

Connah's Quay Low Carbon Power

Preliminary Environmental Information Report
Volume IV, Appendix 22-A: Long List of Major
Accidents and Disasters Risk Events

Uniper

The Planning Act 2008
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
PINS Reference: EN010166
September 2024

Prepared for:
Uniper UK Limited

Prepared by:
AECOM Limited

© 2024 AECOM Limited. All Rights Reserved.

This document has been prepared by AECOM Limited ("AECOM") for sole use of our client (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

Table of Contents

1. Long List of Major Accidents and Disasters Risk Events 1

Tables

Table 1: Long List of Major Accidents and Disasters Risk Events 1

1. Long List of Major Accidents and Disasters Risk Events

- 1.1.1 Taking into consideration baseline conditions, the identified construction, commissioning, 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 1**.

Table 1: Long List of Major Accidents and Disasters Risk Events

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
Construction Hazards			
Release of diesel	Diesel may be used and/or temporarily stored on site during construction as fuel for vehicles. A release which is ignited could cause harm to people via exposure to thermal radiation in a fire. A release which is unignited can cause harm to people if inhaled, ingested or exposed to skin. A release of diesel to the environment such as the Dee Estuary could result in harm to flora and fauna.	The quantities of Diesel to be stored on site are likely to be relatively minor (probably a few m ³) and would be stored in appropriately banded / self-contained areas. As such, an accidental release of diesel would be retained locally, and be readily cleaned up, due to these small quantities. If the release contacts with a source of ignition, the resulting fire would be relatively minor and localised, with a low potential for significant harm. Secondary containment measures will be adopted for temporary diesel storage. An appropriate firefighting strategy will be in place.	No
Release of liquid concrete	Liquid Concrete may be produced on the Site from cement powder, this is classified as an irritant to skin as contact can cause alkali burns. Cement powder can also harm the eyes and the respiratory system via inhalation of dust. If cement or wet concrete enters drains or watercourses, there is the potential for it to cause harm to the aquatic environment by increasing the pH of the water.	An accidental release of liquid concrete would be contained for recovery or disposal and is unlikely to reach the environmental receptors, i.e. the River Dee.	No
Release of Acetylene	Acetylene is used in welding activities, stored in compressed gas cylinders and is a flammable gas. A release of Acetylene gas can lead to fires/explosions if ignited. An unignited release can cause asphyxiation in an enclosed area.	The quantity of material stored on site will be relatively small and limited to that contained within single cylinders, dotted around the site, associated with welding units. As such, an accidental release from a single cylinder is unlikely to cause harm to human health or the environment. If a release is ignited the resulting fire would be relatively minor and localised, with a low potential for significant harm.	No
Release of Nitrogen	Nitrogen is used in welding activities, stored in compressed gas cylinders. A release of Nitrogen can cause asphyxiation in an enclosed area.	The quantity of material stored on site will be relatively minor and limited to that contained within single cylinders, dotted around the site, associated with	No

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
		welding units. As such, an accidental release is unlikely to cause harm to human health.	
Ground instability	Construction activity results in disturbance of manmade or naturally occurring ground related hazards. Vibration causes ground instability / collapse / settlement.	Construction activity has the potential to cause instability and vibration resulting in ground instability / collapse / settlement which has the potential to cause harm to onsite workers. Need to consider in more detail procedural controls and industry standards such as the Framework Construction Environmental Management Plan (CEMP).	Yes
Structural collapse/ accidental impact	Collapse of new and existing buildings, structures and excavations via accidental impact with vehicles or via other failure mechanisms.	Can cause injury / harm to onsite workers. Compliance with CDM requirements, including Construction Phase Plan. Need to consider in more detail procedural controls and industry standards such as the Framework CEMP.	Yes
Utility strike / unexploded ordnance (UXO) strike	Impact on high-pressure gas pipelines could cause flammable gas to be released which, if ignited, can lead to injury/harm to persons within the vicinity. Potential damage to the environment via fire water run-off. Impact with utilities, i.e. a HV transmission cable would cause immediate harm to workers.	Can cause harm / injury to onsite workers and potentially the environment. Undertake UXO survey prior to commencement of site-based activities. Need to consider in more detail procedural controls and industry standards such as the Framework CEMP.	Yes
Domino Effects through Loss of Containment / Fire / Explosion etc.	An event on the construction site impacts and escalates to a neighboring hazardous Control of Major Accident Hazards (COMAH) site. Alternatively, an event at a neighboring hazardous (COMAH) site impacts the Proposed Development.	Domino effects can cause harm / injury and is considered under the COMAH requirements of a site. The likely COMAH status of the Proposed Development is to be determined. There are a number of Lower and Upper-Tier COMAH establishments within the Major Accidents and Disasters (MAD) study area (5 km distance).	Yes
Accidental Vehicle Impact	Construction / delivery / Abnormal Indivisible Load (AIL) vehicle collisions which effect drivers or other onsite workers.	Potential to cause harm / injury to site personnel. Need to consider in more detail procedural controls and industry standards such as the CEMP.	Yes

