20. Climate

20.1 Introduction

20.1.1 The scope of this chapter differs from the majority of topics considered in this report as it is principally informative in nature rather than assessing potential environmental effects resulting from the Moorside Project and their likely significance.

20.1.2 The scope of the climate technical chapter was defined in the EIA Scoping Report as follows:

- to include the impact of climate change upon the Moorside Project (and assess these impacts and any adaptive actions necessary to ensure that the Moorside Project Sites (and principally the Moorside Power Station) could be modified to deal with climate change effects; and
- to exclude the impacts of the Moorside Project on global climate change, given that the Moorside Project is one of many major development projects and its individual impact on global climate is therefore negligible.

20.1.3 Although the impacts of the Moorside Project on global climate change are excluded from the scope of this preliminary assessment, a carbon footprint of the Project, as a whole is planned to be carried out and reported with the DCO Application in 2017 with the aim of ensuring that Greenhouse Gas (GHG) emissions from all relevant elements of the Project are minimised as far as is reasonably practicable.

20.1.4 It is recognised that the lifecycle carbon emissions of a new nuclear power station are comparable to those of renewable energy sources such as wind and PV, and compare very favourably to lifecycle emissions of power plants using fossil fuels such as coal (Reference 1: Schlömer et al). Nonetheless, it is recognised that there will be a carbon impact associated with the construction and operation of the Moorside Project which needs to be considered. The purpose of the carbon footprint assessment is to provide detail with respect to the contribution of different elements of the development activities to the overall carbon footprint of the Moorside Project. It is acknowledged that construction of the Project elements (and most importantly the MPS) may have a notable carbon footprint as the construction works will involve substantial site preparation activities, large scale earthwork and major building works. The information arising from the carbon assessment will enable measures to be taken to minimise carbon emissions where it is possible and reasonable to do so.

20.1.5 Given that safety requirements and design constraints limit the options in building design approaches that may be taken for certain elements of the Moorside Power Station, there will be a focus on GHG emissions from other more conventional elements of the Project which do not have the same constraints in terms of building design and construction. Therefore for non-nuclear safety categorised support buildings within the Moorside Site (offices,

storage warehousing etc.), or on the Accommodation Sites or Additional Sites, NuGen proposes to follow CEEQUAL and BREEAM Standards (at Very Good or higher level) to minimise the impact of the development where it is appropriate to do so given the longevity of such developments. For the nuclear power generation elements, and other safety critical infrastructure, safety requirements and design constraints limit options in building design approaches on the basis of feedback from carbon footprint analysis.

20.1.6 Given the above, the main objective of this chapter is to set out at a high level how climate change may impact upon the Moorside Project and to identify if any adaptive actions may be required to address climate change in the context of development elements which are considered necessary for the delivery of the Project.

20.2 Limitations of the PEIR

20.2.1 The preliminary assessment presented below is based on the description of the Moorside Project as presented in **Chapter 2**. A number of design decisions remain to be confirmed e.g. regarding how on-site power generation requirements for the construction of the MPS will be met, which introduce uncertainty in the assessment at this stage. These limitations will have be resolved prior to submission of the Environment Statement (ES) in 2017.

20.2.2 Decommissioning has not been specifically assessed within the PEIR, as it remains uncertain at this point which elements would be decommissioned and when. Each of the Accommodation Sites and Additional Sites (including the Corkickle to Mirehouse Railway Site and the St. Bees Railway Site) may see some element of decommissioning activity undertaken once the construction phase of the Moorside Site itself is complete (demolition or removal of certain features) and the effects of these operations are expected to be no greater than those in the construction phase assessments for these sites. The decommissioning phase of each Moorside Project Site will be assessed in the ES. As discussed in **Chapter 2**, decommissioning of the Moorside Power Station itself will also be included within the ES, but at a high level given that these activities will take place around 60 years after operations commence, and they will be covered by a discrete EIA of the activities at that time.

