ENVIRONMENTAL STATEMENT – VOLUME 1 – CHAPTER 17 MAJOR ACCIDENTS AND DISASTERS

Drax Bioenergy with Carbon Capture and Storage

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

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TABLE OF CONTENTS

PLATES

TABLES

17. MAJOR ACCIDENTS AND DISASTERS

17.1. INTRODUCTION

17.1.1. This chapter reports the outcome of the assessment of likely significant environmental effects arising from the Proposed Scheme on of the vulnerability of the Proposed Scheme to the risk of Major Accidents and Disasters (MA&D).

17.1.2. Impacts during the construction phase, operational phase and decommissioning of the Proposed Scheme are assessed. For the purpose of the EIA, the vulnerability of the Proposed Scheme to a MA&D event during decommissioning is anticipated to be no worse than that for the construction phase following the implementation of the risk management plans for decommissioning. The construction phase and decommissioning are therefore considered together.

17.1.3. A full description of the Proposed Scheme is described in **Chapter 2 (Site and Project Description)** of this ES (document reference 6.1.2).

17.1.4. This chapter (and its associated figures (**Volume 2**) and appendices (**Volume 3**)) is intended to be read as part of the wider ES with particular reference to **Chapter 5 (Traffic and Transport)** (document reference 6.1.5)**, Chapter 6 (Air Quality)** (document reference 6.1.6)**, Chapter 8 (Ecology)** (document reference 6.1.8)**, Chapter 11 (Ground Conditions)** (document reference 6.1.11)**, Chapter 12 (Water Environment)** (document reference 6.1.12) and **Chapter 14 (Climate Change Resilience)** (document reference 6.1.14).

17.1.5. This chapter:

- **a.** Summarises the legislative and policy framework;
- **b.** Describes consultation undertaken to date;
- **c.** Describes the methodology followed for the assessment;
- **d.** Identifies the potential impacts as a result of the Proposed Scheme;
- **e.** Details the design, mitigation and enhancement measures that have been identified;
- **f.** Reports the assessment of the significant effects resulting from the vulnerability of the Proposed Scheme to the risk of major accident(s) and / or disaster(s); and
- **g.** Details the monitoring that should be carried out for the Proposed Scheme.

OPTIONALITY

17.1.6. For the purposes of this assessment the options, as described in **Chapter 2 (Site and Project Description) para 2.3.5** do not affect the assessment. The sequential construction or development of Units 1 and 2 at the same time will not increase the vulnerability of the Proposed Scheme or the Existing Drax Power Station Complex to a MA&D. Furthermore, Drax Power Station employees and their contractors are out of scope of the assessment as their health and safety (H&S) is managed through other regulatory regimes.

17.2. LEGISLATIVE AND POLICY FRAMEWORK

LEGISLATIVE FRAMEWORK

17.2.1. The applicable legislative framework is summarised as follows.

International

Directive 2014/52/EU amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

17.2.2. "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

Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

17.2.3. Schedule 4 Paragraph 8 of the Regulations require:

- **a.** A description of the expected significant adverse effects of the Proposed Scheme on the environment deriving from the vulnerability of the Proposed Scheme to risks of major accidents or disasters that are relevant to the project concerned; and
- **b.** If appropriate, a description of the measures envisaged to prevent or mitigate the significant adverse effects of major accidents and / or disasters on the environment and details of the preparedness for and proposed response to such emergencies.

Health and Safety at Work etc. Act 1974 (c. 37)

17.2.4. The Act provides the framework for the regulation of workplace health and safety in the UK. It provides a legal framework for the provision of safe plant and equipment and prevention of harm to people from occupation hazards present in a workplace, including emergencies which may affect those offsite, or visiting the site.

Construction (Design and Management) Regulations 2015 (CDM)

17.2.5. These regulations place legal duties on almost all parties involved in construction work. The regulations place specific duties on clients, designers and contractors, so that health and safety is taken into account throughout the life of a construction project from its inception to its subsequent final demolition and removal.

17.2.6. The Client, Designers and Contractors have to avoid foreseeable risks so far as is reasonably practicable by eliminating hazards associated with the design, construction, operation and maintenance aspects of the Proposed Scheme.

17.2.7. Therefore, the regulations ensure that mechanisms are in place to continually identify, evaluate and manage safety risks throughout the design, construction phase and

operational phase of the Proposed Scheme. Many of the risks identified and managed out at the design phase also serve to eliminate or reduce the risk of a major accident (and therefore environmental consequence) occurring during the construction phase, operational phase and maintenance phase.

Control of Major Accident Hazards Regulations 2015 (COMAH)

17.2.8. The purpose of the COMAH Regulations is to prevent major accidents involving dangerous substances and limit the consequences to people and the environment of any accidents which do occur.

17.2.9. The Existing Drax Power Station Complex is a Lower Tier establishment under the Regulations. Therefore, the Major Accident Prevention Policy for the installation will be updated to address the changes to the risk profile of the installation by the Proposed Scheme and the risks will be As Low As Reasonably Practicable (ALARP).

The Planning (Hazardous Substances) Regulations 2015

17.2.10. These regulations transpose the land-use planning requirements of the European Seveso III Directive and relate to the way hazardous substances consents operate, and the way in which the planning system reduces the likelihood and impact of major accidents.

17.2.11. Hazardous substance consents focus on ensuring the safety of the public around the consented site from potential major accident hazards.

17.2.12. Changes to the hazardous substance inventory and risk profile of the Existing Drax Power Station by the Proposed Scheme would be reviewed to ensure that risk control measures are ALARP.

