VikingCCS

Viking CCS Pipeline

# Environmental Statement Volume IV – Appendix 19-1: Major Accidents and Disasters Long List

Document Reference: EN070008/APP/6.4.19.1

Applicant: Chrysaor Production (U.K.) Limited,
a Harbour Energy Company
PINS Reference: EN070008
Planning Act 2008 (as amended)
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)
Date: October 2023

Harbour Energy | AECOM

| PINS Reference | Document Reference | Document Revision | Date |
|---|---|---|---|
| EN070008 | EN070008/APP/6.4.19.1 | Revision 1 | October 2023 |

| Prepared by | | Verified by | | Approved by |
|---|---|---|---|---|
| HW | | MW | | NP |
| EIA Principal Consultant | | EIA Technical Director | | EIA Technical Director |

Prepared by:

AECOM Limited
Exchange Station
Tithebarn Street
Liverpool
Merseyside
L2 2QP

## Table of Contents



## Tables

# 1 Major Accidents and Disasters Long List

1.1.1 The Environment Agency commented on the Scoping Report version of the Major Accidents and Disasters Long List and requested that further consideration is given to Avian flu due to the large number of poultry houses within or in close proximity to the DCO Site Boundary, therefore this event type has been scoped in and will be taken to the Major Accidents and Disasters Short List.

