the prevalence of mental health conditions may decrease by 2037.

19.5 Development Design and Impact Avoidance

- 19.5.1 Chapter 6: Need, Alternatives and Design Evolution describes the measures that have been incorporated in order to 'design-out' potential impacts.
- 19.5.2 As described in Chapter 8: Air Quality, the primary means of avoiding impacts on health due to emissions to air has been through the selection of high efficiency generating units burning natural gas as the fuel. The Proposed Development will be designed such that process emissions to air comply with the Emission Limit Values specified in the Industrial Emissions Directive (European Commission, 2010) and this will be enforced by the Environment Agency through an Environmental Permit required for the operation of the generating station.
- 19.5.3 By selecting the existing Eggborough coal-fired Power Station site rather than an alternative site, impacts on the health of the local population have been minimised as far as practicable. This is because the existing coal-fired power station is facing closure and without alternative investments, there would be a resultant impact on employment in the local area. There is a close link between unemployment, debt and mental health problems – particularly depression and anxiety. By continuing power generation at the existing coal-fired power station site, some of the existing workforce jobs will potentially be retained or similar employment opportunities will be provided.

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- 19.5.4 As set out in Chapter 6: Need, Alternatives and Design Evolution, options for the specific location and layout of plant were carefully considered and evaluated at the feasibility stage, resulting in the preferred location for the Proposed Power Plant Site being selected at the coal stockyard of the existing coal-fired power station.
- 19.5.5 A potential golf course site option, located between the existing power station infrastructure and the A19, on the site of the existing golf course was discounted. One of the reasons for this was that it would result in loss of the golf course, sports and social club and wider sports land. Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities. By discounting the golf course option, health benefits have been realised with resulting long term positive effects on users.
- 19.5.6 One of the reasons for the selection of the coal stockyard area for the Proposed Power Plant site was because it could be connected to the existing 400 kV sub station by shorter, underground cables, whereas the alternative site to the north-east (the Lagoon Site Option) would have a longer, overhead electrical connection. The health impacts resulting from the connection into the existing National Grid sub station via underground cables is likely to have reduced potential exposure to sources of EMF, particularly in relation to electrical fields, with resultant health benefits for any receptors exposed.
- 19.5.7 The Lagoon Site Option would also have been located closer to the nearest sensitive residential receptors (at Gallows Hill) compared to the coal stockyard area. By increasing the distance to sensitive receptors, potential health impacts are reduced (*e.g.* less potential for sleep disturbance due to noise or exposure to construction dust, with resultant potential health effects).
- 19.5.8 Three alternative options were considered in relation to route corridors for the gas pipeline required to connect the Proposed Development to the National Grid gas transmission network (see Chapter 6: Need, Alternatives and Design Evolution for more details). During the EIA Scoping stage, the eastern route was ruled out in part because it runs closer to existing residential areas with potential health impacts during construction. Potential health impacts have therefore been avoided by reducing the number of residential receptors close to the gas connection corridor.
- 19.5.9 The choice and design of plant and equipment will comply with standard industry guidelines set to protect human health, including construction workers and operational staff. As set out in the ICNIRP Guidelines (ICNIRP, 1988), the occupationally EMF-exposed population will consist of adults who are generally exposed under known conditions and are trained to be aware of potential risk and to take appropriate precautions.
- 19.5.10 Measures for the protection of workers from potential EMF effects include engineering and administrative controls, personal protection programs, and medical surveillance.
- 19.5.11 Appropriate protective measures will be implemented if exposure in the workplace is predicted to result in the basic restrictions set out within ICNIRP Guidelines (ICNIRP, 1988) being exceeded.

19.6 Likely Impacts and Effects

19.6.1 With the exception of effects relating to EMF, this chapter summarises health-related effects that are also described elsewhere in the ES (chapters on emissions to air (Chapter 8: Air Quality), noise and vibration (Chapter 9: Noise and Vibration), traffic (Chapter 14: Traffic and Transportation), emissions to water (Chapter 11: Water Resources, Flood Risk and Drainage), waste management (Chapter 17: Waste Management), land quality/ contamination (Chapter 12: Geology, Hydrogeology and Land Contamination) and socio-economics (Chapter 15: Land Use, Agriculture and Socio-Economics). The key health impacts for each of these assessment topics are summarised below, followed by the assessment of EMF effects.