20.2.3 Specific limitations relating to the assessment of impacts due to climate change will be described within the technical chapters where that assessment is taking place. These will include **Chapters 13** (Groundwater)**, 14** (Surface water), and **15** (Marine and Coastal Physical Processes).

20.3 Policy and legislative context

20.3.1 The following planning policy and guidance will be used to inform this assessment:

Legislation

- The UK Climate Change Act 2008 (Reference 2: UK Government).
- The Paris Agreement 2015 (following ratification) (Reference 3: UNFCCC).

Policy

- Overarching National Policy Statement for Energy Development (NPS EN-1) (Reference 4: DECC), sections 3.5 and 4.8:
  - NPS EN-1 states that having examined a range of independent life cycle analyses[1], the Government position is that carbon emissions from a nuclear power station are likely to be within the range of 7-22 g CO_2/kWh over the lifetime of the plant. This range represents the emissions expected from the construction, operation and decommissioning of the plant over its lifetime, per kWh of electricity produced. This is in line with research published by the Sustainability Development Commission (Reference 5: SDC) and the IAEA (Reference 6: Spadaro). The estimation is similar to the lifecycle CO_2 emissions from wind power and much less than from fossil fuelled power plants.
  - NPS EN-1 describes the Government's key goals on energy supply as being to reduce carbon emissions, secure energy supply and ensure affordability. It explains that there is considered to be an urgent need for new nuclear electricity generation plant and that new nuclear power should contribute as much as possible to the need for new capacity. New nuclear power is identified as one of the three key elements in the move towards a decarbonised electricity sector (Section 4.8).
  - NPS EN-1 describes how new energy infrastructure will typically be a long-term investment, remaining operational over many decades, and therefore needs to be resilient to expected changes in climate over its lifespan. It also allows for a situation where, if measures potentially required to deal with future events caused by climate change would have effects on the surrounding environment in their own right, they could be implemented if the need arises rather than at the outset of the development (section 4.8).
- The National Policy Statement for Nuclear Power Generation (NPS EN-6) (Reference 7: DECC) Section 2.10 identifies that due to the requirement for large amounts of cooling water, most nuclear power stations are developed in coastal or estuarine locations and therefore could be at greater risk of flooding from climate than if they were located inland. Applicants for new nuclear power stations are therefore required to provide information on:

[1] Life cycle analyses examine the emissions for the complete nuclear fuel cycle (including CO_2 emitted during construction, operation and decommissioning of the power station, mining, transport of fuel and disposal of waste). For a review of life cycle analyses see Chapter 4 of the decisions by the Secretary of State for Energy and Climate Change on the Regulatory Justification of the AP1000 and EPR nuclear power station designs.

- "*coastal erosion and increased likelihood of storm surge and rising sea levels";* This issue will be addressed in **Chapter 15**, Marine and Coastal Physical Processes;
- *effects of higher temperatures*. This issue will be addressed within the design process if necessary*; and*
- *increased risk of drought, which could lead to a lack of available process water*" (Paragraph 2.10.2). This issue will be addressed in **Chapter 13**, Groundwater, if necessary.

- Copeland Borough Council Local Plan (Reference 8: Copeland Borough Council);
  - The Local Plan describes climate change as "*The most important environmental issue shaping our future*" (paragraph 3.3.2) and that the planning policies of the Local Plan can have influence over this in terms of where development is located and how efficiently it uses energy and land.
  - Policy ST1 describes the key principles which will underpin all other planning policies in the Borough. These key principles include: encouraging development that minimises carbon emissions, maximises energy efficiency and helps us to adapt to the effects of climate change; and focusing development on sites that are at least risk from flooding or ensuring that the risk is minimised or mitigated through appropriate design if development has to take place in these areas.
- Allerdale Borough Council Local Plan (Reference 9: Allerdale Borough Council) includes the following strategic objectives:
  - Reduce Allerdale's carbon footprint and support a low carbon future.
  - Promote renewable and low carbon energy production in the Plan Area.
  - Strategic policy - Energy Coast Innovation Zone: A key objective of the Local Plan is to facilitate Allerdale's economic strategy to ensure that we successfully grow and diversify the Borough's economy. 'Britain's Energy Coast; a Masterplan for West Cumbria' was published in 2007. It aims to provide a focused strategy for both public and private sector to build on the area's existing expertise in the nuclear industry and deliver the national priorities of tackling climate change and securing the nation's energy supply, while also transforming and diversifying the West Cumbria economy.