1.1.2 This appendix provides an updated version of the Major Accidents and Disasters Long List in Table 1.

## *Table 1: Major Accidents and Disasters Long List*

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| Natural Hazards | Geophysical | Earthquakes | NA | NA | Earthquakes in the UK are moderately frequent but are unlikely to be powerful enough to inflict severe damage.<br>The British Geological Survey (BGS) acknowledges although the UK is distant from the nearest plate boundary, the Mid-Atlantic Ridge, earthquakes in the UK occur as crustal stresses within the tectonic plates are relieved by movement occurring on pre-existing fault planes. One of the driving forces is regional compression caused by motion of the Earth's tectonic plates and uplift resulting from the melting of the ice sheets that covered many parts of Britain thousands of years ago. | N |
| Natural Hazards | Geophysical | Volcanic Activity | NA | NA | According to the National Risk Register – 2020, there are a number of volcanoes across Europe that could affect the UK, especially volcanoes in Iceland (such as Bárðarbunga and Eyjafjallajökull) which are of most concern because of their proximity to the UK and frequent eruptions and - due to prevailing winds – have potential to blow ash and gas towards the UK.<br>It is highly unlikely that an ash cloud could significantly impact on any aspect of the Proposed Development. | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| Natural Hazards | Geophysical | Landslides | NA | NA | The BGS is the definitive source of landslide information in Great Britain. The National Landslide Database shows there have been one landslide recorded within the Scoping Boundary and three within 4km of it.<br>The Proposed Development's topography is mostly relatively flat or gently undulating land. The Proposed Development does not involve the formation of deep cuts/high embankments. In designing the Proposed Development to applicable standards, resources and receptors would not be put at a greater risk as a consequence of the Proposed Development. | N |
| Natural Hazards | Geophysical | Sinkholes | Construction, Operation | Public, local community, property | The superficial geology underlying the Proposed Development include the following: Glacial Till, Tidal Flat Deposits, Glaciofluvial Deposits, Alluvium, Lacustrine Deposits. The bedrock geology that underlies the Proposed Development includes various chalk formations. Some sinkholes result from the removal of a soluble rock, such as chalk, which can be triggered by construction works and development. This has therefore been considered further in the ES. | Y |
| Natural | Geophysical | Tsunamis | NA | NA | The Proposed Development is not located | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| Hazards | | | | | in a tsunami risk zone. | |
| Natural Hazards | Hydrology | Tidal Flooding | Construction, Operation | Public, local community, property | A review of the Environment Agency Flood Map for Planning (Rivers and Sea) (Environment Agency, 2020) indicates that Sections A and E of the Scoping Boundary are at risk of tidal flooding.<br>There is a risk of tidal flooding which would be considered as part of the Flood Risk Assessment. As the Proposed Development predominantly consists of a buried asset, tidal flooding is not considered to be a major consideration related to accidents, but the ES has included further assessment to confirm this. | Y |
| Natural Hazards | Hydrology | Fluvial Flooding | Construction, Operation | Public, local community, property | A review of the Environment Agency Flood Map for Planning (Rivers and Sea) (Environment Agency, 2020) indicates that the Proposed Development crosses Flood Zone 2 at 12 locations and Flood Zone 3 at 11 locations. Flood Zone 2 is land assessed as having between 0.1% and 1 % chance of flooding any given year from rivers, or between 0.1% and 0.5% chance of flooding any given year from the sea. Flood Zone 3 is land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. | Y |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | There are fluvial flood defenses running along the edge of the Great Eau, the Long Eau, the Great Fleet Drain, the Louth Canal, Tetney Drain.<br>There is a risk of fluvial flooding which would be considered as part of the Flood Risk Assessment. As the Project predominantly consists of a buried asset, tidal flooding is not considered to be a major consideration related to accidents, but the ES has included further assessment work to confirm this | |
| Natural Hazards | Hydrology | Pluvial Flooding | NA | NA | A review of the Environment Agency's Flood Risk from Surface Water Map (Environment Agency, 2020) shows isolated areas within the area of the Project to be at very low to high risk of flooding from surface water. Surface water flooding is likely to be associated with localised depressions where water will pond during or after prolonged rainfall events.<br>There is a risk of pluvial flooding which would be considered as part of the Flood Risk Assessment, but this is not expected to lead to any increased risk of a major accident or disaster. | N |
| Natural Hazards | Hydrology | Groundwater Flooding | NA | NA | Groundwater is relatively shallow throughout the Scoping Boundary ranging | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | from 0.30m to 25m below ground level according to the borehole records found on BGS GeoIndex.<br>There is a risk of groundwater flooding during excavations during construction phase which would be considered as part of the Flood Risk Assessment, but this is not expected to lead to any increased risk of a major accident or disaster. | |
| Natural Hazards | Hydrology | Avalanches | NA | NA | Avalanches are not considered relevant given the location of the Proposed Development. | N |