Air Quality (Chapter 8)

Construction

19.6.2 Human health impacts from PM₁₀ releases from construction activities has been assessed as low magnitude, on account of the distance from the activity source to the nearest receptors, and the existing low background concentration of particulates (<24 µg/m³). Overall, the effects of construction emissions, demolition and construction dust, construction road traffic and onsite plant, have been determined to be minor or negligible adverse effects and therefore the construction air quality effects are considered to be not significant, following the implementation of best practice mitigation measures through the Construction Environmental Management Plan (CEMP) (a framework of which is included as Appendix 5A (ES Volume III)).

Operation:

19.6.3 The air quality effects from operation of the Proposed Development (including those that could impact upon human health, such as from emissions of NO₂) have been identified as not significant. No specific additional mitigation is considered to be required or has been proposed beyond the embedded mitigation, which includes compliance with the Environmental Permit.

Noise and Vibration (Chapter 9)

Construction

19.6.4 Without further mitigation, construction of some elements of the Proposed Development is predicted to result in some moderate and major adverse (significant) effects on some of the nearest residential Noise Sensitive Receptors (NSRs). The NSRs which have the potential to experience moderate and major (significant) effects are:

- NSR4 – residential property at the Eggborough Sports and Leisure Complex, which could experience moderate adverse daytime construction noise effects if piling and foundations works for the Proposed Development coincide with the demolition of the existing coal-fired power station, and during the works associated with the Proposed Borehole Water Connection at the existing borehole near this NSR; and
- NSR5 – properties on Millfield Road, Chapel Haddlesey, which could experience major adverse daytime construction noise effects during the breaking out of concrete at the cooling water abstraction structure.

19.6.5 It should be noted that the effect on NSR4 from piling and foundation works associated with the Proposed Development is only predicted to be significant if it coincides with demolition

works at the closest part of the existing coal-fired power station. In addition, the period of works required near NSR4 in relation to the Proposed Borehole Water Connection will be short term and temporary, and as the works along the Proposed Borehole Connection route further away from NSR4 will not cause a significant adverse effect.

- 19.6.6 Works at NSR5 will be mitigated through acoustic screening and other mitigation methods where appropriate, reducing the short term noise effects (and consequential short term health effects) to a non-significant level.
- 19.6.7 Construction traffic on local roads associated with the Proposed Gas Connection could lead to at worst short term moderate adverse (significant) effects on the nearest NSRs during the initial two weeks (when the majority of HGV movements would occur). Given the very short-term nature of anticipated noise effects and with this occurring during the daytime only, significant effects on human health are not anticipated.
- 19.6.8 No more than negligible adverse (not-significant) effects are anticipated for construction vibration, due to the distances between source and closest NSRs; therefore no effect on human health is anticipated due to vibration.

Operation

- 19.6.9 The change in noise levels due to operation of the Proposed Development (before mitigation) is predicted to have a minor/moderate adverse (significant) effect at NSR3 (1 Roall Waterworks to the west of the Proposed Power Plant Site, near the existing Tranmore Lane entrance). Mitigation is to be developed as part of the detailed design to reduce the effect to a non-significant level, with agreement on noise limits and noise monitoring to be made in accordance with a draft DCO Requirement. As such, noise from the operation of the Proposed Development is not anticipated to lead to human health effects.
- 19.6.10 No significant noise effects due to operational traffic are predicted due to the low levels of operational traffic associated with the Proposed Development.

Water Resources, Flood Risk and Drainage (Chapter 11)

Construction

- 19.6.11 During construction, there is an elevated risk of leakage or accidental spillage of building materials and potential pollutants used on-site, which could migrate to nearby surface watercourses or infiltrate to groundwater. Washout facilities (washing of tools, plant and equipment), storage and use of various liquids and soluble solids, unstable exposed soils, excavated materials, stored aggregates, contaminated road surfaces, and fuel storage and handling all have the potential to result in pollution of water resources, which could indirectly lead to human health effects. However, due to the implementation of impact avoidance measures (set out in the Framework CEMP at Appendix 5A (ES Volume III)) no significant adverse effects are predicted. No adverse effects on human health due to exposure to contaminated water or impacts on recreational activity (such as walking, recreational fishing or river navigation) are predicted.
- 19.6.12 The use of cofferdams to create dry working areas within the channel of the River Aire adjacent to the cooling water abstraction and discharge points will result in localised reductions in channel capacity, which has the potential to increase flood risk to the area local

to the working areas and upstream of the working areas. However, with the proposed impact avoidance measures that will be implemented (short-duration phases of cofferdam installation during summer, when river flows are generally lower), any potential impacts are expected to be avoided. If a high flow event coincides with a period when a cofferdam is in place, an impact is possible, but given the low risk the effect is considered to be minor adverse (not significant) and as such is not anticipated to lead to human health effects.

