KEADBY
NEXT GENERATION
POWER STATION
Hydrogen-enabled flexible power

A collaboration between SSE Thermal and Equinor

The Keadby Next Generation Power Station Project

Document Ref: 6.3

Planning Inspectorate Ref: EN0110001

The Keadby Next Generation Power Station Development Consent Order [year]

Environmental Statement (ES)

Volume II – Appendix 19A Longlist of Major Accidents and Disasters Risk Events

The Planning Act 2008

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

Applicant: Keadby Next Generation Limited

Date: August 2025

Version: V0

ARUP DWD AECOM

Document History

Document Ref	6.3.27 / Appendix 19A
Issue	V0
Document Owner	AECOM

Glossary of Abbreviations and Definitions of Frequently Used Terms

Abbreviation/	Description
AEP	Annual Exceedance Probability
CEMP	Construction Environmental Management Plan
COMAH	Control of Major Accident Hazards
CO_2	Carbon Dioxide
H_2	Hydrogen
HSC	Hazardous Substances Consent
HV	High Voltage
MA&D	Major Accidents and Disasters
SCR	Selective Catalytic Reduction
UK	United Kingdom
UXO	Unexploded Ordnance

Contents

Tables

19A. LONG LIST OF MAJOR ACCIDENTS AND DISASTERS RISK EVENTS

19A.1. Introduction

19A.1.1. Taking into consideration baseline conditions, the identified construction, operational (including commissioning) and decommissioning activities, which will be carried out as part of the Proposed Development, and the hazardous substances likely to be present, a long list of potential MA&D Risk Events has been prepared and is presented in **Table 19A.1**.

Table 19A.1: Long List of MA&D Risk Events

Risk event	Considered Further?	Commentary
Construction Hazards		
Ground instability	Y	Construction activity has the potential to cause instability and vibration resulting in ground instability / collapse/ settlement which has the potential to cause harm to workers.
Structural collapse/ accidental impact	Y	Construction hazards can include events which have the potential for significant harm / injury to workers. These hazards include the collapse of new and existing buildings, structures and excavations.

Risk event	Considered Further?	Commentary
Utility strike / unexploded ordnance (UXO) strike	Y	Construction hazards can include events which have the potential for significant harm injury to workers. These include contact with high voltage (HV) transmission cables (overhead and buried), contact with underground utility services including high pressure gas pipelines and UXO.
Domino Effects / Explosion	Y	Proposed Development is in the locality of two COMAH facilities, which need to consider Domino Effects. At this stage the Proposed Development is considered Lower Tier and should also consider Domino Effects.
Accidental Vehicle Impact	Y	Construction vehicle accidents can include events which have the potential for significant harm / injury to workers and / or result in a spill of construction materials.

Risk event	Considered Further?	Commentary
Aircraft/drone impact	Y	The Proposed Development is located within a low fly zone. The impact of an aircraft / drone crash on the Proposed Development would be a major accident with the potential for significant injuries to people and damage to assets.
Damage to road / railways	N	A construction accident results in damage to existing railway and road lines. The final CEMP will be in place to control the potential environmental impacts of construction works and will be in accordance with the **Outline CEMP (Application Document Ref. 7.4)** provided with this Application.

Risk event	Considered Further?	Commentary
Release of diesel	N	An accidental release of diesel used as fuel would be retained on site due to the small quantities present. If the release contacts with a source of ignition, the resulting fire would be relatively minor and have a low potential for serious harm.
Release of liquid concrete	N	An accidental release of liquid concrete would be contained for recovery or disposal and is unlikely to reach environmental receptors.
Vandalism	Y	A malicious destructive act onsite whereby material loss of containment could occur, resulting in ire / explosion / pollution. Harm to onsite personnel and / or members of the public off site from fire / explosion / loss of containment. Damage to environmental receptors from loss of containment.
Operational Process Hazards		

Risk event	Considered Further?	Commentary
Fire	Y	The accidental release of flammable substances could result in a fire if immediately ignited, i.e. natural gas or hydrogen. This could result in significant harm to people onsite, and potentially offsite, and destroy property and assets.
Explosion	Y	The accidental release of flammable substances could result in an explosion if the gas accumulates prior to ignition, i.e. natural gas or hydrogen. This could result in significant harm to people onsite, and potentially offsite, and destroy property and assets.
Toxic gas release	N	The toxic gas present at the Proposed Development is limited to small quantities of ammonia (in vapours above ammonia solution) and will not cause a MA&D owing to the small quantities of materials present.

Risk event	Considered Further?	Commentary
Asphyxiant gas release	N	At high concentrations, CO_2 can cause harm to people via asphyxiation. Hydrogen (H_2) is also an asphyxiant in high concentrations. There is no onsite storage of CO_2 or H_2 and the onsite inventory in pipes and equipment is relatively small gas quantities, at levels that are unlikely to have impacts at offsite receptors.
Environmentally harmful liquid release	N	An accidental release of aqueous ammonia or diesel which reached environmental receptors could result in harm. However, the quantity present on site will be relatively minor and the impact would not reach the criteria for a MA&D.