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
Aircraft / Drone Impact	Aircraft / drone incident results in harm to site personnel and / or member of public and / or irreversible damage to environmental receptor (ecological site, watercourse etc.).	The Proposed Development is located in an area close to Hawarden Airport (Aerodrome). The CEMP will require that consultation be undertaken with relevant airports / Civil Aviation Authority (CAA) to manage interfaces and define appropriate control measures, including the need for aviation warning lighting to be fitted to tall construction machinery. If the onsite structures are considered an 'aerodrome obstacle' consultation with the Aerodrome license holder and the CAA will be undertaken, such that appropriate mitigation, i.e. lighting, is in place to minimize risk of collision.	Yes
Vandalism	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.	Appropriate security measures will be installed at the construction site, including CCTV, site security and fencing to prevent trespassers and mitigate this risk to ALARP as per the CEMP. During construction, the on-site chemicals inventory is limited to small volumes (diesel etc.) and thus the severity of a potential incident would be limited.	Yes
Commissioning Hazards			
Release of Nitrogen	Nitrogen may be used for gassing up and dewatering pipelines before operation, a release of which can cause asphyxiation in enclosed areas.	The site is located in a well-ventilated area, with limited enclosed areas. This activity will be subject to a task risk assessment and appropriate mitigation controls put in place to prevent an accidental release. Consequently, an accidental release is unlikely to cause harm to human health.	No
Release of Propane	Propane is commonly used in pilot ignition systems for combustion plants and as reference gases in the continuous emissions monitoring systems installed within the stack(s). A release of this material could cause a fire / explosion if ignited.	The areas where propane is used are well-ventilated areas and the quantities of propane to be used / stored onsite is relatively small. Consequently, an accidental release is unlikely to cause harm to human health.	No

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
Wet Testing of Equipment and Charging Storage Vessels – first use	Equipment needs to be clean when brought online and charged / used for the first time. If equipment has not been sufficiently purged of construction materials, i.e. cleaning agents or flushing oils, there may be unwanted reactions or loss of containment.	A Commissioning Strategy / Plan will be required for sharing with the Health and Safety Executive (HSE) and Notifiable Reportable Work (NRW) as part of both the COMAH (if applicable) and Environmental Permitting regimes. Need to consider in more detail procedural controls and industry standards.	Yes
Testing of Critical Instrument and Control Systems and Critical Equipment	Failure of critical instrument and control systems and critical equipment during testing may lead to loss of containment of materials.	A Commissioning Strategy / Plan will be required for sharing with the HSE and NRW as part of both the COMAH (if applicable) and Environmental Permitting regimes. Need to consider in more detail procedural controls and industry standards.	Yes
Operational Phase			
Process Hazards			
Fire and / or Explosion of Natural Gas	Used as the main fuel source for the Combined Cycle Gas Turbine (CCGT) and supplied via the National Grid National Transmission System. A release of gas can lead to a major fire / explosion if ignited. Potential for onsite personnel injury / harm from fire / explosion. Potential for injury / harm to off site people. Potential damage to environmental receptors from contaminated firewater.	Potential harm / injury to onsite and offsite persons. Potential impact on environmental receptors from contaminated firewater. The design of the Proposed Development will have fire safety measures embedded, both as hard systems i.e., fire detection and soft systems i.e., fire drill procedure. The natural gas systems will be up to industry codes and standards for gas use in fired systems and pipelines. Need to consider in more detail design codes, fire detection, procedural controls and industry standards.	Yes
Asphyxiant Gas Release - CO ₂	CO ₂ is a combustion by-product which is captured from the power plant, concentrated, and transported off site for secure storage under the sea. This substance is an odorless gas which is heavier than air and is an asphyxiant.	A major release is unlikely to effect offsite receptors due to the dispersal of the substance over distance. A major release of CO ₂ gas could result in significant harm / injury to people onsite. The design of the Proposed Development will have CO ₂ containment safety measures embedded, such as	Yes