| Natural Hazards | Climatological and Meteorological | Cyclones, hurricanes, typhoons, storms and gales | NA | NA | Cyclones, hurricanes, typhoons do not typically occur in the UK.<br>Storms and gales could result in damage to the above ground installations (AGIs). However, all AGIs will be designed in line with UK standards which take into account environmental conditions including exposure to UK weather conditions. The risk is not significantly different to other similar infrastructure in the locality. | N |
| Natural Hazards | Climatological and Meteorological | Thunderstorms | NA | NA | This type of event could result in lightning strikes to temporary elevated structures during construction (e.g., tower cranes); however, the risk is no different to other construction projects in the locality. Specific measures are therefore not considered to | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | be required as part of the Proposed Development. | |
| Natural Hazards | Climatological and Meteorological | Wave surges | Construction, Operation | Public, local community, property | The Project is located in an area at risk of tidal flooding. The floodplains of the Humber Estuary and North Sea are at risk of tidal flooding. The pipeline is below ground and therefore would not be subject to the direct hydraulic forces of a wave surge.<br>The AGI's proposed would largely be sited inland enough not to be subject to wave surges. However, a review of the Emergency Shutdown Valve on the existing LOGGS Pipeline will be reviewed further and an assessment has been included within the ES. | Y |
| Natural Hazards | Climatological and Meteorological | Extreme temperatures: Heatwaves, Low (sub-zero) temperatures and heavy snow | NA | NA | This type of event could expose site infrastructure to greater heat intensity and exposure to sunlight. Heavy snow could cause disruption to workers and delivery vehicles and drivers.<br>In August 2003, a UK heatwave lasted 10 days and resulted in over 2,000 deaths. Temperatures reached what was then a record 38.5°C in Faversham, England and 33°C in Anglesey, Wales. High temperature records are now being broken across the UK with increasing frequency, most recently | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | in 2019 when a temperature of 38.7°C was recorded in Cambridge.<br>In late February and early March 2018, the UK experienced a spell of severe winter weather with very low temperatures and significant snowfall. This event became known as 'The Beast from the East' in the media and led to widespread impacts across the UK. Climate change is set to lead to more extreme events over the coming years.<br>The risk is not significantly different to other similar infrastructure in the locality. | |
| Natural Hazards | Climatological and Meteorological | Droughts | NA | NA | Over the past 40 years or so, England has experienced five long-duration droughts (lasting over 6 months) and two shorter periods of drought. Drought in the other UK nations is rare. During the 2010–12 drought, parts of south-east and eastern England recorded their lowest 18-month rainfall total in over 100 years. Temporary hosepipe bans were applied to 20 million customers, and the environment and agricultural sectors were disrupted. Drought has the longest advance warning times of the severe weather types.<br>The Proposed Development should not be vulnerable to drought as water is not an essential service during its use or | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | maintenance phases. The design of the pipeline will be resilient to ground shrinkage. | |
| Natural Hazards | Climatological and Meteorological | Severe Space Weather: Solar Flares | NA | NA | The energy from solar flares reaches Earth within a few minutes and can cause radio blackouts.<br>The Proposed Development is no more vulnerable than other similar infrastructure in the locality. | N |
| Natural Hazards | Climatological and Meteorological | Severe Space Weather: Solar Energetic Particles | NA | NA | Solar energetic particles arrive at Earth around 15 minutes to a few hours after they occur, and cause solar radiation storms which can potentially harm astronauts and impact electronics.<br>The Project is no more vulnerable than other similar infrastructure in the locality. | N |
| Natural Hazards | Climatological and Meteorological | Severe Space Weather: Coronal Mass Ejections (CMEs) | NA | NA | CMEs travel slowly and can take between 14 hours and up to four days to reach Earth, and cause geomagnetic storms with many impacts including localised disruptions to power grids.<br>The Project is no more vulnerable than other similar infrastructure in the locality. | N |
| Natural Hazards | Climatological and Meteorological | Fog | NA | NA | Fog is one of the most common weather conditions in the UK, particularly throughout autumn and winter. Severe disruption to transport occurs when the visibility falls | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | below 50m over a wide area.<br>Should fog become an issue during the construction phase due to visibility, work would cease until conditions improve. | |
| Natural Hazards | Climatological and Meteorological | Wildfires: Forest fire, Bush/brush, pasture | NA | NA | In 2018, fire and rescue services dealt with a number of wildfires across the country. The vast majority of these were considered business as usual, although some larger incidents (including the Saddleworth Moor and Winter Hill fires) involved mutual aid from other services and the use of specialist capabilities such as high-volume pumps. Scotland also experiences large, rural wildfires, most recently seen in Dumfries and Galloway in 2020.<br>The Project is not located in wooded or highly vegetated areas. Should weather conditions during construction become hot and dry for a long period of time, further consideration would be given to hot work activity locations. | N |
