The Drax Power (Generating Stations) Order

Land at, and in the vicinity of, Drax Power Station, near Selby, North Yorkshire

Environmental Statement
16 – Major Accidents and Disasters

The Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

Drax Power Limited

Drax Repower Project

Applicant: DRAX POWER LIMITED
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16.1 Introduction

16.1.1. This Chapter addresses the potential vulnerability of the Proposed Scheme to major accident(s) and/or disaster(s) as required by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

16.1.2. With respect to the Proposed Scheme, this assessment of Major Accidents and Disasters (MA&D) has been undertaken assuming the Proposed Scheme repowers both the existing coal-powered generating units (Units 5 and 6) at the Existing Power Station Complex with new gas turbines that can operate in both combined cycle and open cycle modes. This has the greatest potential environmental impact of the two options under consideration (See Chapter 3 Site and Project Description).

16.1.3. The Chapter describes the assessment methodology, any primary and tertiary mitigation adopted for the purposes of the assessment, a summary of the expected significant effects resulting from the vulnerability of the Proposed Scheme to the risk of MA&D taking into account relevant legislation and guidance applicable in England. Where appropriate, this description includes the further mitigation measures required to prevent, reduce or offset any significant negative effects, the preparedness for and proposed response to emergencies, and the expected residual effects after these measures have been employed.

16.1.4. To date, there is no specific guidance on how to consider MA&D with the context of EIA. However, the assessment takes account of emerging EIA good practice, which refers to other relevant documentation, including the Cabinet Office's National Risk Register of Civil Emergencies (Ref 16.1)

16.1.5. The assessment of major accidents and disasters will identify whether an appropriate risk management structure is in place, for both health and safety, and environmental risks. Furthermore, it will report on whether the potential for major accidents and/or disasters to impact on human health or the environment has been identified, and arrangements have been identified to manage the risk to be As Low As Reasonably Practicable (ALARP) by the Applicant and its suppliers. This will be achieved through a review of available documentation and regulatory requirements; the EIA will not involve assessment from 'first principles'. The assessment will present any identified risks which may require further precautionary mitigation actions beyond those already integrated into the design and execution of the Proposed Scheme.

16.1.6. The structure of this Chapter does not conform to the typical chapter structure used elsewhere in this ES as it is recognised that existing legislation and health and safety requirements already identify risks and help to protect human beings and the environment (Appendix 16.1) For this Chapter to remain proportionate, it is not a full risk assessment itself. Rather this Chapter identifies risks and whether or not they are relevant for the Proposed Scheme, and signposts other documentation where these risks have been/will be addressed (e.g. Construction Environmental Management Plan).

16.1.7. This Chapter (and its associated figures and appendices) is intended to be read as part of the wider ES, with particular reference to Chapter 5 (Transport), Chapter 6 (Air Quality), Chapter 7 (Noise and Vibration), Chapter 8 (Historic Environment), Chapter 9 (Biodiversity), Chapter 10 (Landscape and Visual Amenity), Chapter 11 (Ground Conditions), Chapter 12 (Water Resources, Quality and Hydrology), Chapter 13 (Waste), Chapter 14 (Socio Economics) and Chapter 15 (Climate).

16.2 Policy, Legislation and Guidance

Policy

National

- Department of Energy and Climate Change (DECC), Overarching National Policy Statement for Energy (EN-1), July 2011 (Ref. 16.2).
- Department of Energy and Climate Change (DECC), National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2), July 2011 (Ref. 16.3).
- Department of Energy and Climate Change (DECC), National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4), July 2011 (Ref. 16.4).

Local

- Selby District Council, Selby District Local Plan 2005 (SDLP), adopted February 2005 (Ref. 16.5).
- The Selby District Core Strategy Local Plan 2013 (CS), adopted October 2013 (ref. 16.6).

16.2.1. The applicable policy framework is summarised as follows:

National Policy Framework

16.2.2. The NPS EN-1 (Overarching National Policy Statement for Energy) (Ref. 16.2); sets out the assessment principles to which the Secretary of State (SoS) will have regard to in the examination of an energy Nationally Significant Infrastructure Project (NSIP). Specific considerations for fossil fuel generating stations are provided in the NPS for Fossil Fuel Generating Infrastructure (EN-2) (Ref. 16.3) and NPS Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref. 16.4).

16.2.3. None of NPS EN-1, EN-2 or EN-4 set out any principles for the assessment of MA&D. They do include reference to potential generic mitigation measures for environmental impacts for aspects which must be addressed by the ES but do not reference any generic mitigation measures for Health & Safety.

Local Policy Framework

Selby District Local Plan (SDLP) 2005

16.2.4. The Local Plan (Ref. 16.5) develops and underpins many of the aims and objectives of the Local Planning Authority (LPA). It provides a comprehensive land-use framework for promoting, coordinating and controlling future development. The SDLP does not set out any principles for the assessment of MA&D but does state that the location of a development will be controlled to ensure that it does not have an adverse effect on the environment, health, safety and amenity. The SDLP states that conditions may be imposed to help regulate and minimise the impact of a proposed development.

The Selby District Core Strategy Local Plan 2013 (CS)

16.2.5. This document is the first part of the replacement for the 2005 Selby District Local Plan. This sets out the high level strategic policies for the District for the period 2012 - 2028. The policies in the CS (Ref. 16.6) replace many of the SDLP policies. The CS does not set out any principles for the assessment of MA&D.

Legislation

International

16.2.6. Paragraph 15 of Directive 2014/52/EU (Ref. 16.7) states:

"*In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment*."

National

16.2.7. The above EU Directive has been transposed into UK law under relevant EIA legal framework surrounding the MA&D topic being the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations 2017) (Ref. 16.8). Schedule 4 Paragraph 8 of the EIA Regulations 2017 require that the ES include:

"(8). A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies."

16.2.8. It is worth noting that the UK approach has removed the word 'natural' with respect to "disasters". An article written by a registrant of the EIA Quality Mark Registrant Scheme of the Institute of Environmental Management and Assessment (IEMA) suggests that given the intention underlying this aspect of the EU Directive, both manmade and natural disasters should be considered (Ref. 16.9, 16.10, 16.11).

16.2.9. The applicable legislative framework covering the design, construction, operation and maintenance of the Proposed Scheme is summarised as follows, further details are presented in Appendix 16.1:

- Health and Safety at Work etc. Act 1974 (HSWA) (Ref. 16.12);
- Pipe-Lines Act 1962 (Ref. 16.13);

- The Pipelines Safety Regulations 1996 (Ref. 16.14).
- Gas Safety (Management) Regulations 1996 (as amended) (Ref. 16.15).
- Pressure Systems Safety Regulations 2000 (Ref. 16.16).
- The Supply of Machinery (Safety) Regulations 2008 (Ref. 16.17).
- Construction (Design and Management) Regulations 2015 (CDM) (Ref. 16.18);
- Control of Major Accident Hazards Regulations 2015 (COMAH) (Ref. 16.19);
- The Planning (Hazardous Substances) Regulations 2015 (Ref. 16.20)
- The Dangerous Substances and Explosive Atmospheres Regulations 2002 (Ref. 16.21).
- The Equipment and Protective Systems for Use in Potentially Explosive Atmospheres Regulations 1996 (Ref. 16.22); and
- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 (Ref. 16.23).