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
	CO ₂ could cause harm / injury and there are historic cases of fatalities within breweries, associated with personnel being overcome by CO ₂ asphyxiation.	recognised design codes for plant / equipment / pipelines, and CO ₂ detection systems (fixed site locations and personnel monitors). Need to consider in more detail design codes, CO ₂ detection, procedural controls and industry standards.	
Release of Amine Solution	Used as a solvent in the carbon capture processes, this material is an irritant when inhaled or makes skin contact and is also toxic to aquatic environments as such there is potential to cause major harm to the environment if this substance reaches the River Dee.	An accidental release is unlikely to cause harm to human health, and appropriate systems, such as bunding, drainage sumps and an attenuation pond, will be put into place to minimise risk of this material reaching the environment. As such this scenario is not considered for further assessment.	No
Release of Acidic / Basic Solutions	Used in the water treatment plant for the preparation of demineralised water for the steam cycle makeup to the CCGT. These materials have the potential to harm the environment by changing the pH and are corrosive. They can cause injury / harm to onsite personnel.	The quantity of material stored on site will be relatively small. An accidental release of solution from storage would be contained within the appropriate containment systems, i.e. bunding and spill kits. As such, an accidental release is unlikely to cause harm to human health or the environment	No
Release of Diesel fuel	Diesel is likely to be used in back-up generators and firewater pumps onsite. This material is flammable and toxic to aquatic environments.	The quantity of material stored on site will be relatively minor. As such, an accidental release is unlikely to cause harm to human health / the environment	No
Release of Ammonia / Urea	Ammonia / Urea may be used in the Selective Catalytic Reduction (SCR). These substances are very toxic to aquatic life and can cause harm to human health via skin burns and eye damage.	The quantity of material stored on site will likely be relatively minor. As such, an accidental release is unlikely to cause harm to human health / the environment	No
Release of Hazardous materials from Battery Energy Storage Site (BESS)	A BESS may be included in the Proposed Development as part of a 'black-start' system to allow startup without reliance on the UK transmission system. Hazardous materials may be included in the BESS dependent on the type of battery used, including chemicals containing fluoride and chloride. Batteries can ignite which in turn could lead to a thermal runaway where the battery / batteries would self-generate	The BESS will likely only account for a small area on site separate to the main operating area, as such an accident is unlikely to cause harm to human health. The design of the Proposed Development will have fire safety measures embedded as well as appropriate drainage strategies to stop firewater from reaching the environment.	No

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
	more heat than can be dissipated. There is also potential damage to environmental receptors from contaminated firewater.	The BESS will follow appropriate design codes, fire detection, drainage strategy, procedural controls and industry standards.	
Domino Event – Industrial	An incident at another facility close to the Proposed Development or at the existing Connah's Quay Power Station, such as a fire/explosion, may impact the Site potentially leading to knock on effects. Similarly, an incident at the Proposed Development could impact COMAH establishments in the locality.	The closest Site, Shotton Steel works is within 1 km from the Proposed Development and, as this is a COMAH site, it is required to take all measures necessary to ensure safe operations with regards to the potential Domino effect on neighbors. It is likely the Shotton Sites Domino effects assessment will need to be reviewed as a consequence of the Proposed Development. The Proposed Development will have to assess the potential for Domino effects either being the initiator or the receptor of an event. Appropriate mitigation measures will need to be implemented such that the Principles of As Low As Reasonably Practicable (ALARP) are upheld to minimise risk.	Yes
Accidental Vehicle Impact	Delivery / onsite / AIL vehicle collisions which effect drivers or other onsite workers.	Potential to cause harm / injury to site personnel. Traffic movements much reduced in operational phase after construction. Limited to site deliveries of chemicals – which are very infrequent and maintenance / operator movement. Site Health, Safety, Security and Environment provisions will cover traffic movements on site, such as induction procedures for visiting drivers at the site entrance, one-way routes on-site, requirements for Personal Protective Equipment (PPE), and supervision by operators. Considered low risk and Tolerable.	No
Other Industrial Hazards			
Electrical power supply failure	Electrical failure or power loss can be caused by supply issues or disruption to infrastructure, which may lead to the emergency shutdown of operations.	Process equipment and instrumentation will be designed to fail to a safe condition, i.e. valves close to "lock in" process gases, feed supplies are isolated to	No