| Natural Hazards | Climatological and Meteorological | Poor Air Quality | NA | NA | Between 27 June and 7 July 2006, and between 13 and 23 July of the same year, the UK experienced two periods of extended hot weather with associated elevated ozone and harmful airborne particles. In the first episode, the | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | combination of heatwave conditions, poor air quality and worsening of people's pre-existing conditions led to up to 540 deaths and up to 700 hospital admissions. The same factors led to up to 630 deaths and up to 830 hospital admissions in the second episode. Periods of elevated pollution over a widespread area, and lasting more than two days, can occur around 5 to 10 times a year dependent on seasonal weather conditions.<br>During the construction, changes in air quality effects could arise from vehicles emissions, plant emissions and dust associated with the construction work. These would be temporary, and should the air quality assessment deem them significant, appropriate mitigation measures would be put in place to reduce their effect.<br>During operation of the Project there is unlikely to be any effect on Air Quality as maintenance vehicles would be very few and there are no emissions associated with the operation of the project itself. | |
| Natural Hazards | Biological | Disease epidemics:<br>- Viral<br>- Bacterial<br>- Parasitic | NA | NA | There were four influenza pandemics in the 20th century. The most recent flu pandemic was the H1N1 strain (swine flu) pandemic in 2009 which caused at least 18,500 deaths worldwide. In 1918, another variant | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | - Fungal<br>- Prion | | | of the same H1N1 strain (Spanish flu) killed over 50 million people globally.<br>Over the past 30 years, more than 30 new, or newly recognised, diseases have been identified. Most of these have been zoonoses – diseases that are naturally transmissible, directly or indirectly, from animals to humans. Examples of new infections that have emerged in the human population include COVID-19 (which has led to more than 150,000 deaths in the UK since the start of the pandemic), HIV and HCIDs, such as Ebola, SARS, Middle East Respiratory syndrome (MERS), and Zika virus.<br>The construction and operation of the Project would not give rise to any disease epidemics. The development itself would be constructed following all necessary guidance and restrictions in place at the time of its construction relating to the control of COVID-19. | |
| Natural Hazards | Biological | Animal Diseases:<br>- zoonotic:<br>• avian influenza<br>• West Nile virus<br>• Rabies<br>- non-zoonotic: | NA | NA | Both low and highly pathogenic avian influenza has been recorded in poultry in the UK several times in the last 10 years, although with no human cases reported. The most recent outbreaks of avian influenza occurred in November 2020 years, most recently in the winter of | Y |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | • foot and mouth<br>• swine fever | | | 2016/17, although with no human cases reported.<br>Bats infected with Lyssavirus (rabies) have been found every year for the last seven years and there have been a number of cases of equine notifiable disease in the UK in 2019 and 2020.<br>Classical swine fever has been recorded in the UK but African swine fever has not.<br>Bluetongue was first recorded in the UK in 2007. It was eradicated in 2008 through vaccination but UK animals are vulnerable to new incursions.<br>There was a devastating foot and mouth disease outbreak in 2001 which cost the UK around £8 billion, however, greatly improved response arrangements ensured that an outbreak in 2007 caused much less damage (£150 million).<br>The Project would not be a source of any disease epidemics and spread would be controlled through containment of infected animals including prohibition of transportation. Strict biosecurity protocols would be put in place when working between livestock farms and these measures would form part of the draft CEMP (*ES Volume IV: Appendix 3.1*).<br>The Environment Agency requested that | |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | further consideration is given to Avian flu due to the large number of poultry houses within or in close proximity to the DCO Site Boundary, therefore this event type has been scoped in and will be taken to the short list. | |
| Natural Hazards | Biological | Plants | NA | NA | Standard control measures would be implemented by the appointed contractor during construction to handle and dispose of any diseased, invasive plants to prevent their spread. Measures, such as an invasive plant management plan would be a commitment within the draft CEMP (*ES Volume IV: Appendix 3.1*). | N |
| Technological or Manmade Hazards | Societal | Extensive public demonstrations which could lead to violence and loss of life | NA | NA | In recent decades, serious widespread disorder in the UK has been rare. On 6 August 2011, a protest in Tottenham following the shooting of Mark Duggan by the police escalated into widespread public disorder. The G20 summits in 2009 and 2017 resulted in varying degrees of violent disorder, while the tuition fees protest in 2010 saw incidents of criminal damage and use of improvised missiles against police.<br>The Proposed Development is located in a largely rural area of the UK, and despite the isolated cases listed above, the UK is considered to be a politically stable country. | N |
| Technological or Manmade Hazards | Societal | Widespread damage to societies and economies. | NA | NA | | |
| Technological or Manmade Hazards | Societal | The need for largescale multi-faceted humanitarian assistance. | NA | NA | | |
| Technological | Societal | The hindrance or | NA | NA | | |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| or Manmade Hazards | | prevention of humanitarian assistance by political and military constraints | | | The Proposed Development is not considered particularly controversial and should not lead to high profile public demonstrations, widespread damage to societies and economies and is unlikely to require largescale multi-faceted humanitarian assistance. | |
| Technological or Manmade Hazards | Societal | Significant security risks for humanitarian relief workers in some areas. | NA | NA | | |