Guidance

16.2.10. There is currently no published guidance for the application of the legal requirements to major accidents and disasters. However, selected relevant guidance for risk assessment methodologies is summarised as follows:

- Defra (2011) 'Guidelines for Environmental Risk Assessment and Management (Ref. 16.24);
- Chemical and Downstream Oil Industries Forum, (2013), Guideline – Environmental Risk Tolerability for COMAH Establishments (Ref. 16.25); and
- The International Standards Organization's ISO 31000: 2009 Risk Management – principles and guidelines (Ref. 16.26).

16.2.11. Additionally, the following have been consulted to support the identification of all potential major accidents and disasters:

- The Cabinet Office National Risk Register of Civil Emergencies (2017 Edition) (Ref. 16.1). This document is the unclassified version of the National Risk Register and it identifies the main types of civil emergencies that could affect the UK in the next five years. It is recognised, however, that this document does not provide an all-encompassing list of all potential accidents and disasters and its timescales are short term.
- The International Federation of Red Cross & Red Crescent Societies Early Warning, Early Action (2008) (Ref. 16.28). This guidance looks to other countries including those in warmer climates, thereby identifying risks that the UK may encounter in the future in light of climate change and global warming.
- The International Disaster Database (Ref. 16.29). This online source (http://www.emdat.be/) contains data covering over 22,000 mass disasters in the world since 1900 to the present day and aims to "rationalise decision making for disaster preparedness, as well as provide an objective base for vulnerability assessment and priority setting".

16.3 Scoping Opinion and Consultation

Consultation

16.3.1. General consultation activities have been undertaken in support of the Proposed Scheme and specific environmental aspects, however there has been no specific consultation with respect to potential MA&D outside the scoping process for the EIA and the statutory consultation undertaken by the Applicant.

Scope of the Assessment

16.3.2. This section explains how the scope of the assessment has developed.

16.3.3. An EIA Scoping Report was submitted to the SoS in September 2017, as presented in Appendix 1.1. A Scoping Opinion was received by the Applicant from the Planning Inspectorate (on behalf of the SoS) on 23 October 2017, including formal responses from statutory consultees. The responses from the Planning Inspectorate/SoS in relation to MA&D, and how those requirements should be addressed by the applicant, are set out below in Table 16-1.

Table 16-1 - Statutory Consultation Table (MA&D)

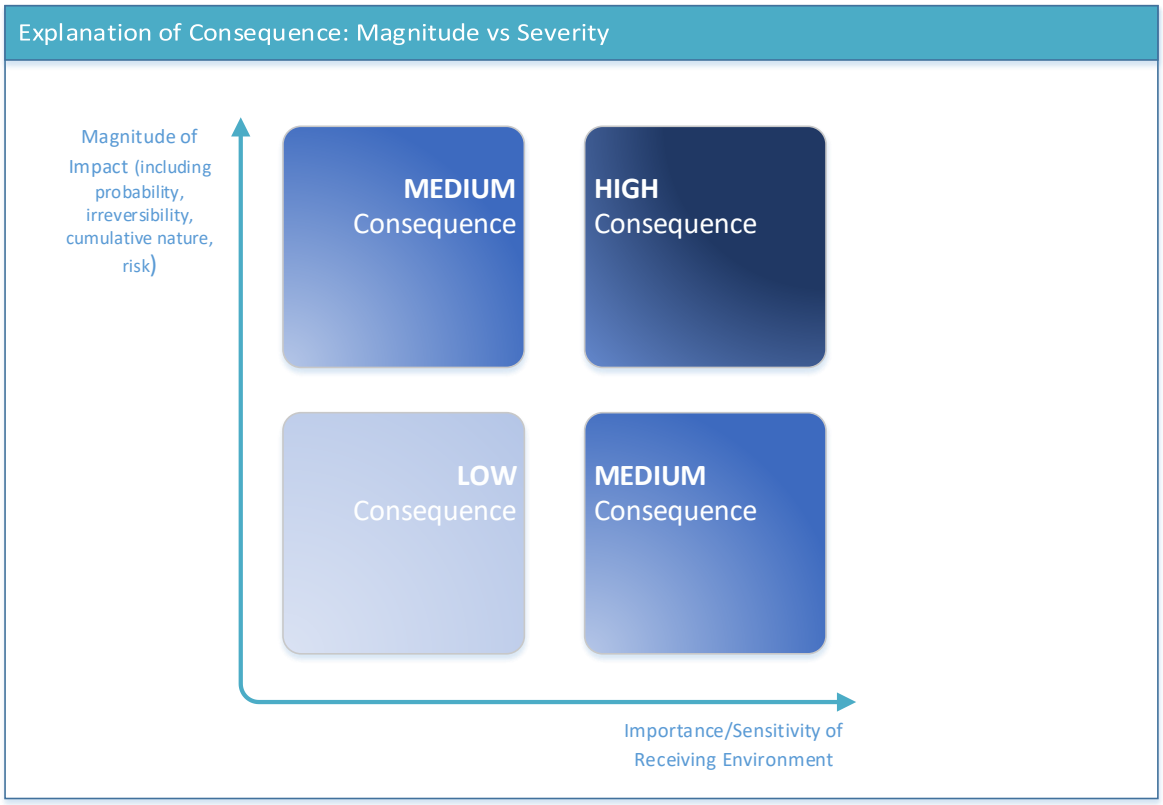
Section of Scoping Report	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of Response
6.1.1	Major accidents or disasters	The ES should include a description of the potential vulnerability of the Proposed Scheme to risks of major accidents and/or disasters, including the vulnerability to climate change, which are relevant to the Proposed Scheme.	This comment is addressed within this Chapter. Climate change resilience (or vulnerability to climate change) is assessed in Chapter 3 (Site and Project Description) and Appendix 15.1.
North Yorkshire County Council response	Major accidents or disasters	The only reference within the document is that major accidents or incidents will be considered as part of Chapter 3 of the ES (Project Description). It is assumed the applicant will detail measures and steps to prevent and control such matters (including those which may be as a result of CC) but I am not sure that this is sufficient at this stage. They have neither screened in or out such matters from the EIA due to its environmental significance or lack of,	This comment is addressed within this Chapter. Climate change resilience (or vulnerability to climate change) is assessed in Appendix 15.1.

Section of Scoping Report	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of Response
		and therefore, more justification or information is considered necessary at this stage.	

16.3.4. The assessment of MA&D was not included in the scoping report. Therefore a scoping summary is provided below.

MA&D Scoped In

Figure 16-1 - Graphical Representation of MA&D Consequence Significance



16.3.5. Significant adverse effects have been considered both within and outside the boundary of the Proposed Scheme along with potential external influencing factors within 5 km of the Proposed Scheme (Appendix 16.2). The 5 km radius has been selected for the Scoping study using professional judgement based on the hazardous nature of natural gas and previous experience of hazard studies involving flammable and explosive gases.

16.3.6. Events to be included in the MA&D assessment are those which fall within the "High" consequence category (Figure 16-1 top right box) with a low likelihood of occurrence.

16.3.7. In line with Regulation 14 of the EIA Regulations 2017 and the Scoping Report, this Chapter considers these receptors:

- Members of the public and local communities;
- Infrastructure and the built environment;
- The natural environment, including ecosystems, land and soil quality, air quality, surface and groundwater resources and landscape;
- The historic environment, including archaeology and built heritage; and
- The interaction between the factors above.