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
		the process etc. A UPS (Uninterruptible Power Supply) back-up power generator will be installed to ensure power to the Site.	
System/utilities failures	Disruption to water supplies and effluent disposal / release will have an impact on process operations.	The Proposed Development will be designed to handle such failures such that they do not cause any impact on the surrounding environment or the health and amenity of surrounding populace. The plant and equipment will be designed to fail safe, which includes protection of the environment.	No
Meteorological Hazards			
High windspeed	Major Storms could result in damage to site infrastructure, recognising that the site will have large structures, i.e. Carbon Capture Plant (CCP) adsorption towers. Potential to directly impact the onsite workforce to cause harm / injury.	This will be addressed during the design process and the appropriate standards will be applied such that impacts are mitigated. Extreme weather working practices and procedures will be in place and with worsening weather conditions, construction activities will be stopped, to ensure safety to the workforce / members of the public. Protection from adverse weather (working outdoors) is required as part of the Construction Design Management (CDM) Regulations. Suitable sheltering / housing will be provided.	No
Low temperatures and heavy snow	In the event of extreme, prolonged low temperatures and snowfall, there is the potential for snow loading on buildings and freezing liquids in pipework. Potential to directly impact the onsite workforce to cause harm / injury.	This will be addressed during the design process and the appropriate standards will be applied such that impacts are mitigated, such as the application of insulation around sensitive pipework. Extreme weather working practices and procedures will be in place and with worsening weather conditions, construction activities will be stopped, to ensure safety to the workforce / members of the public. Protection from adverse weather (working outdoors) is required as part of the CDM Regulations. Suitable sheltering / housing will be provided	No

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
High temperatures/ heatwave	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. Potential to directly impact the onsite workforce to cause harm / injury.	This will be addressed during the design process and the appropriate standards will be applied such that impacts are mitigated. Extreme weather working practices and procedures will be in place and with worsening weather conditions, construction activities will be stopped, to ensure safety to the workforce / members of the public. Protection from adverse weather (working outdoors) is required as part of the CDM Regulations. Suitable sheltering / housing will be provided.	No
Drought	Reduction of water availability for the Proposed Development	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 accesses water from an intake located in the River Dee / Dee Estuary.	No
Electrical storms	Lightning could result in damage to the Proposed Development as a result of a direct strike to buildings or structures. Lightning could also act as an ignition source if there was a release of flammable substance as a result of infrastructural damage from the storm, i.e., natural gas.	This will be addressed during the design process and the appropriate standards will be applied such that impacts are mitigated, such as the application of lightning protection systems on buildings and structures.	No
Geophysical Hazards			
Earthquake	This could cause damage to infrastructure, i.e., pipelines, buildings, structures.	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. Appropriate standards will be applied such that impacts are minimised, e.g. protective measures for expected stresses and loadings will be incorporated within the civil and structural engineering design of the Proposed Development.	No

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
Ground stability	Unstable ground and events such as landslides could cause damage to infrastructure, i.e., pipelines, buildings, structures.	The area around the Site has a low risk of landslides, ground collapse, ground compression, or sinkholes associated with site geology. Groundworks carried out prior to construction will provide a stable Main Site and within the pipeline connection corridors prior to construction. Appropriate standards will be applied such that impacts are minimised.	No
Hydrological Hazards			
Coastal / Fluvial flood	Flooding could result in damage to site assets such as storage tanks and pipework, with the potential for subsequent loss of containment of hazardous substances. There is also the potential for flooding to increase the buoyancy of the natural gas pipeline, such that the underground pipeline rises causing structural damage to the pipeline.	The site is located adjacent to the River Dee, which is influenced by tidal movements. The site is located in Flood Zone 3 and has a >0.5% chance of flooding from tidal influence. This will be considered during design such that appropriate mitigation measures will be applied to ensure impacts are minimised including appropriate flood defences.	Yes
Pluvial flood	Flooding could result in damage to site assets such as storage tanks and pipework, with the potential for subsequent loss of containment of hazardous substances. There is also the potential for flooding to increase the buoyancy of the natural gas pipeline, such that the underground pipeline rises causing structural damage to the pipeline.	As described in Chapter 13: Water Environment and Flood Risk (PEIR Volume II) the site experiences relatively low levels of rainfall, at an average of 728.74 mm of rainfall per year, with it raining more than 1 mm on around 136 days per year. As such the site is at a low risk of pluvial flooding.	No
Groundwater flood	Flooding could result in damage to site assets such as storage tanks and pipework, with the potential for subsequent loss of containment of hazardous substances. There is also the potential for flooding to increase the buoyancy of the natural gas pipeline, such that the underground pipeline rises causing structural damage to the pipeline.	The site is mostly underlain by low permeability silts and clays and as such is at very low risk of flooding from ground water.	No

