20. Health and Safety

20.1. Introduction

20.1.1. The EIA Regulations state than an EIA must identify, describe and assess in an appropriate manner, the expected effects deriving from the vulnerability of the Proposed Development to risks, so far as relevant to the development, upon health and safety, including natural disasters and major accidents.

20.2. Vulnerability of the Development to Natural Disasters

20.2.1. The Proposed Development is not located within an area known for natural disasters such as floods, hurricanes, tornadoes, volcanic eruptions, earthquakes or tsunamis. At 200 m Above Ordnance Datum (AOD, approximately equivalent to sea level) and 30 km east of the Firth of Clyde, the Development is not at risk from tsunamis, and there are no volcanoes anywhere near the site.

20.2.2. As stated in Chapter 21: Climate Change and Carbon Balance of this EIA Report, none of the identified climate change trends listed will affect the Proposed Development with the exception of increased windstorms. Due to the exposed nature of windfarm sites, wind turbines are designed to withstand extreme weather conditions. Brake mechanisms installed on turbines allow them to be operated only under specific wind speeds and, should severe windstorms be experienced, then the turbines would be shut down. Although an unlikely event for Scotland, the brake mechanism could also apply to a hurricane scenario.

20.2.3. Other natural disasters that could affect the Proposed Development include forest fires and floods. Wildfires within forests form a small proportion of "outdoor fires" in Scotland[1] and are uncommon[2], and the risk of a forest fire affecting the Proposed Development is therefore low. The Forestry Management Plan contains details of how this would be managed within the surrounding forestry. In the rare event that one does occur, standard operating procedures for emergency operations at wind turbine sites would be followed. Flooding is the most probable natural disaster that could affect the Proposed Development and is assessed within the hydrological assessment, Chapter 13 of this EIA Report; therefore, natural disasters are not considered further within this chapter.

20.3. Potential for the Development to Cause Major Accidents

20.3.1. The risk of environmental accidents is covered, where relevant, in individual technical chapters. For example, the potential for environmental incidents, like flooding, or accidents, like spillages, are considered in Chapter 13: Hydrology and Hydrogeology whilst aviation safety issues are assessed within Chapter 16: Aviation of this EIA Report.

[1] The Scottish Government (2014). Fire and Rescue Statistics, Scotland. [online] Gov.scot. Available at: http://www.gov.scot/Resource/0046/00466202.pdf [Accessed 6 Jun. 2018].
[2] Davies, G. and Legg, C. (2016). Regional variation in fire weather controls the reported occurrence of Scottish wildfires. PeerJ, 4, p.e2649.

Construction Phase

20.3.2. Effects upon health and safety are managed through risk assessments, pursuant to legislation of the European Union such as Directive 2012/18/EU of the European Parliament[3] on the control of major-accident hazards. The Directive lays down rules for the prevention of major accidents which might result from certain industrial activities and the limitation of their consequences for human health and the environment. Directive 2012/18/EU requires the preparation of emergency plans and response measures which will be covered under equivalent documents relevant to the nature of the Proposed Development.

20.3.3. The Construction (Design and Management) Regulations 2015[4] (CDM Regulations) are intended to ensure that health and safety issues are properly considered during development to reduce the risk of harm. In accordance with the CDM Regulations, a Principal Designer and Principal Contractor would be appointed.

20.3.4. The Principal Designer would have responsibility for coordination of health and safety during the pre-construction phase. Guidance published by the Health and Safety Executive in January 2015, defines principal designers as '…designers appointed by the client in projects involving more than one contractor. They can be an organisation or an individual with sufficient knowledge, experience and ability to carry out the role.'

20.3.5. Principal contractors are defined in the 2015 CDM Regulations as 'contractors appointed by the client to coordinate the construction phase of a project where it involves more than one contractor …They … must possess the skills, knowledge, and experience, and (if an organisation) the organisational capability necessary to carry out their role effectively given the scale and complexity of the project and the nature of the health and safety risks involved.'

20.3.6. Throughout all phases of the Proposed Development, cognisance would be made of the following guidance documents produced by Renewable UK:

- Wind Turbine Safety Rules Third Edition[5];
- Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules Third Edition[6]; and
- Onshore Wind Health & Safety Guidelines[7].