| Technological or Manmade Hazards | Societal | Famine | NA | NA | The Project is located in a developed country that produces its own crops and imports food. It is politically stable and not subject to hyperinflation and therefore food is available, whether produced within the UK or imported. Famine is also not relevant to the use of the Proposed Development. | N |
| Technological or Manmade Hazards | Societal | Displaced population | NA | NA | The Proposed Development is located in a developed country which is politically stable. There will be no significant displacement of populations as part of the Proposed Development. | N |
| Technological or Manmade Hazards | Industrial and Urban Accidents | Major Accident Hazard Chemical sites | Construction, Operation | Public, local community, property | There are approximately 17 establishments within the Immingham Docks area, within proximity of Section A of the Scoping Boundary near the Pipeline Inlet Facility, which are covered by the Control of Major | Y |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | Accident Hazard (COMAH) Regulations 2015. The inter-relationship with our Project and the potential for events to occur which could lead to potential incidents has been explored further and included within the ES. | |
| Technological or Manmade Hazards | Industrial and Urban Accidents | Major Accident Hazard Pipelines | Construction, Operation | Public, local community, property | There are Major Accident Hazard (MAH) pipelines within the Scoping Boundary and utility information has been sought and considered. Consultation has commenced with the asset owners and crossing design would be such that physical damage does not occur (including further discussions and correspondence linked to protective provisions). The inter-relationship with the Proposed Development and the potential for events to occur which could lead to potential incidents has been explored further and included within the ES. | Y |
| Technological or Manmade Hazards | Industrial and Urban Accidents | Nuclear | NA | NA | Nuclear sites are designed, built and operated so that the likelihood of releases of radiological material in the UK is extremely low. Historical accidents include Windscale (UK) in 1957.<br>The Theddlethorpe Gas Terminal is being considered by the Radioactive Waste Management (RWM) authority as a site for the storage of nuclear waste. However, at this stage, no formal decision has been | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | made and so we do not intend to include any further assessment on it. | |
| Technological or Manmade Hazards | Industrial and Urban Accidents | Fuel storage | NA | NA | There are fuel storage sites within the Scoping Boundary. However, detailed information on these would not be sought until pipeline routing is more developed. Consultation would commence with the asset owners and the Project would be designed to ensure that physical damage does not occur. | N |
| Technological or Manmade Hazards | Industrial and Urban Accidents | Dam breaches | NA | NA | Dam breaches in the UK are rare. The last major breach was at the Cwm Eigiau dam in 1925, which caused 17 fatalities and widespread flooding. The Malpasset Dam in southern France was breached on 2 December 1959, resulting in over 400 fatalities and widespread damage.<br>English reservoirs are regulated under the Reservoirs Act (1975).<br>A UK dam breach is highly unlikely. However, if a breach occurs, the emergency services will issue a warning and may decide that evacuation is necessary.<br>The Environment Agency Flood Risk from Reservoirs map indicates that the pipeline crosses one area at risk of reservoir flooding. This is associated with the | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | Covenham Reservoir. However, as the pipeline would be located below ground it is unlikely to be affected by flooding as a result of a dam breach. | |
| Technological or Manmade Hazards | Industrial and Urban Accidents | Mines and storage caverns | NA | NA | The Proposed Development is not within a Coal Mining Reporting Area nor within proximity of sites licensed to store explosives. | N |
| Technological or Manmade Hazards | Industrial and Urban Accidents | Fires | NA | NA | Fires could be initiated by construction related activities however standard control measures would be implemented by the appointed contractor to manage the risk of fire and these would be included in the draft CEMP (*ES Volume IV: Appendix 3.1*). | Y |
| Technological or Manmade Hazards | Transport accidents | Road | NA | NA | Transport accidents occur across the UK on a daily basis.<br>The Project would include approximately 40 road crossing, including one trunk road crossing at the A180. Further 'A' road crossing would be required as the A1173, A1173, A18 (in two places), A46, A16 and the A1031. 'B' road network crossing would include the B1210, B1203 and B1200. The remaining 29 crossings would take place at unclassified roads.<br>During construction there will be an increase in heavy construction plant and equipment on the local road network which | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | would form the entry and exit points for construction traffic and therefore may increase the risk of accidents.<br>Careful consideration of the micro-siting of these temporary access points will be a key feature in terms of reducing the risk of adverse effects, with access points needing to incorporate appropriate visibility splays, turning radii and speed limit reductions where necessary/appropriate. Outside of those design measures, the main mitigation for traffic and transport effects are also described within the draft CEMP which would is included in (*ES Volume IV: Appendix 3.1*).<br>The operation of the Project would not result in increased traffic flow or changes to traffic composition which could have an adverse impact on highway safety. It is considered that there would not be a significant risk to underground pipeline integrity as a result of a road traffic accident as the pipeline will be buried and constructed to good engineering practice.