Other Natural Hazards

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
Poor air quality	Emissions from the proposed development may harm the health of the surrounding populace and the environment.	<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 and will have appropriate pollution abatement,.</p> <p>An assessment of likely significant effects arising from the transportation of hazardous loads will be carried out in the Environmental Statement (ES) as described in Chapter 8: Air Quality (PEIR Volume II).</p> <p>No MA&D scenarios have been identified.</p> <p>Air quality impacts are fully assessed in Chapter 8: Air Quality (PEIR Volume II).</p>	No
Wildfires	This could cause damage to site personnel and infrastructure.	Severe wildfires are infrequent in the UK and the Proposed Development is not located in an environment particularly vulnerable to wildfire.	No
Climate Change	The impact of climate change causing extremes of temperature, flooding and winds may affect process operation of the Power and Carbon Capture (PCC) such as the cooling systems and structural stability. This could potentially impact the operation and efficiency of the Proposed Development.	These have been assessed individually under meteorological hazards and flooding events (see above). Further detail is also provided within Chapter 20: Climate Change (PEIR Volume II)	No
Societal Hazards			
Aircrafts / Drone Impact	The site contains will contain tall structures such as adsorber towers and associated stacks which are anticipated to be up to 120 m Above Ground Level (AGL). The site is located	The impact of an aircraft / drone crash on the Proposed Development could be a major accident with the potential for significant injuries	Yes

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
	approximately 9 km from Hawarden Airport, towards the south-east along the River Dee.	to people and damage to assets.	
Malicious attacks	Violence to people, arson or other methods of destruction of property, cyber-attacks, or chemical, biological, or nuclear attacks by terrorists or other actors, may cause damage to infrastructure at site or lead to direct release of hazardous substances.	Software security will be incorporated within the process control systems and physical security measures such as fencing, security guards and CCTV will be installed. As a supplier of energy, the Proposed Development will include appropriate measures as a matter of National Security and liaison with appropriate government bodies will be undertaken, e.g. National Counter Terrorism Security Office (NaCTSO) and the Centre for Protection of National Infrastructure (CPNI).	No
Vandalism	A malicious destructive act onsite whereby material loss of containment could occur, resulting in fire / explosions / pollution incidents. Harm to onsite personnel and members of the public off site from fire / explosions. Potential damage to environmental receptors.	Appropriate security measures will be installed at the Proposed Development through each phase of the development (Construction, Operation and Decommissioning).	Yes
Pandemic	Civil Emergency with restricted people movements, people falling ill, workforce restrictions.	Operators are more prepared (following the Covid pandemic) for the impact of a pandemic and the need for operational / business continuity. As this is a National Infrastructure project – robust contingency plans will be developed and implemented across all phases of the development (Construction, Operation, Decommissioning).	No
Decommissioning Phase			
Release of Residual Inventory of Operational Phase Substances	A failure to de-inventory the process systems, which leads to the accidental release of substances used for the operational phase, potentially causing harm to human health and the environment. For example a release of natural gas that initiates a fire / explosion or a release of diesel or amine that impacts upon the environment.	The design of the Proposed Development should consider decommissioning, e.g., drain legs on pipework and the avoidance of “dead leg” areas, where fluids would accumulate and cannot be drained. Application of a Decommissioning Plan and Standard Practice will minimise the risk such that it is tolerable.	Yes

Risk Event	Potential Impacts	Initial Risk Level Assessment	Considered further
		Need to consider in more detail the design philosophy, decommissioning procedural controls and industry standards.	

1.1.2 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;
- domino Effects with neighboring COMAH establishments ;
- accidental vehicle impact;
- aircraft / Drone impact; and
- vandalism

1.1.3 The following risk events during Proposed Development commissioning have been identified for further analysis:

- wet testing of equipment and charging of storage vessels; and
- testing of critical instrument and control systems.

1.1.4 The following risk events during Proposed Development operation have been identified for further analysis:

- major release of natural gas – fire and / or explosion;
- major release of carbon dioxide (CO₂) – asphyxiant;
- domino Effects with neighboring COMAH establishments ;
- flooding;
- aircraft / Drone impact; and
- vandalism.

1.1.5 The following risk event during Proposed Development decommissioning have been identified as requiring further assessment:

- release of residual inventory substances used during operational phase.