MA&D Scoped Out

16.3.8. Low likelihood and low consequence events, such as minor spills, have been scoped out as these events are unlikely to result in significant adverse effects as they do not fall into the definition of a MA&D. Highly likely and low consequence events are also scoped out as they will not lead to significant adverse effects. Furthermore, high likelihood and high consequence events are also scoped out, as it is assumed that existing legislation and regulatory controls would not permit the project to be progressed under these circumstances (e.g. allowing an ignition source to be taken into a known explosive atmosphere inside a vessel which would cause an explosion).

16.3.9. A two tiered scoping process has taken place:

- The first component is in accordance with emerging EIA practice, whereby occupational health and safety (H&S) is scoped out of this chapter (other health issues are covered in relevant chapters, such as Chapter 6 (Air Quality), Chapter 7 (noise and Vibration) and Chapter 17 (Cumulative Impacts)) as it is covered by detailed H&S legislation, such as:
  - The Workplace (Health, Safety and Welfare) Regulations 1992 (Ref. 16.30).
  - Management of Health & Safety at Work Regulations 1999 (Ref. 16.31).
  - The Dangerous Substances and Explosive Atmospheres Regulations 2002 (Ref. 16.21)
  - The Control of Major Accident Hazard Regulations 2015 (Ref. 16.19).
- The Applicant has committed to constructing and managing the Proposed Scheme in accordance with, *inter alia*:
  - Environmental, Health & Safety Management systems.
  - Supplier management environmental, health & safety standards.
  - Risk Management systems.
  - Construction and Environmental Management systems (including CEMP which is secured by a requirement in Schedule 2 to the draft DCO (Document reference 6.5)).
- The initial risk list (see Table 16-2) forms the second component of the scoping process by ruling out any potential accidents and disasters that are considered highly unlikely to occur due to the location of the Proposed Scheme. This screening process illustrates that due account has been taken of the full range of potential accidents and disasters and that the assessment process is fully transparent.

Initial Risk List

16.3.10. Based on the sources identified in the Policy, Legislation and Guidance section of this Chapter, and taking into account the specific type of development in question (cross-country pipeline and gas fired generators) and the Proposed Scheme location,), if the MA&D is not considered a potential risk for the location of the Proposed Scheme, a 'x' is indicated under the 'location risk' column. Similarly, if the major accident or disaster is not associated with the proposed use of the development, either at the construction or operation phase, a 'x' is indicated. Where all columns receive a 'x', for an identified major accident or disaster, this major accident or disaster is screened out.

16.3.11. If the major accident or disaster is considered a potential risk owing to either the location of the Proposed Scheme or its use during construction or operation, a '✓' is given. If a '✓' is identified in either column, or in both columns, a major accident or disaster is screened in and taken to the next stage of the assessment, the Environmental Risk Record (Appendices 16.3 and 16.4). The Environmental Risk Record considers whether or not the Proposed Scheme could make the major accident or disaster worse (in the absence of any mitigation) and whether or not the Proposed Scheme could in turn be affected by the major accident or disaster.

Table 16-2 - The Initial Risk List

Disaster Group	Disaster Sub Group	Accident / Disaster Type	Location Risk	Proposed Use Risk		Is Further Consideration Required?
				Construction	Operation	
Natural Hazards	Geophysical	Earthquakes	x	x	x	No - screened out. Do not occur in Britain of a sufficient intensity owing to the motion of the Earth's tectonic plates causing regional compression. In addition, uplift from the melting of the ice sheets that covered many parts of Britain thousands of years ago can also cause movement. The BGS acknowledges that on average, a magnitude 4 earthquake happens in Britain roughly every two years and a magnitude 5 earthquake occurs around every 10 to 20 years. In terms of geographical proximity, the closest epicentre of an earthquake to the Proposed Scheme occurred in Goole, Humberside in 1991 with a magnitude of 1.6, in Thorne, South Yorkshire in 2017 with a magnitude of 1.3 and in Doncaster, Yorkshire in 2013 with a magnitude of 1.7. As such the Cabinet Office National Risk Register of Civil Emergencies (Ref.16.1) states that "*Earthquakes*

Disaster Group	Disaster Sub Group	Accident / Disaster Type	Location Risk	Proposed Use Risk		Is Further Consideration Required?
				Construction	Operation	
						in the UK are moderately frequent but rarely result in large amounts of damage. An earthquake of sufficient intensity (determined on the basis of the earthquake's local effect on people and the environment) to inflict severe damage is unlikely". As earthquakes have not caused any deaths in the UK since 1950, and buildings are damaged (not devastated) this disaster is screened out.
		Volcanic activity	x	x	x	No, screened out: Volcanic activity does not occur in the UK and is not linked to the Proposed Scheme.
		Landslides	x	x	x	No, screened out: No historical landslides have been recorded within the boundary of the Proposed Scheme (BGS Geological Survey Geo Index Onshore (Ref.16.32))
		Tsunamis	x	x	x	No, screened out: The Proposed Scheme is located inland, outside a tsunamis risk zone (Prevention Web (2005) Europe: Tsunamis hazard map (Ref.16.33)).

Disaster Group	Disaster Sub Group	Accident / Disaster Type	Location Risk	Proposed Use Risk		Is Further Consideration Required?
				Construction	Operation	
	Hydrology	Coastal flooding	x	x	x	No, screened out: The Proposed Scheme is located inland, outside a coastal area.
		Fluvial flooding	✓	✓	✓	Yes
		Surface water flooding	✓	✓	x	Yes
		Avalanches	x	x	x	No, screened out: The Proposed Scheme's topography is relatively flat and therefore an avalanche will not occur.
	Climatological and Metrological	Cyclones, hurricanes, typhoons, storms and gales	✓	x	x	Yes
		Wave surges	x	x	x	No, screened out: The Proposed Scheme is located inland, and therefore is not subject to wave surges.
		Extreme temperatures: Heatwaves Low (sub-zero) temperatures and heavy snow	✓	x	x	Yes
		Droughts	✓	x	✓	Yes

Disaster Group	Disaster Sub Group	Accident / Disaster Type	Location Risk	Proposed Use Risk		Is Further Consideration Required?
				Construction	Operation	
		Severe Space Weather • Solar Flares • Solar Energetic Particles • Coronal Mass Ejections	✓	x	✓	Yes The exception is solar energetic particles which cause solar radiation storms, but only in outer space, so this disaster sub-type can be screened out.
		Fog	✓	x	x	Yes
		Wildfires: Forest fire Bush/brush pasture	x	x	x	No, screened out: The Proposed Scheme and surrounding area does not contain vegetation with a potential high fuel load such as gorse.
		Poor Air Quality	✓	✓	x	Yes
	Biological	Disease epidemics: • Viral • Bacterial • Parasitic • Fungal • Prion	x	x	x	No, screened out: The Proposed Scheme is located in a developed country where the population is in general good health. Furthermore, the use of the Proposed Scheme (electricity generation) is not going to give rise to any disease epidemics. Public Health England, the executive agency of the Department of Health is responsible for

Disaster Group	Disaster Sub Group	Accident / Disaster Type	Location Risk	Proposed Use Risk		Is Further Consideration Required?
				Construction	Operation	
						protecting the nation from public health hazards, preparing for and responding to public health emergencies. One of Public Health England's functions is to protect the public from infectious disease outbreaks and the Agency has produced a document providing operational guidance for the management of outbreaks of communicable disease, 'Communicable Disease Outbreak management: Operational Guidance'.
Technological or Manmade Hazards		Complex emergencies: • Extensive violence and loss of life. • Displacement of populations; • Widespread damage to societies and economies. • The need for large-scale multi-faceted humanitarian assistance.	x	x	x	No, screened out: The Proposed Scheme is located in a developed country that has steady, yet small population growth. England is politically stable with no direct border with countries experiencing conflicts.