Guidance

- Adapting to Climate Change: A Guide for Local Councils (Reference 10: Defra);
- Climate Resilient Infrastructure: Preparing for a Changing Climate (Reference 11: Defra);

- Adapting to Climate Change in the Infrastructure Sectors (Reference 12: PWC);
- in addition, the recently published Institute of Environmental Management and Assessment (IEMA) Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (Reference 13: IEMA) has been taken into consideration;
- Office for Nuclear Regulation and Environment Agency Joint Advice note on Principles for Flood and Coastal Erosion Risk Management (Reference 14: EA and ONR); and
- Adapting to climate change: Advice for flood and coastal erosion risk management authorities (Reference 15: EA).

20.3.2 In relation to the carbon footprint assessment which will be completed once more detailed design information is available, guidance that will considered includes the following:

- Carbon Calculator for Construction Projects Tool, Environment Agency (Reference 16: EA); and
- Embodied Carbon, The Inventory of Carbon and Energy (ICE) (Reference 17: Hammond, Reference 18: Hammond).

20.4 Data gathering methodology

Study Area

20.4.1 The Study Area for the purpose of climate will be a broad geographic area (West Cumbria) encompassing all the Moorside Project Sites. In practice, the impacts of climate change relevant to the Moorside Project (such as changes in temperature and precipitation), will not vary significantly within the spatial scope of the project elements.

20.4.2 Where climate projection data from the UK Climate Projections2 (UKCP09) are used, the appropriate 25 km grid square within the projections will be identified and used. **Figure 20.1** illustrates the most appropriate grid square selection for land-based climate projections. Defra announced in February 2016 that the current UK Climate Projections are being updated by the Met Office, and that new projections would be issued in 2018 (Project UKCP18[3]). It is not anticipated that any significant new projections data will be released before 2018 which is after the Moorside Project DCO Application is due to be submitted. However, if any new guidance is issued in the interim by UK government agencies this will be incorporated into the analysis for the DCO submission.

[2] http://ukclimateprojections.metoffice.gov.uk/

[3] http://ukclimateprojections.metoffice.gov.uk/24125

Desk study

20.4.3 The key approach to assessing future risks from climate change involves first identifying potential impacts, e.g. an increase in the frequency or severity of surface flooding arising from increased precipitation in the future, then using both historic met data and UKCP09 climate projections data to assess the impact of climate change on identified receptors.

20.4.4 Historic data available for the Moorside Project area includes 30 years of recorded met station data from the St Bees Head weather station, together with data from the Sellafield met mast (located closer to the Moorside Site, this source provides data from 2008 onwards).

20.4.5 In addition, historic data on water levels from the National Tide and Sea Level Facility (NTSLF) UK National Tide Gauge Network have been reviewed to inform the baseline.

20.4.6 The approach to be taken for climate change in relation to flooding will be in accordance with the Office for Nuclear Regulation and Environment Agency Joint Advice Note on Principles for Flood and Coastal Erosion Risk Management (Reference 14: ONR and EA), which sets out the principles for Flood Risk Assessment and Flood and coastal Risk Management. The Joint Advice Note states that the effects of climate change should be assessed over the lifetime of the site (assumed to be 160 years, to the end of decommissioning), using the most up to date credible UK climate change projections. The following guidance is provided:

- site designs should be capable of accommodating the future 1 in 10,000 p.a. flood event based on the 84th percentile estimate from the UKCP09 medium emissions scenario (a 'reasonably foreseeable' scenario); and
- a wider range of scenarios, up to a credible maximum scenario[4] (such as the UK Climate Projections H++ scenario) should also be considered to assess 'cliff-edge' effects, and to assess the potential need for adaptation options.