<br>The block valves would be located away from trunk/'A' roads and would be within a fenced compound and therefore are unlikely to be impacted during a road traffic accident. | |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| Technological or Manmade Hazards | Transport accidents | Rail | NA | NA | The Proposed Development requires crossing of the rail network including the Barton Railway Line and the Lincolnshire Wolds Heritage Railway Line.<br>Trenchless crossing techniques will be employed during the construction phase so as not to impact ongoing use of the railway. There will be close liaison and agreement with the railway operator before works commence near and under the railway.<br>The Project includes a buried pipeline which would pass underneath embankments. There is the potential for railways to subside over time and the vibration from trains passing over at high speed could pose risks to the pipeline, however these are taken into consideration during the design. There is unlikely to be a significant risk to the integrity of the pipeline as a result of a rail accident as it would also be considered during design.<br>The AGI's would be located within a fenced compound a significant distance away from the railway line and are unlikely to be impacted during a rail accident. | N |
| Technological or Manmade Hazards | Transport accidents | Waterways | NA | NA | The Proposed Development would require crossing the Louth Canal.<br>Trenchless crossing techniques would be | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | used to install the pipeline so as not to impact ongoing use of the canal. There will be close liaison and agreement with the canal operator before works commence near and under the canal. | |
| Technological or Manmade Hazards | Transport accidents | Aviation | NA | NA | There have been no major air accidents in the UK since the Shoreham aviation incident in 2015.<br>There are no airports or airfields within the Draft Order Limits. The nearest airport is Humberside International Airport which is approximately 7km west of Section 2 of the Draft Order Limits at its nearest point.<br>As the Proposed Development includes a buried pipeline it would be protected from any above ground aviation incidents and is unlikely to cause an aviation incident. There would be no AGI's sited within close proximity of this airport. | N |
| Technological or Manmade Hazards | Pollution accidents | Air | | | Construction activities may cause an increase in the exposure to dust and emissions from vehicles and construction plant. This would be temporary in nature and emissions associated with construction plant and vehicles are managed under specific air quality legislation. Effects of the Project on Air Quality will be considered as part of the EIA. | Y |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | If there was a significant loss of containment event involving the pipeline it would result in a large-scale release of $CO_2$ to the environment, which could potentially cause a significant adverse impact on local air quality and human health.<br>$CO_2$ is not currently defined as a dangerous substance under the Control of Major Accident Hazards Regulations 1999 (COMAH) or as a dangerous fluid under the Pipelines Safety Regulations 1996, thus there is no requirement to produce a formal Safety Case Report.<br>However, safety is of paramount importance to the applicant and further work will be undertaken relating to the safety of the Proposed Development. In addition, detailed standards and codes of practice written specifically for the design and operation of dense phase or supercritical $CO_2$ plant and pipelines are currently being developed. | |
| Technological or Manmade Hazards | Pollution accidents | Land | NA | NA | During the construction phase there may be an increase in the risk of leaks and spillages of hazardous materials associated with the construction activities. This risk would be controlled through standard control measures which would form commitments within the draft CEMP (*ES* | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | *Volume IV: Appendix 3.1*). | |
| Technological or Manmade Hazards | Pollution accidents | Water | NA | NA | The superficial underlying aquifers comprise Tidal Flat Deposits, Glacial Till, Glaciofluvial Deposits, Alluvium and Lacustrine Deposits.<br>The bedrock aquifers comprise Welton Chalk Formation and Burnham Chalk Formation.<br>The Groundwater Source Protection Zone mapping (DEFRA, 2020) shows that the Scoping Boundary contains various Source Protection Zones. These are a mixture of Zone I Inner Protection Zone and Zone II Outer Protection Zone.<br>During construction there is a risk of contaminating groundwater, however mitigation measures would be incorporated into the draft CEMP (*ES Volume IV: Appendix 3.1*).<br>During operation of the Project, it is unlikely to have significant effects on groundwater. | N |
| Technological or Manmade Hazards | Utilities failures | Electricity | NA | NA | Above-ground electrical transmission lines are present within the Scoping Boundary which are National Grid owned and transmitted 400kv.<br>During construction, any work required near electric overhead power lines would be adequately controlled and consulted on with | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | the operator, and appropriate site-specific risk assessments completed which would consider such aspects as:<br>• The voltage and height;<br>• Size and reach of any machinery or equipment;<br>• Safe clearance distances required;<br>• Site conditions such as undulating terrain; and<br>• Competence, supervision, training and briefing to staff. | |
| Technological or Manmade Hazards | Utilities failures | Gas | NA | NA | Underground gas transmission pipelines are present in the Scoping Boundary. Detailed information on these would be sought once pipeline routing is more developed. Consultation would commence with the asset owners and crossing design would be such that physical damage does not occur. | N |