Disaster Group	Disaster Sub Group	Accident / Disaster Type	Location Risk	Proposed Use Risk		Is Further Consideration Required?
				Construction	Operation	
		• The hindrance or prevention of humanitarian assistance by political and military constraints. • Significant security risks for humanitarian relief workers in some areas.				
		Famine	x	x	x	No, screened out: The Proposed Scheme 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 scheme.
		Displaced population	x	x	x	No, screened out: The Proposed Scheme is not located in an urban area and the pipeline passes through open countryside.
		Industrial Accidents	✓	✓	✓	Yes

Disaster Group	Disaster Sub Group	Accident / Disaster Type	Location Risk	Proposed Use Risk		Is Further Consideration Required?
				Construction	Operation	
		Transport accidents	x	✓	✓	Yes
		Pollution accidents	x	✓	✓	Yes
		Electricity, gas, water supply or sewage system failures	✓	✓	✓	Yes
		Acts of Terrorism	x	✓	✓	Yes
		Urban fires	x	x	x	No, screened out: The Proposed Scheme is not located in an urban area.
		Fires with the Proposed Scheme development zone	x	✓	✓	Yes

16.4 Assessment Methodology and Significance Criteria

Scenarios Assessed

16.4.1. The assessment will be structured around construction (Stages 1 & 2), and operation and maintenance (Stages 2 & 3) phases. This is considered to be the worst-case as no additional risks are introduced during Stage 0. Other assessment scenarios described in Chapter 3 (Site and Project Description) do not affect this assessment.

Extent of the Study Area and Receptors

16.4.2. The extent of the study area used for the MA&D assessment is the COMAH Consultation Zone for the Existing Power Station Complex (i.e. the Drax installation as it is referred to under the COMAH Regulations) and a 1 km wide corridor along the proposed route of the Gas Pipeline. Note that this is different to the area used for the scoping study described above.

16.4.3. Within the study area, the assessment of significant adverse effects has considered all factors defined in the regulations, i.e. population and human health, biodiversity, land, soil, water, air and climate and material assets, cultural heritage and the landscape.

16.4.4. Assessments within the ES such as the resilience of the Proposed Scheme to climate change (Appendix 15.1) and the flood risk assessment (Document reference 6.8) are relevant to this topic. Although, they are not receptors as defined above, they are potential hazards that may lead to Risk Events, and therefore have been considered accordingly within the ES and included within the MA&D assessment.

16.4.5. Certain receptors have been excluded from the assessment, for the reasons described in 16-3 below.

Table 16-3 - Excluded Receptors

Excluded Receptors	Reason for Exclusion
Employees of Drax Power Ltd and/or its suppliers, whether during construction, operation or maintenance of the Proposed Scheme.	Drax Power Ltd's commitment and obligations to manage risks to employees are described in other documents (e.g. Drax's H&S management system).
Members of the public who are wilfully trespassing.	Outside the occupier's legal requirements under the Occupier's Liability Act 1984 (Ref.16.34).

Method of Baseline Data Collation

16.4.6. The assessment uses baseline information collected from other chapters of the ES to define the receptors and the Proposed Scheme's vulnerability to a major accident or disaster. In particular, baseline information on climate change, community,

ecology, health, socio-economics, traffic and transport and water resources and flood risk is pertinent to the assessment.

16.4.7. In accordance with Schedule 4 Paragraph 8 of the EIA Regulations 2017, available safety assessments undertaken for the Proposed Scheme have been used to inform the identification and assessment of likely significant environmental effects. For the purposes of the Proposed Scheme these include for example Construction, Design and Management (CDM) risk registers and hazard identification studies current at the time of undertaking the assessment. Application and acceptance of the ALARP principle is within the remit of the Health and Safety Executive and not part of the EIA.

16.4.8. The assessment will be based on a review of available documentation and regulatory requirements.

16.4.9. Additional baseline information was required on features external to the Proposed Scheme which could contribute a potential source of hazard to the Proposed Scheme (Appendix 16.2). This information was obtained from a desk based study. Such features included but were not limited to:

- Presence of COMAH sites.
- Potentially hazardous ground conditions.
- Proximity to other infrastructure (road, rail, aviation, energy).

16.4.10. The assessment of significant adverse effects on the environment has been undertaken with reference to only the regulatory requirement and design standards in place for the construction and operation of the Proposed Scheme.

16.4.11. The assessment provides a collation and review of available risk assessments, as defined in paragraph 16.4.7, to identify whether significant effects on the environment have been determined, and whether such risks have been managed and mitigated to be ALARP.

Assessment Methodology

16.4.12. The potential for identified relevant major accident and/or disaster events to result in a significant adverse environmental effect will be evaluated using a risk based approach. The approach will consider the environmental consequences of a Risk Event, the likelihood of these consequences occurring, taking into account planned design and embedded mitigation, and the acceptability of the subsequent risk to the environment. The process followed includes:

- Identifying risks;
- Screening these risks;
- Defining the impact;
- Assessing the likelihood; and
- Then assessing the risk.