Risk event	Considered Further?	Commentary
Environmentally harmful solid release	N	An accidental release of catalyst material could result in harm to the environmental or to people. As solid materials the source-receptor pathway for these materials is limited and would likely only occur as a corollary to another MA&D event involving catastrophic failure due to the multiple levels of containment of these substances.
Domino event - Industrial	Y	A major incident at the Proposed Development Site could have an impact on neighbouring facilities, including Keadby Windfarm and PD Port Services Keadby. PD Port Services Keadby is a site with a HSC for ammonium-nitrate fertiliser, and in the context of domino effects could present an explosive risk.
Nuclear accident	N	There are no nearby nuclear power stations within 5km of the Proposed Development.

Risk event	Considered Further?	Commentary
Operational Transportation Hazards		
Road traffic accident (dangerous goods)	N	A small number of hazardous substances will be transported to the Site via the road network, e.g. water treatment chemicals, diesel back up fuel and ammonia solution for the SCR unit. Collisions/accidents involving road tankers delivering materials to the Site could result in a loss of containment of these substances which include diesel and aqueous ammonia. An assessment of likely significant effects arising from the transportation of hazardous loads will be carried out in the ES as described in **ES Volume I Chapter 10:** Traffic and Transport (**Application Document Ref. 6.2**). However, at this juncture, in the context of a MA&D, it is unlikely that the transport of the hazardous substances would cause a MA&D as the delivery is very

Risk event	Considered Further?	Commentary
		infrequent and the volumes are low.
Other Industrial Hazards		
Loss of Containment on Initial Commissioning (Wet Testing)	Y	On first use of equipment, loss of containment possible if equipment fails / has open route (i.e. untested open valve or poorly seating valves – not cleaned correctly). Harm to onsite personnel and environment from loss of containment. Damage to environmental receptors from loss of containment.
Loss of Containment from Failure of Testing Critical Control Systems	Y	On first use of equipment, loss of containment possible if failings in testing of critical control systems. Harm to onsite personnel and environment from loss of containment. Damage to environmental receptors from loss of containment.

Risk event	Considered Further?	Commentary
Electrical power supply failure	N	During operation, electrical failure or power loss can be caused by supply issues or disruption to infrastructure. In the event of a power supply failure, the site backup systems will be designed to enable the sequential safe shutdown of operations and not likely to cause a MA&D by design.

Risk event	Considered Further?	Commentary
System / utilities failures	N	Disruption to water supplies and effluent disposal may have an impact on process operations, however, these are unlikely to cause harm to the environment as this will be considered within the design of the facility and the appropriate safety systems installed. The engineering design of the Proposed Development will also take into consideration the potential for the Proposed Development to have an impact on other utility users within the area. The appropriate protective systems such as electrical switching and breaking equipment will be installed.
Meteorological Hazards		

Risk event	Considered Further?	Commentary
High windspeed	N	There is a low probability of a hurricane force wind event occurring at the Proposed Development. However, major storms and gales could result in damage due to infrastructure. Storms are considered during the engineering design of buildings and process structures and the appropriate engineering standards employed. Meteorological hazards are unlikely to result in a MA&D.

Risk event	Considered Further?	Commentary
Low temperatures and heavy snow	N	The climate in the North of England is typically mild. In the event of extreme, prolonged low temperatures and snowfall, there is the potential for snow loading on buildings and freezing liquids in pipework. Operations are unlikely to be interrupted, however, as these potential issues will be considered within the engineering design and appropriate insulation used. Meteorological hazards are unlikely to result in a MA&D.

Risk event	Considered Further?	Commentary
High temperatures/ heatwave	N	In the event of a prolonged period of hot weather there is the potential for an impact to temperature sensitive equipment such as process cooling systems and electrical switchgear. The impact of climate change will increase the potential for high temperatures. This could cause an operational upset but is unlikely to cause harm to people or the environment. These issues will be incorporated within the engineering design, e.g. material selection, equipment design and selection etc. Meteorological hazards are unlikely to result in a MA&D.

Risk event	Considered Further?	Commentary
Drought	N	The Proposed Development is not expected to be vulnerable to drought conditions, as there is a low risk of interruptions to the supplies of water in this location which is near the River Trent. Meteorological hazards are unlikely to result in a MA&D.

Risk event	Considered Further?	Commentary
Electrical storms	N	Lightning could result in damage to the Proposed Development as a result of a direct strike to buildings or structures. There is also the potential for lightning to act as a source of ignition if damage occurred during the storm causing a loss of containment of flammable gases. Design engineering standards including British Standards will be incorporated by the Project for the provision of lightning protection systems on buildings and structures are well established. Meteorological hazards are unlikely to result in a MA&D.
Geophysical Hazards		

Risk event	Considered Further?	Commentary
Earthquake	N	There is a low record of seismic activity observed in the location of the Proposed Development and severe damage as a result of an earthquake is unlikely. Protective measures for expected stresses and loadings will be incorporated within the civil and structural engineering design of the Proposed Development.
Ground stability	N	Groundworks carried out prior to construction will provide a stable site at the Site and within pipeline connection corridors prior to construction. Civil and structural engineering design will be carried out in accordance with industry standards.
Hydrological Hazards		
Coastal flood	N	The Proposed Development will be located inland, away from areas at risk of coastal flooding, and therefore this risk has been screened out,