| Technological or Manmade Hazards | Utilities failures | Water Supply | NA | NA | During the construction phase, the Proposed Development would require water for welfare use and during hydrostatic testing. The required volumes are anticipated to be brought in by tanker. | N |
| Technological or Manmade | Utilities failures | Sewage system | NA | NA | No use of the sewage system is associated with the Proposed Development. During the | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| Hazards | | | | | construction phase, temporary portable systems will be in place covered by H&S welfare requirements. | |
| Technological or Manmade Hazards | Malicious Attacks | Unexploded Ordnance | | | Part of the Draft Order Limits contains a UXO moderate risk area. Measures would be undertaken during the construction phase to raise awareness of this issue to construction site staff and operatives, and to define the appropriate response strategies should any be discovered during the works. An assessment of UXO is included within the ES and how they can link to major incidents. The initial findings of the preliminary UXO desk-based assessment are included *in ES Volume IV: Appendix 19.2 (Application Document 6.4.19.2).* | Y |
| Technological or Manmade Hazards | Malicious Attacks | Chemical Biological Radiological Nuclear | NA | NA | Historical attacks have been within closed densely occupied structures (underground, buildings) or targeted at specific individuals. The Proposed Development is unlikely to be a target for such an event. | N |
| Technological or Manmade Hazards | Malicious Attacks | Transport systems | NA | NA | The main transportation methods used in the construction phase of the Proposed Development would include road, for staff transit and material delivery / waste removal. The Proposed Development is unlikely to be a target for this type of event | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| | | | | | due to the low number of exposed targets. | |
| Technological or Manmade Hazards | Malicious Attacks | Crowded places | NA | NA | The routing of the pipeline associated with the Proposed Development and the siting of the AGI's would specifically seek to avoid crowded or highly populated areas in a bid to reduce construction impacts. The Proposed Development is also unlikely to be a target for this type of event due to the low number of exposed targets. | N |
| Technological or Manmade Hazards | Engineering accidents and failures | Cyber | | | According to the National Risk Register 2020, cyber-attacks occur almost constantly on key national and commercial electronic information, control systems and digital industries. The reliance on telemetry for remote monitoring and to allow the remote operation of valves could render the Proposed Development more vulnerable to a cyber-attack.<br>The Applicant is accountable to the Secretary of State (SoS) for Business, Energy and Industrial Strategy for ensuring the resilience of their strategic power generator stations and network to national security risks, including from terrorism, cyber-attack, natural hazards and other risks. Consequently, this has been included further within the ES. | Y |
| Technological | Engineering | Infrastructure | NA | NA | The Proposed Development will be | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| or Manmade Hazards | accidents and failures | | | | developed following the most up to date regulations and standards in place at the time of its development. These requirements have been developed to reduce the risk of accidents of failures of pipeline projects and draw upon experiences from around the world. Consequently, no infrastructure related accidents are anticipated. | |
| Technological or Manmade Hazards | Engineering accidents and failures | Bridge failure | NA | NA | Significant bridge works are not proposed as part of the Proposed Development. Temporary bailey bridges will be constructed and used during construction. These will be monitored and maintained to ensure they are safe to use. | N |
| Technological or Manmade Hazards | Engineering accidents and failures | Flood defense failure | | | There are watercourses within the Scoping Boundary that benefit from flood defenses. The design of the Proposed Development will be developed to include allowances for future climate change predicted effects on flooding. The potential risk of breech events has been considered in the EIA, specifically the Flood Risk Assessment (*ES Volume IV: Appendix 11.5*). This will be explored as part of the FRA to see if there could be any major incidents which would need to be considered within the MADS assessment. | Y |
| Technological | Engineering | Mast and tower | NA | NA | There are electric overhead line power lines | N |

| Major Event Group | Major Event Category | Major Event Type | Proposed Development Phase | Potential Receptors | Basis of Decision to Scope In/Out | Short List? |
|---|---|---|---|---|---|---|
| or Manmade Hazards | accidents and failures | collapse | | | and pylons within the Scoping Boundary.<br>During construction, any work required near electric overhead power lines would be adequately controlled and consulted on with the operator, and appropriate site-specific risk assessments completed which would consider such aspects as:<br>The voltage and height;<br>• Size and reach of any machinery or equipment;<br>• Safe clearance distances required;<br>• Site conditions such as undulating terrain; and<br>• Competence, supervision, training and briefing to staff. | |
| Technological or Manmade Hazards | Engineering accidents and failures | Property or bridge demolition accidents | NA | NA | The Proposed Development does not involve demolition works in order for it to be constructed. | N |
| Technological or Manmade Hazards | Engineering accidents and failures | Tunnel failure/fire | NA | NA | There are no tunnel structures proposed as part of the Proposed Development or within the Study Area. | N |

VikingCCS

Harbour Energy | AECOM