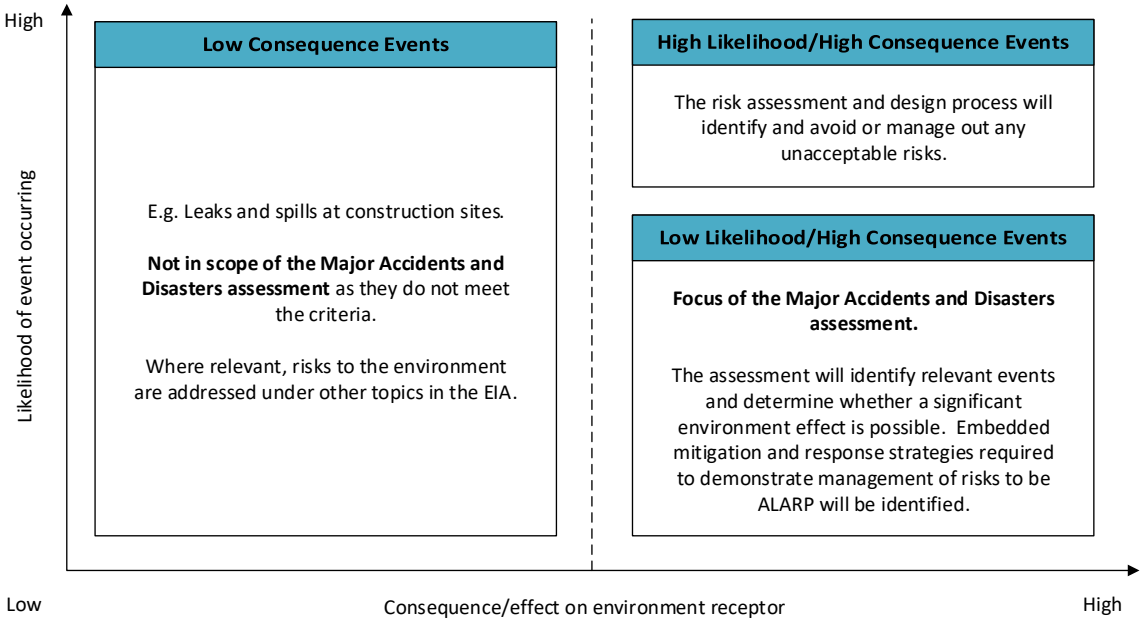
Identify Risks

16.4.13. The MA&Ds considered in the assessment are rare events.

16.4.14. All low consequence events, whatever their likelihood, do not meet the definition of major accidents and/or disasters (section 16-2). For example minor spills which may occur during construction, but would be limited in area and volume and temporary in nature do not meet the definition of a major accident. Such minor events would be dealt with under the Drax or contractors' Environmental Management System (EMS) and do not fall within the scope of this assessment.

16.4.15. This assessment focuses on low likelihood but potentially high consequence events (see Figure 16-2).

Figure 16-2 - Summary of risk event considered in the scope of the assessment for major accidents and/or disasters



16.4.16. Low likelihood is defined for the purposes of this assessment, as something that may occur during the lifetime of the Proposed Scheme, so no more than once in 10 years for the construction phase, and no more than once in 100 years for the operational phase.

16.4.17. This is an upper boundary for low likelihood. Very low likelihood events will also be included in the assessment, which may only occur at most once in every 1,000 years. Mitigation measures will reflect what is reasonable for such rare events, considering their potential consequence, within the guiding principle of risks being ALARP.

16.4.18. High consequence events are considered to lead to a significant adverse effect which will typically align with definitions given for each environmental topic.

16.4.19. Risk identification will use existing sources of information wherever possible, as described in Section16.5, such as risk assessments undertaken for the Proposed Scheme as part of other processes (many of which are required by law) or Risk Events identified within the UK's current National Risk Register. It is envisaged that

no additional risk assessments will be undertaken. The risk identification activity will focus on collating and reviewing these existing sources.

16.4.20. In order to identify whether a Risk Event has the potential to be a major accident and/or disaster, which also has the potential to have a significant adverse effect on an environmental receptor, three components need to be present: a source, a pathway (between source and receptor) and a receptor. As such, and as recommended by Defra (2011), the assessment uses the following conceptual model:

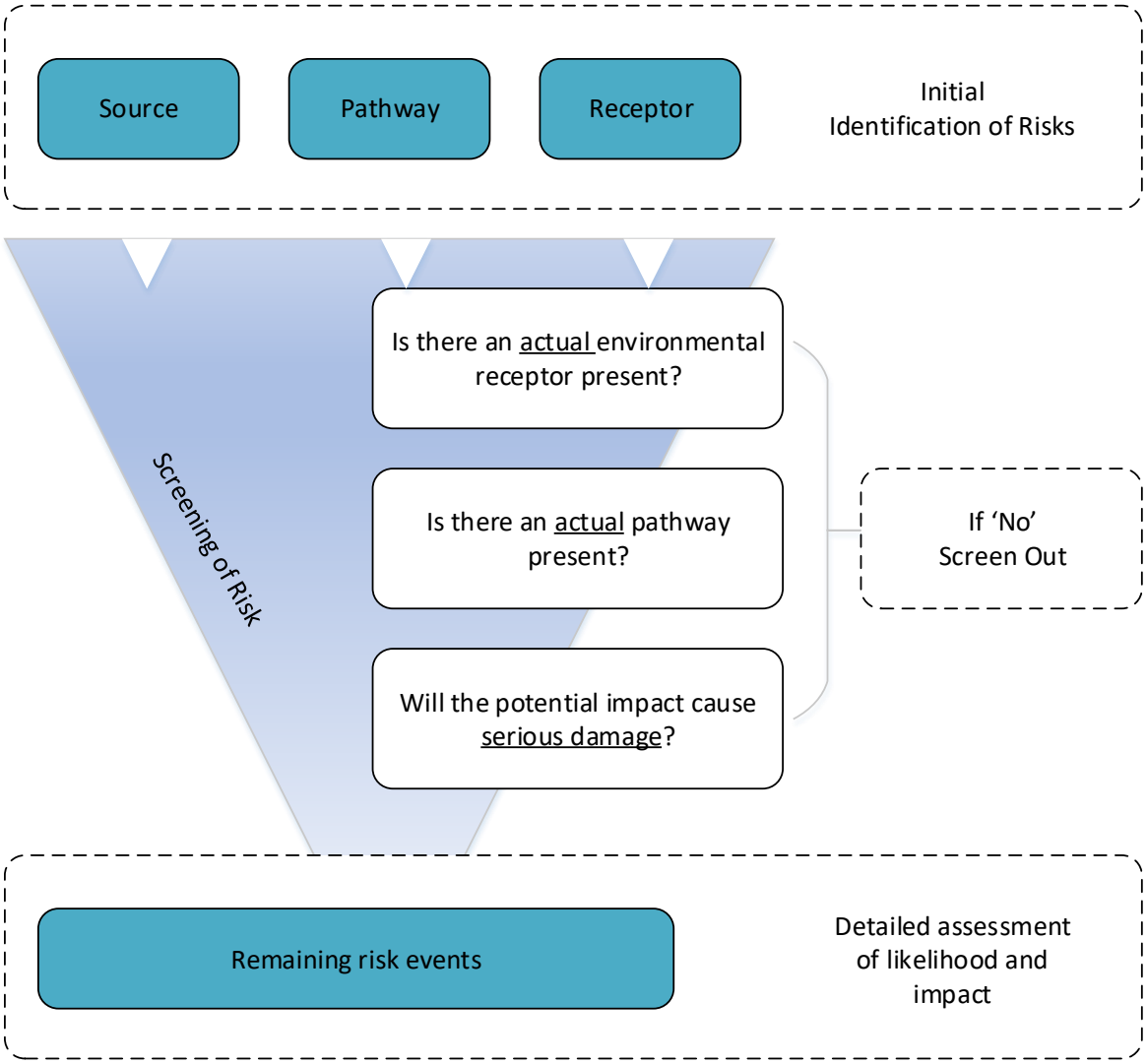
- The **source** is the original cause of the hazard, which has the potential to cause harm;
- The **pathway** is the route by which the source can reach the receptor; and
- The **receptor**, which is the specific component of the environment that could be adversely affected, if the source reaches it.

16.4.21. Risk Events which do not have all three components will be screened out from the assessment (Figure 16-3)

Screen Risks for those within Scope

1. Is there a potential source, and/or pathway and/or receptor. If not, no further assessment required;
2. Is there a relevant environmental receptor present in the locations where the risk event could occur, and a pathway whereby the source of harm can reach the receptor? If not, no further assessment required; and
3. Does the potential impact on the environmental receptor meet the definition of a significant adverse effect. If not, no further assessment required.

Figure 16-3 - Screening Process Flow Diagram



16.4.22. For those Risk Events which are not screened out during the three step process, the following assessment methodology has been used. The assessment forms the basis for recommending additional mitigation measures, as appropriate.