20.4.7 In addition, consideration has been given to the IEMA guidance (Reference 13: IEMA) in relation to considering climate change resilience and adaptation within the EIA process, in line with the 2014 European Union Directive on EIA (Reference 19: European Commission). The EU Directive will not be implemented in UK regulations until May 2017; however IEMA has provided advanced guidance on the impacts this will have on the consideration given to climate change adaptation and resilience within EIA. The IEMA guidance (Reference 13: IEMA) recommends that every EIA team includes a 'climate change co-ordinator', a practitioner who is knowledge about future climate change scenarios, and is experienced in the use and interpretation of future projections. The IEMA guidance also advises on the use of UKCP09 climate projections as future projections for the UK. Our approach to climate change

[4] The credible maximum scenario is a peer-reviewed, high end, plausible scenario. The H++

within this PEIR includes both elements, having identified a climate change practitioner with experience in the use of UKCP09 climate projections.

20.5 Consultation

20.5.1 Issues relating to climate change have been discussed with relevant stakeholders in the context of specific studies (such as Flood Risk Assessment) which include requirements to consider climate change. Further engagement on climate issues will take place as the relevant studies progress and the Moorside Project design evolves.

20.5.2 Climate was addressed within the Scoping Report, and feedback from the Planning Inspectorate received and addressed. Accordingly the ES will provide full justification for the choice of climate change scenarios (as described in **Section 20.4** above, these will be in line with the EA and ONR guidance note (Reference 14: ONR and EA)), and the ES will address issues in relation to the effects of higher temperatures and increased drought as appropriate.

20.6 Scope of the assessment

20.6.1 **Climate adaptation**: the assessment will assess potential impacts arising from accepted projections of climate change. **Section 20.8** below provides an initial assessment of the climate based on historic data.

20.6.2 **Climate mitigation**: as set out in the introduction, climate mitigation will include the development of a carbon footprint assessment for the Moorside Project, with the aim of identifying measures to reduce GHG emissions where appropriate. The carbon footprint assessment scope will include the Moorside Power Station and support buildings including offices, warehouses and worker welfare facilities; and will cover both construction and operation of the Moorside Project.

20.6.3 For all non-safety critical buildings (support buildings such as offices, warehouses, and welfare for workers) NuGen will aim to achieve BREEAM Very Good standard or better. In addition, built development at the Accommodation Sites or Additional Sites (such as the worker accommodation and related welfare and recreation facilities) will target the CEEQUAL and BREEAM Very Good standard. Some of these facilities will be used for the Moorside Project for a limited time period (likely to be 7 - 8 years), such during the construction period of the MPS. After this time, various of these structures will be removed.

20.6.4 The transport strategy emphasises how use of transport by rail and sea will be made in order to minimise use of road transport. Some of the transport strategy objectives outlined include:

- ‘minimise the amount of road traffic associated with the development of the Moorside Project as far as reasonably practicable’; and

- ‘maximise the safe, efficient and sustainable movement of people and materials as far as reasonably practicable’.

20.6.5 During the construction phase, the strategy for transporting workers to the Moorside Site includes the use of a NuGen charter train to transport workers living locally and workers staying at the Corkickle Site and Mirehouse Site to the Moorside Site. These measures will contribute to reducing the GHG emissions impact of the transport element of the Moorside Project. Key elements of the construction workforce strategy include:

- restricted parking at the Moorside Site, to discourage construction workers from using private vehicles to arrive;
- restricted parking within the Accommodation Sites;
- a dedicated Moorside Project charter train from the Corkickle Site and Mirehouse Site directly in to the Moorside Site; and
- dedicated coaches to transport workers from the Egremont Site (including workers residing locally) to the Moorside Site; Non-home based workers travelling to/from the Accommodation Sites (at the beginning/end of weekly shift) will be taken to/from Penrith or Carlisle train station by train or coach shuttles.

20.6.6 Climate mitigation will also be taken into consideration in decisions relating to the options for meeting on-site power demand during the construction phase of the MPS.

