



# H2Teesside Project

## Preliminary Environmental Information Report

Volume III – Appendices

Appendix 20A: LONG LIST OF MAJOR ACCIDENTS & DISASTERS RISK EVENTS

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)





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## 20A.0 LONG LIST OF MAJOR ACCIDENTS & DISASTERS (MA&D) RISK EVENTS

### 20A.1 Introduction

20A.1.1 Taking into consideration baseline conditions, the identified construction, operational (including maintenance) 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 20A-1. This table was initially developed at the Environmental Impact Assessment (EIA) Scoping stage. It has been reviewed and updated as applicable for this Preliminary Environmental Information (PEI) Report. It now includes commentary why the Risk Event should or should not be considered further within the preliminary assessment.

Table 20A-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, up to and including fatal injuries to workers.  These hazards include the collapse of new and existing buildings, structures and excavations.  There are also hazards associated with construction traffic movements on site.
Utility strike/ unexploded ordnance (UXO) strike	Y	Construction hazards can include events which have the potential for significant harm, including fatal injuries 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.



RISK EVENT	CONSIDERED FURTHER?	COMMENTARY
Release of existing ground contamination	Y	Preparatory work during construction could encounter significant quantities of contaminated ground due to the historic industrial use of the site. If this material is accidentally released to the environment, there is the potential for harm due to the proximity of the Proposed Development Site to protected sites.
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.
Operational Process Hazards		
Fire	Y	The accidental release of flammable substances could result in a fire if immediately ignited. This could result in significant harm to people onsite and potentially offsite. The presence of O <sub>2</sub> on site increases the risk of an on-site fire event and has the potential to intensify a fire event.
Explosion	Y	The accidental release of flammable substances could result in an explosion if the gas accumulates prior to ignition. This could result in significant harm to people onsite and potentially offsite. The presence of O <sub>2</sub> on site increases the risk of an on-site explosion event and has the potential to intensify an explosion event.



RISK EVENT	CONSIDERED FURTHER?	COMMENTARY
Toxic gas release	Y	<p>Depending on concentration, the gases present at the Proposed Development (including syngas and Carbon dioxide (CO<sub>2</sub>)) have the potential for toxic effects to people.</p> <p>Syngas containing Carbon Monoxide (CO) is classified as a toxic gas.</p> <p>A major accidental release of syngas could result in significant harm to people onsite however it is unlikely that this event could have an impact at offsite receptors due to rapid dispersion.</p>
Asphyxiant gas release	Y	<p>At high concentrations, CO<sub>2</sub> can cause harm to people via asphyxiation.</p> <p>A major accidental release of CO<sub>2</sub> could result in significant harm to people on site, however, it is unlikely that this could have an impact at offsite receptors.</p>
Environmentally harmful liquid release	N	<p>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&amp;D.</p>
Environmentally harmful solid release	N	<p>An accidental release of toxic catalyst material could result in harm to the environment 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&amp;D event involving catastrophic failure due to the multiple levels of containment of these substances.</p>
Domino event - Industrial	Y	<p>A major incident occurring at a site which is part of the Teesside cluster of major hazard sites could escalate and cause an impact at the Production Facility. Conversely, a major incident at the Proposed Development Site could have an impact on neighbouring facilities.</p>



RISK EVENT	CONSIDERED FURTHER?	COMMENTARY
Nuclear accident	N	<p>The Hartlepool Nuclear Power Station is located approximately 2 km away from the proposed development on the other side of the river Tees. This site has robust measures in place to prevent major accidents. The Proposed Development could fall within the nuclear fallout evacuation zone if a serious nuclear incident were to occur at the power station. This could potentially result in a halt of all operations at the Proposed Development; however, the design will include safety measures in the event of an extended shutdown. It is unlikely for any thermal radiation or explosion overpressure, generated by an event at the power station, to have a significant effect on the Proposed Development due to the distance. As such, this risk event is not considered further.</p>
<b>Operational Transportation Hazards</b>		
Road traffic accident (dangerous goods)	N	<p>The primary raw materials used at the Proposed Development are gaseous substances, delivered via pipeline. Ancillary materials and substances used in smaller quantities to support production will, however, be transported to the Main Site via the road network.</p> <p>Collisions/accidents involving road tankers delivering materials to the Main Site could result in a loss of containment of these substances which include diesel and aqueous ammonia. The quantity of these substances will typically be in order of a few tonnes and transport will be controlled via regulations for the carriage of dangerous goods.</p> <p>If a release occurred on the public highway, an emergency response plan as required by the regulations will limit the potential harm therefore unlikely to result in an accident with the potential for MA&amp;D criteria.</p>



RISK EVENT	CONSIDERED FURTHER?	COMMENTARY
		An assessment of likely significant effects arising from the transportation of hazardous loads will be carried out in the ES as described in Chapter 15: Traffic and Transport (PEI Report, Volume I).
Marine accident	N	The primary process materials for the Proposed Development will be transported to and from the Main Site via pipeline therefore marine transport is not applicable.
Other Industrial Hazards		
Electrical power supply failure	N	During operation, electrical failure or power loss can be caused by supply issues or disruption to infrastructure. Process equipment and instrumentation will be designed to fail to a safe condition and the project will install back-up power generation and uninterruptable power supplies (UPS). In an emergency event where all power supplies are lost, a flare will be provided for the safe disposal of gas.
System/utilities failures	N	Disruption to water supplies and effluent disposal may have an impact on process operations, however, 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.