Embedded Mitigation

16.4.23. Several mechanisms are in place to reduce the vulnerability of the Proposed Scheme to major accidents and/or disasters, or mitigate significant effects on the environment should they occur. All measures to manage and reduce risk of significant adverse effects occurring as a result of the vulnerability of the Proposed Scheme to major accidents and/or disasters are considered to be 'embedded' mitigation measures for the purposes of the assessment. It has been assumed that:

- The design of the Proposed Scheme will take into consideration the relevant potential mitigation measures set out in NPS EN-1, EN-2 and EN-4. Further detail of embedded mitigation through design is set out in the relevant topic

chapters, such as flood mitigation in Chapter 13 (water resource, quality and hydrology) and Chapter 15 (Climate), and will also include:

- The design of Units X & Y and the Gas Pipeline will be subject to relevant Hazard Identification (HAZID) studies and actions identified integrated into the final design to reduce risks to as low as reasonably practicable.
- The design, installation, commissioning, operation and maintenance of plant, piping, equipment and machinery, including associated systems, will take into account Good Engineering Practice (GEP).
- The actions stated in the Applicant's existing Major Accident Prevention Plan (MAPP), which will be updated in order to cover the operation of the Proposed Scheme ahead of the commissioning of Units X and Y, are fully and effectively implemented. The requirements of a MAPP are set out in the COMAH Regulations 2015,
- All control and mitigation measures identified in the Pipeline Safety Report for the Gas Pipeline are fully and effectively implemented. A Pipeline Safety Report is a requirement of the Pipeline Safety Regulations 1996.
- The construction stage(s) of the Proposed Scheme will be managed through the implementation of the Construction Phase Plan and Construction Environmental Management Plan (CEMP) (required under the CDM Regulations 2015 and the final approval and implementation of which is proposed to be secured by a requirement in Schedule 2 to the draft DCO (Document reference 3-1)).

Define Impact

16.4.24. A reasonable worst case environmental impact(s) has been identified for each Risk Event which remains in scope following assessment through a qualitative assessment, supported where necessary by consultation with relevant disciplines for each environmental topic within the ES. This does not have to be an extensive or quantitative assessment, but must answer the question ‘could this event constitute a major accident or disaster in terms of the definitions provided. Where relevant, specific sensitive receptors around the Power Station Site and along the Pipeline Area of the Proposed Scheme are considered. The Environmental Risk Record (Appendices 16.3 and 16.4), which sets out the results of the review process undertaken for major accidents and disasters, reflects this review, and records the consultation outcome.

Assess Embedded Mitigation Measures

16.4.25. The likelihood of the reasonable worst case environmental effect(s) occurring has been evaluated taking into account:

- The likelihood of the risk event occurring considering the measures already embedded into the design and execution of the Proposed Scheme; and
- The likelihood that an environmental receptor is affected by the risk event.

16.4.26. Likelihood assessments are not necessarily quantitative, but evaluate whether the effect (for example, loss of life) is a possible outcome of the risk event.

16.4.27. This evaluation refers to existing risk assessments as well as consultation with relevant discipline specialists as defined in Section 16.1.7, with reference to the definition of low likelihood in Section 16.1.1.

Assess Risk

16.4.28. The assessment of the risk has been carried out using a MA&D assessment tool and the results presented in an Environmental Risk Record (Appendices 16.3 and 16.4). Where likely significant adverse effects are identified, mitigation measures must be in place, commensurate with the likelihood of the event occurring. The assessment considers, in consultation with relevant disciplines, whether the risk to the environmental receptor is managed to be ALARP with the existing measures. If gaps are identified, where the existing measures do not represent management of risks to an environmental receptor to be ALARP, then additional measures may be required.

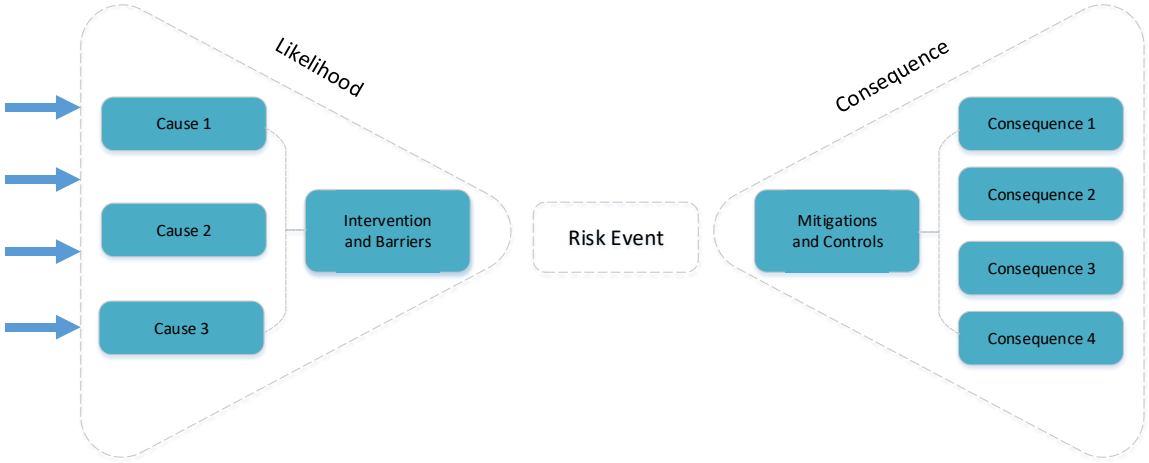
Appraise Risk Management Options

16.4.29. Risk management options, including embedded mitigation (refer to Section 16.6.27), fall into one of the following categories consistent with the mitigation hierarchy used for the EIA:

- Eliminate (or 'avoid') the risk, by adopting alternative processes in order to eliminate the source of the hazard, or remove the receptor;
- Reduce the risk by adapting proposed processes such that either the likelihood or the impact of the risk event can be reduced;
- Isolate the risk, by using physical measures to ensure that should the risk event occur, it can be effectively isolated such that there is no pathway;
- Control the risk, by ensuring that appropriate control measures are in place (e.g. emergency response) so that should a risk event occur, it can be controlled and managed appropriately. The EIA mitigation hierarchy of repair and compensate any significant damage to environmental receptors may then apply following a control measure; and
- Exploit the risk, if it presents potential benefits or new opportunities.

16.4.30. Figure 16-4 shows the principles of managing risk, where measures to prevent a risk event occurring are barriers or intervention measures (for example appropriate pipeline route selection), or mitigation measures and controls in place should an event occur (for example, firewater containment measures).

Figure 16-4 - The Principles of Managing Risks Both Pre and Post Event



16.4.31. The regulatory framework for the Proposed Scheme will ensure that safety risks will be adequately addressed and appropriate emergency preparedness and response arrangements are developed and put in place (i.e. COMAH Regulations 2015 and Pipelines Safety Regulations 1996).

Significance Criteria

16.4.32. Significance for MA&D is based on professional judgement. Factors to consider in determining whether potential adverse effects are significant include:

- The geographic extent of the effects. Effects beyond the project boundaries are more likely to be considered significant;
- The duration of the effects. Effects which are permanent (i.e. irreversible) or long lasting are considered significant;
- The severity of the effects in terms of number, degree of harm to those affected and the response effort required. Effects which trigger the mobilisation of substantial civil emergency response effort are likely to be considered significant;
- The sensitivity of the identified receptors; and
- The effort required to restore the affected environment. Effects requiring substantial clean-up or restoration efforts are likely to be considered significant.