Spatial and temporal scope

20.6.7 **Temporal scope**: the ONR and EA guidance (Reference 14: ONR and EA) defines the full lifetime of a nuclear power station as the operational lifespan together with the time taken for decommissioning, generally assumed to be 160 years. UKCP09 projections are only available to 2100 (the ‘2080s’ time period which covers 2070-2099). It has been suggested by NuGen that the operational lifespan of Moorside will be circa 60 years, possibly increasing to circa 80 years. In this case, available estimates of climate projections from UKCP09 will cover the lifespan up to the end of the operational period. For timelines beyond 2100 (if necessary), the available UKCP09 projections will be considered. In the case of temperature, it may be appropriate to extrapolate from the available projections for a later time period (beyond 2100). For precipitation this is not possible due to the non-linear changes in precipitation projected by UKCP09 (this is based on Amec Foster Wheeler’s prior experience in using UKCP09 projections), therefore the projections for 2100 are being used.

20.6.8 **Spatial scope**: The spatial scope includes the broad geographic area including all the Moorside Project Sites, including the coastline and immediately adjacent sea areas where relevant (e.g. when considering the issue of sea level rise).

20.7 Environmental measures incorporated into the proposed development

Table 20.1 Rationale for incorporation of environmental mitigation

Potential impact arising from the development	Predicted changes and potential effects	Incorporated measure
Contribution to global carbon emissions through construction phase of the development	Impact on climate change globally	Identify and apply lower carbon measures where appropriate, e.g.: Use of alternative transport modes where possible (for personnel, plant, equipment and materials transfer), Seeking achievement of BREEAM Very Good (or better) standards where appropriate (in non-safety critical buildings for the Moorside Power Station and other buildings to be constructed on the Accommodation Sites and Additional Sites). Consideration of on-site power generation options for the Moorside Site during the construction phase of the MPS.

Table 20.2 Rationale for incorporation of environmental measures – climate adaptation

Potential climate impact	Impact on development	Incorporated measure
Change in precipitation patterns leading to increased heavy precipitation events	Increased risk of flooding	Take into account future rainfall projections during development design and incorporate into flood measures accordingly. A Flood Risk Assessment (FRA) is being carried out for the Project which will consider both terrestrial and marine flooding elements. Findings from the pluvial flooding assessment are reported in **Chapter 14,** Surface Water.
Increase in sea level	Increased risk of flooding	Take into account projections of sea level rise during development design and incorporate into flood prevention measures accordingly.

Potential climate impact	Impact on development	Incorporated measure
		A Flood Risk Assessment (FRA) is being carried out for the Project which will consider both terrestrial and marine flooding elements. Findings from the coastal flooding assessment are reported within **Chapter 15**, Marine and Coastal Physical Processes.

20.8 Preliminary assessment of effects

Baseline conditions

20.8.1 The current climate baseline for the UK is characterised as temperate and maritime baselines. Air temperature is principally a function of altitude, with higher ground and mountainous areas experiencing lower temperatures than more sheltered valleys and lower ground. In coastal areas such as West Cumbria, seasonal variation in temperature is driven largely by variations in sea temperature, with February being typically the coldest month and July or August the warmest. Additionally, coastal areas generally experience a more limited seasonal temperature range than more inland locations. Rainfall is also primarily a function of altitude, with higher ground receiving more rainfall than lowland areas. The wettest areas in the UK are the more mountainous areas of Scotland, North Wales and North-West England.

20.8.2 For defining the Moorside Project climate baseline, use has been made of historic weather station records for the St Bees Head station (which is located on the Cumbria coast approximately 12 km to the north of the Moorside Site), for the past 30 years (**Table 20.3** below). The warmest months are July and August, with average maximum temperatures of 17.6ºC and 17.5ºC reported respectively, and the coldest months are January and February (with maximum reported temperature averages of 6.1ºC and 6.2ºC, and minimum temperature averages of 2.2ºC and 2ºC respectively) . The wettest month of the year is October, with 136 mm rainfall recorded on average, and the driest months are April and May (61 mm and 62 mm of precipitation respectively).