Operation

- 19.6.13 During operation there is the potential (albeit the risk is very low due to the implementation of appropriate drainage design) for localised and temporary changes in water quality of surface waters from any leakage in the drainage system and/or contaminated runoff from the Site. This could affect human health due to exposure to contaminated water or impacts on recreational activities. However, the effect is predicted to be negligible adverse (not significant), resulting in negligible effects on human health.
- 19.6.14 Development of the Site for the Proposed Development will not increase the risk of flooding on or off Site.

Geology, Hydrogeology and Land Contamination (Chapter 12)

Construction

- 19.6.15 During construction, there is the potential for the following impacts, which could lead to human health effects:
- impact to construction workers from contaminated soils, sediments and groundwater / surface water encountered;
 - impact to groundwater from runoff and/or leachates from stockpiled materials;
 - impact to groundwater through creation of new or exacerbation of existing pathways;
 - impact to workers, offsite residents and land from potentially contaminated dusts generated; and
 - risks to underlying groundwater potential contamination in imported fill placed at the Site.
- 19.6.16 However, with the implementation of standard practice mitigation measures which will be detailed in the final CEMP (a framework of which is included as Appendix 5A (ES Volume III)), the effects are predicted to be negligible or minor adverse (not significant) and are therefore not anticipated to lead to human health effects.

Operation

- 19.6.17 During operation, there is the potential for the following impacts, which could lead to human health effects:
- impact to groundwater from spills, leachates and runoff during site operation; and
 - impacts to buildings and site workers from gases, vapours and groundwater during operation.
- 19.6.18 However, these risks will be mitigated by design and engineering control measures, resulting in negligible or minor adverse (not significant) effects.

Traffic and Transportation (Chapter 14)

Construction

- 19.6.19 At the peak of construction activity, the change in total traffic associated with the Proposed Development is lower than the very low impact threshold of 30% on the A19. As a result the effects of construction traffic on severance (whereby local residents become isolated), pedestrian amenity, highway safety, and fear and intimidation are all considered to be negligible adverse (not significant) and therefore not likely to give rise to any adverse health effects.
- 19.6.20 The change in total traffic on Wand Lane is predicted to be greater than 90% (high impact) due to the low usage of the road; however, given the link sensitivity is very low (with no residential properties or pedestrian footway along the affected section of the road), the effects on severance, pedestrian amenity, highway safety, and fear and intimidation are considered to be negligible or minor adverse (not significant).
- 19.6.21 The short term traffic increases associated with the access points for the construction of the Proposed Gas Connection via West Lane (Burn), Fox Lane (north of Chapel Haddlesey) and Millfield Road (east of Chapel Haddlesey) have been assessed separately to the overall peak of construction. The changes in traffic on all three of these road links are predicted to result in minor adverse (not significant) effects on pedestrian amenity and negligible adverse (not significant) effects on severance, highway safety, and fear and intimidation. Therefore no significant health effects are predicted as a result of the traffic levels associated with construction of the Proposed Development.

Operation

- 19.6.22 Due to the very low traffic flows that will result from the operation of the Proposed Development, effects on severance, pedestrian amenity, highway safety, and fear and intimidation during operation are therefore considered to be negligible adverse (not significant).

Socio-Economics (Chapter 15)

Construction

- 19.6.23 The construction of the Proposed Cooling Water and Gas Connections will require the temporary stopping up of three public rights of way (PRoW) (a footpath linking the A19 to the River Aire immediately east of the existing cooling water abstraction point, a footpath linking Chapel Haddlesey Weir to Gallows Hill to the south-east, and a bridleway east of the A19 opposite Burn Lodge Farm, known as Whitings Lane). Each PRoW will be temporary closed for approximately three months.
- 19.6.24 This is considered to result in moderate adverse (significant) effects on PRoW users, with potential short term effects on human health. Given the other opportunities for recreational activity in the area (including unaffected sections of the footpath linking Chapel Haddlesey Weir to Gallows Hill, and the bridleway east of the A19 opposite Burn Lodge Farm), and the short term nature of the effect, no significant human health effects are anticipated.