16.5 Baseline Conditions

16.5.1. The baseline relevant to this topic comprises:

- Features external to the Proposed Scheme that contribute a potential source of hazard to the Proposed Scheme;
- Sensitive environmental receptors at risk of significant effect; and
- Current (without the Proposed Scheme) major accident and disaster risks.

16.5.2. Within the Proposed Scheme, the Gas Pipeline from the National Transmission System to the Power Station Site will be constructed across rural / agricultural land which is managed through standard agricultural practices. Units X and Y are being constructed within the boundary of the Existing Drax Power Station Complex.

Baseline Features that Contribute a Potential Source of Hazard

16.5.3. As far as is reasonably practicable, the route of the Gas Pipeline avoids existing features that have the potential to present a hazard to the construction or operation of the Proposed Scheme. There are no sites within 3 miles of the Proposed Scheme (other than the Existing Drax Power Station Complex) where hazardous materials and/or substances are stored, used or made in types or quantities to trigger registration under the Control of Major Accidents Hazards (COMAH) Regulations.

16.5.4. Features external to the Proposed Scheme that lie within the land required to construct the Proposed Scheme and/or cross the route of the Proposed Scheme that present a potential source of hazard, either during construction or operation include, but are not limited to:

- Oil, gas and electricity transmission;
- Potential presence of unexploded ordnance;
- Former landfill sites and the potential presence of landfill gas; and
- Adjacent highways, both local roads and motorways.

16.5.5. These features, where present, have been considered and addressed as appropriate throughout the design development.

Baseline Accident and Disaster Risks

16.5.6. Major accident and disaster risks relevant to the baseline in the absence of the Proposed Scheme include extreme weather events, associated flooding and road traffic collisions. Baseline ‘without project’ conditions are described in the following chapters: Chapter 5 (Transport), Chapter 12 (Water Resources, Quality and Hydrology) and Chapter 15 (Climate).

Surface Water Floods

16.5.7. Historic flood records used in the baseline condition section of Chapter 12 (Water Resources, Quality and Hydrology) explain that no events have been recorded in the vicinity of the Proposed Scheme.

Droughts

16.5.8. Droughts are caused by insufficient rainfall and in the UK context, a drought is defined as at least 15 consecutive days where there is no more than 0.2 mm of precipitation.

16.5.9. For England and Wales, the drought of 2010 to 2012 was one of the ten most significant droughts of one to two years duration in the last 100 years. The drought was due to a sequence of dry months from winter 2009/10 to March 2012, particularly in the spring, autumn and winter seasons. The drought resulted in concerns for farming due to the very dry ground, water resources and the environment generally.

16.5.10. Between April 2010 and March 2012, the Drax area only received 65-85% of rainfall compared with the 1981-2010 average (Ref: 16.35).

16.5.11. There was a drought in 1995-1996 which affected the area of the Proposed Scheme (Ref 16.36).

Hurricanes, Storms and Gales

16.5.12. Hurricanes cannot form in or around the UK as the sea temperatures are not warm enough to sustain a wind of at least 120 km/h, which is one of the measurements used to classify a hurricane. However, deep depressions that were originally hurricanes are experienced in the UK.

16.5.13. According to the latest five year meteorological data (2002 - 2016) from RAF Waddington used in the air quality dispersion modelling for the Proposed Scheme, the greatest wind speed recorded was 66 km/h. The RAF Waddington site is located more than 60 km south of Drax and therefore a review of wind speeds during 2009-2012 from the closest weather station to Drax at Church Fenton, decommissioned in 2013, identified a maximum wind speed of 76 km/h.

Extreme Temperatures: Heatwaves, Low (sub-zero) Temperature and Heavy Snow.

16.5.14. Between 1981 and 2010, there were 12 occurrences where summer mean temperatures exceeded 25.2°C on five or more consecutive days.

16.5.15. Between 1981 and 2010, there have been 1,368 days with a maximum minimum temperature below zero degrees Celsius.

16.5.16. Between 1981 and 2010, there were 229 days with snow lying at 0900 however, there are no records from the Met Office of the depth of snow.

Poor Air Quality (Construction Phase)

16.5.17. According to Chapter 6, paragraph 6.5.7 (Air Quality), current baseline air quality within the Proposed Scheme does not exceed the relevant air quality objectives for NOx, NO_2, PM_{10} and $PM_{2.5}$.

Industrial Accidents

16.5.18. There are no industrial sites located in close proximity to the Proposed Scheme, other than the Existing Drax Power Station Complex itself, and for which there are no records of any major industrial accidents.

Pollution Incidents

16.5.19. According to the Envirocheck Report (dated 17 October 2017), 20 pollution incidents to controlled waters have occurred within 1 km of the Proposed Scheme.

Transport Accidents

16.5.20. The majority of the Gas Pipeline to the Existing Drax Power Station Complex will be routed through agricultural land and no traffic accidents have occurred. The nearest relevant highway is the section of New Road beside the proposed new Gas Receiving Facility (GRF) into which the Gas Pipeline will connect.

Electricity, Gas, Water Supply or Sewerage System Failures

16.5.21. It is understood that natural gas is not currently present on the Existing Drax Power Station Complex.

16.5.22. There is a foul water drainage and water supply connection on the Existing Drax Power Station Complex. However, there are no existing connections in the Pipeline Construction Area, but there are connections at residential properties, Read School, farms and businesses which are in close proximity to the Proposed Scheme.

Acts of Terrorism

16.5.23. No acts of terrorism have been recorded at the Existing Drax Power Station Complex.

Design Evolution

16.5.24. The design of the Proposed Scheme continues to be informed by a suite of health and safety regulations, design codes and other legal requirements. Adhering to these requirements minimises the risk of major accidents and disasters from being initiated.

16.6 Assessment of Potential MA&D

16.6.1. The reconfiguration works (Stage 0) will be within the Existing Drax Power Station Complex and therefore the risk events associated with these will be covered under the current requirements the Applicant must comply with under COMAH Regulations 2015 and CDM Regulations 2015 to prevent any off-site impact.

16.6.2. Information in the other Environmental Topic Chapters indicate that Stage 0 is considered to have insignificant effects and is therefore considered to be no worse than the assessment of Stage 1 and Stage 2 of the Proposed Scheme. Therefore Stage 1 and 2 are considered to be the worst case scenarios and the following results of the assessment of potential MA&D events are presented in Appendices 16.3 and 16.4 and summarised below for Stages 1 and 2.

Construction Phase (Stages 1 & 2)

16.6.3. Major accidents and disasters to which the Proposed Scheme may be vulnerable during the construction phase and the outcomes of the assessment are detailed in the Environmental Risk Record (Appendix 16.3).

Potential Major Risk Events - Construction Phase

16.6.4. Table 16-4 describes those Risk Events whose impact on an environmental receptor has the potential to be a MA&D as defined in Section 16.2.