Table 20.3 St. Bees Head station climate averages (1981-2010)

Month	Maximum temp. (˚C)	Minimum temp. (˚C)	Days of air frost (days)	Rainfall (mm)	Days of rainfall > or = 1 mm (days)	Monthly mean wind speed at 10 m (knots)
Jan	6.1	2.2	6.6	97	15.8	15
Feb	6.2	2	7.1	68.9	12.4	13.9

Month	Maximum temp. (°C)	Minimum temp. (°C)	Days of air frost (days)	Rainfall (mm)	Days of rainfall > or = 1 mm (days)	Monthly mean wind speed at 10 m (knots)
Mar	7.9	3.2	3.2	90.5	13.8	13.3
Apr	10.2	4.7	0.9	61.1	11.6	11.1
May	13.6	7.3	0	62.2	10.7	10.3
Jun	15.8	10	0	67	11	10.3
Jul	17.6	12.1	0	77.5	11.6	10.2
Aug	17.5	12.2	0	91.9	12.9	10.8
Sep	15.7	10.5	0	95.2	12.7	12.2
Oct	12.5	7.9	0.3	136.1	15.6	13.7
Nov	9.1	5.1	1.7	113	15.9	14.2
Dec	6.8	2.8	6.2	103.3	15.3	13.3
Annual	11.6	6.7	26.1	1063.7	159.3	12.4

20.8.3 Additional sources of met data are available and will be used by other chapters within the PEIR (e.g. the **Chapter 6**, Air Quality will use NWP data from the Met Office and data from the meteorological mast at Sellafield (from Sellafield Limited), converted into a suitable format by the Met Office). For the Climate effects assessment, the St Bees Head historic data is considered to be the most suitable historic met data set, as it provides a suitably long-term baseline for assessment of climate impacts.

20.8.4 For sea level, data from the National Tide and Sea Level Facility (NTSLF) UK National Tide Gauge Network[5] provides a useful baseline. The nearest tide gauge is located at Workington, north of the Moorside Site. **Table 20.44** below presents a summary of the Workington sea level tidal gauge data for 2015. Data from the Workington tide gauge is available from 1992 onwards, therefore a more extended baseline can be used if it is considered appropriate.

Table 20.4 Workington sea level data (2015) (all values are Admiralty Chart Datum)

Month	Monthly mean value (metres)	Minimum observed value (metres)	Maximum observed value (metres)	Minimum surge value (metres)	Maximum surge value (metres)
Jan	4.627	0.21	9.203	-0.698	1.493

[5] Accessible through https://www.bodc.ac.uk/data/online_delivery/ntslf/processed/

Month	Monthly mean value (metres)	Minimum observed value (metres)	Maximum observed value (metres)	Minimum surge value (metres)	Maximum surge value (metres)
Feb	4.408	0.166	9.364	-0.632	0.878
Mar	4.429	0.034	9.081	-0.573	1.066
Apr	4.389	0.124	8.735	-0.399	0.502
May	4.503	0.673	8.685	-0.313	0.638
Jun	4.443	0.907	8.697	-0.522	1.102
Jul	4.538	0.691	8.596	-0.203	0.443
Aug	4.571	0.306	9.122	-0.207	0.588
Sep	4.484	-0.037	9.068	-0.426	0.29
Oct	4.553	0.233	9.309	-0.41	0.477
Nov	4.728	0.513	9.039	-0.989	0.93
Dec	4.903	1.167	8.885	-0.541	1.231
Annual minimum and maximum		-0.037	9.364	-0.989	1.493

*Extreme surges are the maximum and minimum tidal residuals calculated during the month (the residual is the measured height minus the predicted height). The predicted values are derived from a database of tidal constants maintained by the National Oceanography Centre Application Group. All values are relative to Admiralty Chart Datum (ACD).