RISK EVENT	CONSIDERED FURTHER?	COMMENTARY
Meteorological Hazards		
High windspeed	N	<p>There is a low probability of a hurricane force wind event occurring at the Production Facility. However, major storms and gales could result in damage due to infrastructure.</p> <p>Storms are considered during the engineering design of buildings and structures and the appropriate engineering standards employed.</p>
Low temperatures and heavy snow	N	<p>The climate in the North East 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.</p>
High temperatures/ heatwave	N	<p>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.</p> <p>The impact of climate change could increase potential for high temperatures. This could cause an operational upset but is unlikely to cause harm to people or the environment.</p> <p>These issues will be incorporated within the engineering design.</p>
Drought	N	<p>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 Tees and North Sea.</p>





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.
Geophysical Hazards		
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 Main Site and within pipeline connection corridors prior to construction. The Teesside area has a low risk of landslides, ground collapse, ground compression, or sinkholes associated with site geology. Civil and structural engineering design will be carried out in accordance with industry standards.
Hydrological Hazards		
Coastal flood	Y	The Main Site is located by the North Sea coast within Flood Zone 1 (defined as having a 'low risk' of flooding from fluvial or tidal sources). Sections of the Connection Corridors are located within Flood Zone 2 and Flood Zone 3. This risk is assessed within Appendix 9A: Flood Risk Assessment



RISK EVENT	CONSIDERED FURTHER?	COMMENTARY
		(PEI Report, Volume III) and is considered a credible MA&D scenario.
Fluvial flood	Y	The Main Site is located by the River Tees coast within Flood Zone 1 (defined as having a 'low risk' of flooding from fluvial or tidal sources). Sections of the Connection Corridors are located within Flood Zone 2 and Flood Zone 3. This risk is assessed within Appendix 9A: Flood Risk Assessment (PEI Report, Volume III) and is considered a credible MA&D scenario.
Pluvial flood	Y	The Main Site and the associated connection corridors are generally at very low risk (<0.1% AEP event) of flooding from surface water. There are isolated areas of high, medium and low flood risk. This risk is assessed within Appendix 9A: Flood Risk Assessment (PEI Report, Volume III) and is considered a credible MA&D scenario.
Groundwater flood	Y	The groundwater vulnerability map places the area of the site at Medium-High risk (75% or greater chance of groundwater emergence). This risk is assessed within Appendix 9A: Flood Risk Assessment (PEI Report, Volume III) and is considered a credible MA&D scenario.
Other Natural Hazards		
Poor air quality	N	<p>Pollution episodes are known to occur in the UK, but the Proposed Development is not expected to be particularly vulnerable to this hazard.</p> <p>The Proposed Development will not contribute significantly to road transport pollution in the area.</p> <p>Air intakes for combustion equipment will be fitted with the appropriate filtration systems to prevent damage from poor air quality.</p> <p>Emissions from combustion equipment will be controlled and regulated in accordance with an environmental permit.</p>



RISK EVENT	CONSIDERED FURTHER?	COMMENTARY
		No MA&D scenarios have been identified. An assessment of likely significant effects arising from the transportation of hazardous loads will be carried out in the ES as described in Chapter 8: Air Quality (PEI Report, Volume I).
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.
Societal Hazards		
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.
Decommissioning Hazards		
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.



RISK EVENT	CONSIDERED FURTHER?	COMMENTARY
Environmentally harmful solid release	Y	<p>A failure to de-inventory process systems which leads to human exposure to toxic catalyst material. This could cause significant harm to people on site.</p> <p>This Risk Event has occurred historically and although incidences are rare, this is considered a credible MA&amp;D scenario.</p>

20A.1.2 The following risk events during Proposed Development construction have been identified as requiring further assessment:

- ground instability;
- structural collapse/accidental impact;
- utility (pipeline or electrical cable) strike/UXO impact; and
- release of ground contamination.

20A.1.3 The following risk events during Proposed Development operation have been identified for further analysis.

- fire;
- explosion;
- toxic gas release;
- asphyxiant gas release;
- domino effect; and
- flooding.

20A.1.4 The following risk event during Proposed Development decommissioning have been identified as requiring further assessment:

- fire and/or explosion.