Table 16-4 - Potential Major Accident and / or Disaster Events during Construction Grouped by High Level Risk Event

ID	Risk Description	Risk Event (High Level)	Reasonable Worst Consequence if Event Did Occur
Pipeline			
C1	Striking of underground services/utilities.	Fire and/or explosion or release of harmful gas	Fire and/or explosion affects neighbouring property and/or members of the public.
C3	Increased road accidents due to additional road traffic. Travel delays. Noise. Air quality. Mud on road. Reduce dust.	Major road traffic accident	Death and / or injury to a member of the public
C4	During ground investigation or construction discovering UXO	Fire and/or explosion or release of harmful gas	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.
C5	Potential flooding and especially a risk if near homes. Impact on habitats and wildlife mitigation.	Extreme weather (flood)	Flooding affecting neighbouring property.
C8	Contamination of groundwater during construction.	Physical damage or contamination of aquifer or borehole	Loss of drinking water supply
C10	Flooding - Storm / Burst water pipe / watercourse. Gas from ground contamination.	Extreme weather (flood)	Flooding affecting neighbouring property.
C13	Increased maintenance requirements as a result of settlement.	Fire and/or explosion or release of harmful gas	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.
C20	Potential for terrorist attack.	Fire and / or explosion or release of harmful gas	Multiple injuries including fatalities.

ID	Risk Description	Risk Event (High Level)	Reasonable Worst Consequence if Event Did Occur
C23	Damage to buildings or road infrastructure leading to injury of member of the public or workers.	Collapse to structures	Collapse/impact leads to harm to members of public.
Power Station			
C3	Increased road accidents due to additional road traffic. Travel delays. Noise. Air quality. Mud on road. Reduce dust.	Major road traffic accident	Death and / or injury to a member of the public
C12	Damage to buildings or road infrastructure leading to injury of member of the public or workers.	Collapse to structures	Collapse/impact leads to harm to members of public.
C17	Electrocution risk to personnel and / or members of the public.	Harm to people	Collapse/impact leads to harm to construction and others in the vicinity
C18	Injury to member of public.	Harm to people	Collapse/impact leads to harm to construction and others in the vicinity.
C33	Release of contaminants onto land outside of the Proposed Scheme.	Harm to ecological receptors	Reversible on site soil contamination

Operation and Maintenance Phase (Stages 2 &3)

16.6.5. Major accidents and disasters to which the Proposed Scheme may be vulnerable during the operation and/or maintenance phase and the outcomes of the assessment are detailed in the Environmental Risk Record (Appendix 16.4).

16.6.6. Table 16-5 describes those Risk Events whose impact on an environmental receptor has the potential to be a MA&D as defined in Section 16.2.

Table 16-5 - Potential Major Accident and / or Disaster Events during Operation and Maintenance Grouped by High Level Risk Event

ID	Risk Description	Risk Event (High Level)	Reasonable Worst Consequence if Event Did Occur
Pipeline			
O27, O28, O30, O33	Loss of containment of gas leading to unconfined gas explosion.	Fire and/or explosion or release of harmful gas	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.
O32, O33	Risk to human health either from long term exposure from leakage which could lead to dangerous concentrations of methane building up within confined spaces, particularly residential property, Read School buildings and in agricultural buildings. To a lesser extent there is a theoretical risk to the general public using rights of way or farmers working on the land due to a sudden gas release to the atmosphere.	Harm to people	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.
O35, O36	Loss of containment of gas leading to unconfined gas explosion	Fire and/or explosion or release of harmful gas	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.
O37, O38	Risk to human health either from long term exposure from leakage which could lead to dangerous concentrations of methane building up within confined spaces, particularly residential property, Read School buildings and in agricultural buildings. To a lesser extent there is a theoretical risk to the general public using rights of way or farmers working on the land due to a sudden gas release to the atmosphere.	Harm to people	Fire and/or explosion affects neighbouring property and/or those people in the immediate area.
Power Station Changes			
M11	Potential for terrorist attack.	Fire and / or explosion or release of harmful gas	Multiple injuries including fatalities.

16.6.7. Key management and mitigation measures are described in Appendix 16.4. In all cases, compliance with the legal and regulatory requirements described in this section to manage risks to be ALARP must be demonstrated, including the requirement to:

- Manage all site and pipeline accident risks in accordance with the site MAPP and Pipeline Safety Report. Measures have to be accepted by the regulator as being adequate to manage risks to be ALARP in order for licence to be granted;
- Comply with design standards, this will include designing to appropriate environmental parameters (flood, wind, lightning) including climate change. Design standards apply to plant, pipeline, controls and systems, civil infrastructure, and electrical infrastructure; and
- Co-Ordinate between Drax Power Ltd and the National Grid gas network.

16.7 Mitigation Measures

16.7.1. Embedded are summarised in the Environmental Risk Record (Appendix 16.3 and 16.4).

16.8 Limitations and Assumptions

16.8.1. Key assumptions for the MA&D assessment are that:

- There will be no natural gas storage associated with the Proposed Scheme. The only natural gas present will be that actually in the Gas Pipeline, transported to the GRF and to the gas turbines themselves; this quantity of natural gas will be below the limit set by the COMAH Regulations for a lower tier COMAH site. The natural gas is used almost as soon as it comes onto site via the Gas Pipeline.
- The Proposed Scheme is being designed and its implementation guided by other industry standards and codes, many of which are mandatory. These require infrastructure and systems to be designed so that risks to people and the environment are either eliminated or reduced to levels that are ALARP.
- Environmental effects associated with unplanned events that do not meet the definition of a major accident and / or disaster (e.g. minor leaks and spills that may be contained within the construction sites are addressed in the topic chapters and not in this section). It is also recognised that the management framework for the Proposed Scheme is not fully defined at this stage; however a presumption of standard practice and regulatory compliance within the adopted management framework has been assumed and will be developed following the appointment of the EPC contractor.

16.8.2. In terms of the assessment methodology, the following assumptions have been made:

- No site visits were be conducted, the assessment was be desk-based;
- No modelling or detailed calculations were undertaken, the qualitative assessment took the form of ‘sign-posting’ to existing risk assessments, and

assessment of potential gaps or residual risks which are not considered to be managed using the ALARP principle;

- Where information was not available, professional judgement was used to reach a conclusion; and
- In accordance with good safety management principles, it was assumed that all risks that have the potential to be major accidents or disasters, and could impact a local environmental receptor, would be managed using the ALARP principle.

16.9 Summary

16.9.1. Given the processes that are in place, and the resulting measures that will be introduced to avoid and/or reduce the vulnerability of the Proposed Scheme to major accidents and/or disasters (CEMP, Construction H&S Plan, MAPP), it is considered that the risks of any such event occurring will be managed to be as low as reasonably practicable (ALARP). The application of the ALARP principle for the management of safety risks has been accepted by the Health and Safety Executive.

16.9.2. The Health & Safety Executive will only authorise construction of the Gas Pipeline on the basis of their assessment of the Pipeline Pre-construction Safety Report and then operation following their assessment of the Operational Safety Report (which therefore must ensure that all risks are mitigated to be ALARP and have appropriate emergency preparedness and response plans). Without their authorisation, the Proposed Scheme would not be granted a licence to operate.

16.9.3. As a result, it is considered that there will not be any likely significant environmental effects arising from the vulnerability of the Proposed Scheme to major accidents and disasters.

16.9.4. The measures in place to avoid and/or reduce the vulnerability of the Proposed Scheme to MA&D will be considered and be subject to review under other legislative processes in the Act.

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