Predicted effects and their significance

20.8.5 With regards to climate change adaptation, predicted effects and their significance are considered within the individual technical chapters as appropriate, principally the impacts of climate change on flood risk will be considered within **Chapter 14,** Surface Water and more widely within the Flood Risk Assessment, and impacts of sea-level rise and coastal erosion will be considered within **Chapter 15,** Marine and Coastal Physical Processes.

20.8.6 **Chapter 13,** Groundwater has not at present addressed the impact of climate change in relation to specific identified effects, however impacts of climate change will be taken into account at a later stage, and assessment methodologies will be scoped in detail once scheme design information and further baseline information is available .

20.8.7 **Chapter 14,** Surface Water describes which of the identified effects will be impacted by climate change and how mitigation measures will be formulated to address this issue where appropriate.

20.8.8 For the Moorside Site, climate change effects over the lifetime of the development will be taken into account specifically with regards to two of the

identified flood risk receptors and predicted effects as follows (see **Table 14.12,** Moorside Site: Summary of predicted residual effects for detail). These flood risk receptors are as follows:

- Property and infrastructure at risk of flooding from the River Ehen/Kirk Beck in the vicinity of the Moorside Site (e.g. properties and roads around Braystones and Beckermet): increased flood risk due to reduction in flood storage as a consequence of construction activities and infrastructure in the floodplain. Mitigation measures would take into account climate change effects over the lifetime of the development.
- Property and infrastructure in the vicinity of the Moorside Site: increased flood risk due to increase in surface runoff as a result of construction activities. Measures to restrict runoff to agreed rates will include allowance of the effects of climate change on extreme rainfall intensity over the lifetime of the development.

20.8.9 For the Egremont Site, two of the flood risk receptors identified have identified that climate change effects during the lifetime of the development will be taken into account. These two flood risk receptors are as follows (see **Table 14.13,** Egremont Site: Summary of predicted residual effects for further detail):

- Increased flood risk to people property and infrastructure downstream (Low Mill and Kersey Bridge). There will be no development within the Ehen floodplain at this site. Surface runoff from the proposed development at the Egremont Site could increase downstream flood risk but would be controlled to pre-development rates using SuDS, including allowance for the impacts of climate change on extreme rainfall intensity over the lifetime of the development.
- Increased flood risk to property and infrastructure within the Pow Beck flood plain (the Rugby ground, bowling club and Coach Road) due to reduction in floodplain storage and channel conveyance, and increased site runoff. Surface runoff from the proposed development would be controlled to pre-development rates using SuDS, including allowance for the impacts of climate change on extreme rainfall intensity over the lifetime of the development. The drainage system would be constructed prior to other aspects of the development and would be sized to meet the requirements of both construction and operation phases.

20.8.10 A separate Flood Risk Assessment (FRA) will also be prepared to support the final application for development consent.

20.8.11 **Chapter 15,** Marine and Coastal Physical Processes states that further details related to climate change will be presented within the ES, once the survey programme has been completed. The ES will also include information on surge water levels and anticipated changes to the marine physical environment as a consequence of climate change.

20.8.12 Regarding the predicted effect of the Moorside Project on climate change through its GHG emissions (mitigation), as stated in National Policy Statement

for Energy Development (NPS EN-1, section 3.5) (Reference 4: DECC), the Government position is that carbon emissions from a nuclear power station are likely to be within the range of 7-22g CO_2/kWh over the lifetime of the plant. This is similar to the lifecycle CO_2 emissions from wind power and much less than fossil fuelled plant. The NPS EN-1 also states that 'New nuclear power is identified as one of the three key elements in the move towards a decarbonised electricity sector (Section 4.8)'.

20.8.13 In addition, a carbon footprint assessment will be carried out for the construction phase of the Moorside Project, which will enable decisions to be made in order to reduce the carbon footprint of the construction elements where appropriate. Measures already identified include targeting BREAAM Very Good (or better) level for ancillary and support buildings including offices, warehouses and workers accommodation, and measures included in the transport plan to reduce the impact of associated transport during the construction phase.

20.9 References

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