- 19.6.25 As described in Chapter 5: Construction Programme and Management, the construction works at the Proposed Cooling Water abstraction and discharge points will require the temporary installation of cofferdams but these will not impede recreational river navigation and appropriate signage will be provided for navigational safety, so no effects are anticipated.
- 19.6.26 The construction of the Proposed Cooling Water and Gas Connections will cause the short term loss of c. 26.1 hectares (ha) from agricultural land use and temporary disruption to farm accesses. This is considered to result in minor adverse (not significant) effects on farm accesses (with access always available, but sometimes altered) and negligible or minor adverse (not significant) effects on agricultural land. Due to the short term nature of the works, and the commitment to reinstate land following construction in accordance with a DCO Requirement, no significant effects on human health are predicted.
- 19.6.27 Construction of the Proposed Development is expected to last approximately three years between early 2019 and early 2022. During this time employment opportunities will be created as a result of the works. Although these jobs are temporary, they represent a positive economic impact that can be estimated as a function of the scale and type of construction. The direct expenditure involved in the construction phase will lead to increased output generated in the York Travel to Work Area (TTWA) economy, resulting in a significant beneficial effect on the local economy and consequentially on human health.

Operation

- 19.6.28 The only area of agriculture land that will be lost permanently is at the AGI location. The layout of the AGI compounds has sought to minimise effects on the agricultural field, by locating the compounds in the corner of the field. As the area of land-take is less than 5 ha (very low impact), the effect on agricultural land is considered to be negligible adverse (not significant), and no significant effects on human health are anticipated.
- 19.6.29 The Proposed Development will also generate long-term jobs once operational; however, when the existing coal-fired power station ceases generation, there will be a loss of 200 permanent staff. This results in a net loss of 101 employees in the York TTWA, resulting in a minor adverse (not significant) long-term effect on the local economy but which is not anticipated to lead to significant human health effects.

Waste Management (Chapter 17)

Construction

- 19.6.30 No significant quantities of contaminated materials are expected to be generated during construction and all materials will be managed in accordance with a Materials Management Plan as set out in Chapter 12: Geology, Hydrogeology and Land Contamination. A Site Waste Management Plan (SWMP) will also be developed in accordance with a draft DCO Requirement to control site activities and minimise environmental impacts. A Framework SWMP forms part of the Framework CEMP (Appendix 5A – ES Volume III).
- 19.6.31 Contractors will be encouraged to adopt good practice to minimise construction waste and waste streams will be separated on-site and monitored. Any waste effluent will be tested and where necessary, disposed of at the correctly licensed facility by a licensed specialist contractor to prevent risks associated with contamination which could lead to human health effects. Consequently no significant human health effects are anticipated.

Operation

- 19.6.32 During operation, the quantities of waste that will be generated are expected to be very small. In contrast to coal, the combustion of gas does not generate any solid residues which require disposal. All operational waste will be dealt with in accordance with the Waste (England and Wales) Regulations 2011 and consigned via a registered waste carrier for treatment or disposal at a suitably licenced waste facility, thereby avoiding any potential for significant adverse human health effects.

EMF-Related Effects

- 19.6.33 The Proposed Development has the potential for differential rather than whole population impacts associated with EMF. Within the conservative up to 50 m radius study area around the proposed below ground electrical connection to the existing 400 kV National Grid sub station, no residential receptors are present and none are anticipated to be present in the future baseline. There are also no residential receptors within the conservative 100 m radius study area around the proposed new sub station at the Proposed Power Plant Site. As such, the only potential exposure to EMF arises for construction workers and operational staff and no significant health effect is predicted for the general public.
- 19.6.34 As set out in Section 19.5 (Development Design and Impact Avoidance) measures will be implemented to protect construction workers and operational staff from potential EMF effects associated with the existing sub station, the proposed sub station and the below ground electrical cable if necessary. With the appropriate precautions in place, no significant health effects in the medium to long-term for construction workers or operational staff are predicted, based on the voluntary code of practice produced by DECC and publicly available data.

19.7 Mitigation and Enhancement Measures

- 19.7.1 Mitigation measures are set out in the relevant technical chapters of this ES. No additional mitigation has been identified.

19.8 Limitations or Difficulties

- 19.8.1 No significant limitations or difficulties have been identified in the preparation of this chapter.

19.9 Residual Effects and Conclusions

- 19.9.1 No significant EMF-related health effects have been identified. No significant residual health effects have been identified for all other environmental assessments following the implementation of mitigation measures.

19.10 References

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