[3] European Union (2012) Directive 2012/18/EU. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0018&from=en [Accessed 15/11/18]
[4] Scottish Government (2015) The Construction (Design and Management) Regulations 2015. Available at http://www.legislation.gov.uk/uksi/2015/51/contents/made [Accessed 15/11/18]
[5] Renewable UK (2015) Wind Turbine Safety Rules, Third Edition. Available at: https://c.ymcdn.com/sites/www.renewableuk.com/resource/resmgr/Docs/Health_&_Safety/WindTurbineSafetyRulesIssue3.pdf [Accessed 15/11/2018]
[6] Renewable UK (2015) Guidance on the Application of Wind Turbine Safety Rules, Third Edition. Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/docs/health_&_safety/wtsr_1506.pdf [Accessed 15/11/2018]
[7] Renewable UK (2015) Onshore Wind Health & Safety Guidelines. Available at: http://c.ymcdn.com/sites/www.renewableuk.com/resource/collection/AE19ECA8-5B2B-4AB5-96C7-ECF3F0462F75/OnshoreWind_HealthSafety_Guidelines.pdf [Accessed 15/11/2018]

20.3.7. Due to the remoteness and the type of Proposed Development, major accidents occurring as a result of construction are highly unlikely. An Outline Construction Environmental Management Plan (CEMP) is located in **Appendix 4.1** which implements best practice construction practices to minimise the risk of accidents, such as pollution events. In the unlikely event that such an event were to occur during construction, emergency response plans would be available and implemented to deal with any occurrences.

20.3.8. The risk of construction accidents as they relate to human health and safety would be covered in the CEMP and construction method statements, prepared as a condition of the Proposed Development. These would include identifying site specific risks and preparing assessments to minimise and manage the risk such as equipment safe handling, personal protection equipment, amongst others. As a result, construction accidents are not considered further within this chapter.

Operational Phase

20.3.9. Electrical infrastructure will be located across the Proposed Development in the form of a an electrical substation which will be subject to routine maintenance such that it is not considered to pose a significant risk of creating an accident Additionally, effects upon population and human health are unlikely due to the remoteness of the Proposed Development, the low population density, and adherence to required safety clearances around turbines.

20.3.10. A possible but rare source of danger to human or animal life from a wind turbine would be the loss of a piece of the blade or, in the most exceptional circumstances, of the whole blade. Many blades are composite structures with no bolts or other separate components. Even for blades with separate control surfaces on or comprising the tips of the blade, separation is highly unlikely. Wind turbines have an exemplary safety record with no recorded instances of fatalities to any member of the public anywhere in the world. The turbines are also designed to shut down automatically during high wind speed conditions, typically in excess of 60 mph.

20.3.11. There is a risk of ice accumulation on turbine blades, nacelles and towers under certain conditions such as periods of very cold weather with high humidity. In those instances where icing of blades occurs, fragments of ice might be released from blades, particularly when the machine is started. The wind turbines would be fitted with vibration sensors to detect any imbalance which might be caused by icing of the blades. This enables the operation of machines with iced blades to be inhibited.

20.3.12. The possibility of attracting lightning strikes applies to all tall structures, and wind turbines are no different. Appropriate lightning protection measures are incorporated in wind turbines to ensure that lightning is conducted harmlessly past the sensitive parts of the nacelle and down into the ground.

20.3.13. Online Renewables Planning Advice on Onshore Wind Turbines states: 'Although wind turbines erected in accordance with best engineering practice should be stable structures, it may be advisable to achieve a set-back from

roads and railways of at least the height of the turbine proposed, to assure safety.

20.3.14. The distance between the nearest proposed turbines and public roads is well in excess of tip height. In respect of footpaths, many wind farms in Scotland are open access and allow members of the public to walk close to the turbine towers.

20.4. Summary of Effects

20.4.1. Due to its location, the Proposed Development is not prone to natural disasters. Whilst adverse weather conditions, most notably high windstorms, ice producing conditions and lightning strikes, do occur within Scotland, wind turbines are designed to withstand extreme weather conditions. Brake mechanisms, vibration sensors and lightning protection measures are installed on turbines allowing them to be operated under optimal conditions and inhibited during extreme weather events.

20.4.2. The risk of construction accidents as they relate to human health and safety are detailed and managed through the CDM Regulations and in the CEMP through construction method statements, which will be prepared as a condition of the Proposed Development.

20.4.3. Therefore, the overall risk of health and safety including major accidents and disasters is considered negligible and not significant in terms of the EIA Regulations.