Risk event	Considered Further?	Commentary
		although the potential effects of tidal surges remains in-scope.
Fluvial flood	Y	The Proposed Development is at a 'low' risk of flooding from tidal and fluvial sources with the existing flood defences in place or resulting from overtopping of the defences during events that exceed a 0.5% AEP (1 in 200 chance) of flooding. Overall, the risk of flooding from artificial waterbodies, including the Stainforth and Keadby Canal, is considered to be 'low'. This risk is assessed within **ES Volume I Appendix 12A:** Flood Risk Assessment (**Application Document Ref. 6.3**) and is considered a credible MA&D scenario.

Risk event	Considered Further?	Commentary
Tidal flood	Y	The Proposed Development is at a 'low' risk of flooding from tidal sources with the existing flood defences in place or resulting from overtopping of the defences during events that exceed a 0.5% AEP (1 in 200 chance) of flooding. Overall, the risk of flooding from artificial waterbodies, including the Stainforth and Keadby Canal, is considered to be 'low'. This risk is assessed within **ES Volume II Appendix 12A**: Flood Risk Assessment (**Application Document Ref. 6.3**) **)** This risk is considered a credible MA&D scenario.

Risk event	Considered Further?	Commentary
Pluvial flood	N	The Proposed Development is at 'low' to 'very low' risk from pluvial flooding. The Proposed Development drainage system will be designed to collect all water generated by precipitation up to a 1 in 200-year storm event. This risk is assessed within **ES Volume II Appendix 12A:** Flood Risk Assessment (**Application Document Ref. 6.3).** This hazard is unlikely to result in a MA&D scenario.
Groundwater flood	N	This risk is assessed within **ES Volume II Appendix 12A:** Flood Risk Assessment (**Application Document Ref. 6.3**). The Proposed Development is considered to be at low risk of flooding from groundwater sources and is unlikely to result in a MA&D scenario.
Other Natural Hazards		
Poor air quality	N	Pollution episodes are known to occur in the

Risk event	Considered Further?	Commentary
		UK, but the Proposed Development is not expected to be particularly vulnerable to this hazard. The Proposed Development will not contribute significantly to road transport pollution in the area. Air intakes for combustion equipment will be fitted with the appropriate filtration systems to prevent damage from poor air quality. Emissions from combustion equipment will be controlled and regulated in accordance with an Environmental Permit. No MA&D scenarios have been identified. Air quality impacts are fully assessed in **ES Volume I Chapter 8:** Air Quality (**Application Document Ref. 6.2**).

Risk event	Considered Further?	Commentary
Wildfires	N	Severe wildfires are infrequent in the UK and the Proposed Development is not located in an environment particularly vulnerable to wildfire, being primarily urban/industrial.
Climate Change	N	The impact of climate change causing extremes of weather, i.e. temperature and winds, may affect elements of the Proposed Development, such as the cooling systems and structural stability. The impact of climate change is considered within the design life of the assets. It is a requirement to consider climate change as part of the Environmental Permit application and also under the COMAH regime.
Societal Hazards		

Risk event	Considered Further?	Commentary
Aircraft/drone impact	Y	The Proposed Development is located within a low fly zone. The impact of an aircraft / drone crash on the Proposed Development would be a major accident with the potential for significant injuries to people and damage to assets.

Risk event	Considered Further?	Commentary
Malicious attacks	N	Malicious attack could include intentional violence to people, arson or other methods of destruction of property, cyber-attacks, or chemical, biological, or nuclear attacks by terrorists or other actors. These events have been known to occur at infrastructure sites in the UK. Software security will be incorporated within the process control systems and physical security measures such as fencing will be installed. As a supplier of energy, the Proposed Development will include appropriate measures as a matter of National Security.

Risk event	Considered Further?	Commentary
Vandalism	Y	A malicious destructive act onsite whereby material loss of containment could occur, resulting in ire / explosion / pollution. Harm to onsite personnel and / or members of the public off site from fire / explosion / loss of containment. Damage to environmental receptors from loss of containment.
Pandemic	N	Risk of pandemic occurring which may cause civil emergency and large numbers of people to fall ill, including construction workers. Risk of loss of control of construction site. Not considered an initiating event for a MA&D.
Decommissioning Hazards		

Risk event	Considered Further?	Commentary
Fire/explosion	Y	A failure to de-inventory process systems which leads to the accidental release of flammable substances could result in a fire and/or explosion. This could cause significant harm to people on site. This Risk Event has occurred historically and although incidences are rare, this is considered a credible MA&D scenario.
Environmentally harmful solid release	N	A failure to de-inventory process systems correctly which leads to human exposure to toxic catalyst material. The only catalyst onsite is the SCR catalyst, which will be of relatively small volume. The toxicity is to be confirmed however, this is not considered a credible MA&D scenario due to the envisaged small inventory of material.