17.2.13. Many of the risks identified and managed out at the design phase also serve to eliminate or reduce the risk of a major accident (and therefore environmental consequence) occurring during the construction phase, operational phase and maintenance phase.

The Supply of Machinery (Safety) Regulations 2008

17.2.14. The Regulations aim to remove technical barriers to trade, in particular products, by harmonising national health and safety provisions applicable to such products when they are first placed on the market or put into service in the European Economic Area.

17.2.15. Many of the risks identified and managed in the design of machinery used in and associated with the Proposed Scheme will serve to eliminate or reduce the risk of a major accident (and therefore environmental consequence) occurring during the construction phase, operational phase and maintenance phase of the Proposed Scheme.

The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)

17.2.16. DSEAR implements the Chemical Agents Directive 98/24/EC (CAD) and the Explosive Atmospheres Directive 99/92/EC (ATEX 137). DSEAR sets minimum

requirements for the protection of workers from fire and explosion risks arising from dangerous substances and potentially explosive atmospheres.

17.2.17. Under the regulations, the capture, use and storage of carbon by the Proposed Scheme would require that mechanisms are in place to identify, evaluate and manage the risk of a major accident due to loss of containment of the carbon to ALARP.

17.2.18. Many of the risks identified and managed will serve to eliminate or reduce the risk of a major accident (and therefore environmental consequence) occurring during the construction phase, operational phase and maintenance phase of the Proposed Scheme.

The Equipment and Protective Systems for Use in Potentially Explosive Atmospheres Regulations 1996 and 2016

17.2.19. The Regulations implement measures for safety and consumer protection as respects electrical equipment and any provisions concerning the composition, labelling, marketing, classification or description of electrical equipment intended to be used in potentially explosive atmospheres.

17.2.20. The use of the correct level of intrinsically safe equipment and protective systems would minimise the available ignition sources in a flammable atmosphere if there were to be a loss of natural gas in the Proposed Scheme and therefore reducing the risk of a major accident.

The Reservoirs Act 1975

17.2.21. The purpose of the Act is to promote the safety of Large Raised Reservoirs, which are defined as retaining more than 10,000 m^3. The regulations require that any reservoir within the scope of the Act may only be designed, or construction supervised, by an Engineer on the appropriate panel. Following construction, another panel engineer must inspect the reservoir within three years. During the life of the structure, a member of the Supervising Engineers panel must be retained to carry out regular inspections, typically every year.

17.2.22. The cooling ponds located in north and south of the Existing Drax Power Station Site each have a capacity of 132,000 m^3 which classifies them as Large Raised Reservoirs. The area around Cooling Towers is used as a contained 'flood plain' in the event of tower basin failure.

Flood and Water Management Act 2010

17.2.23. The Flood and Water Management Act amends The Reservoirs Act 1975, to introduce a risk-based approach to reservoir safety in England and Wales reflecting the danger that reservoir failures might pose to human life.

17.2.24. The cooling ponds located in north and south of the Existing Drax Power Station Site each have a capacity of 132,000 m^3 which classifies them as Large Raised Reservoirs. The area around Cooling Towers is used as a contained 'flood plain' in the event of tower basin failure.

Occupier's Liability Act 1984 (c.3)

17.2.25. This Act amends the law of England and Wales as to the liability of persons as occupiers of premises for injury suffered by persons other than their visitors.

17.2.26. The Act provides a legal framework for the prevention of harm to people from occupational safety and health hazards present on premises under the control of the Occupier, including to those visiting the premises.

17.2.27. The Proposed Scheme includes premises controlled by the Applicant which attract visitors who could be impacted by MA&Ds whilst on / crossing those Applicant controlled premises.

POLICY FRAMEWORK

17.2.28. The applicable policy framework is summarised as follows:

National

Overarching National Policy Statement for Energy (EN-1) July 2011 and Draft Update September 2021

17.2.29. National Policy Statement (NPS) EN-1 (HM Government, 2011), (HM Government, 2021) 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).

17.2.30. NPS EN-1 does not set out any principles for the assessment of MA&D but does include reference to potential generic mitigation measures for environmental impacts for aspects which must be addressed by the ES. NPS EN-1 recognises that some energy infrastructure will be subject to the COMAH Regulations which will ensure that measures are implemented to prevent, control and mitigate major accidents.

National Planning Policy Framework 2021 and associated Planning Practice Guidance

17.2.31. The National Planning Policy Framework (NPPF) (HM Government, 2021) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. The NPPF provides three overarching objectives to achieving sustainable development which includes protecting and enhancing the natural, built and historic environment.

17.2.32. The NPPF does not set out any principles for the assessment of MA&D, however it does refer to accidents and risk assessments in Paragraph 45 as follows;

"Local planning authorities should consult the appropriate bodies when considering applications for the siting of, or changes to, major hazard sites, installations or pipelines, or for development around them."

17.2.33. Malicious threats and natural hazards are also referred to in Paragraph 97 of the NPPF which states that decisions;

"should promote public safety and take into account wider security and defence requirements by … anticipating and addressing possible malicious threats and natural hazards, especially in locations where large numbers of people are expected to congregate…this includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security."

Local

Selby District Council, Selby District Local Plan 2005 (SDLP), adopted February 2005

17.2.34. The Local Plan (Selby District Council, 2005) 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.

17.2.35. A new Local Plan is currently being prepared for Selby District Council (SDC) that will eventually replace current SDLP. As this new Local Plan emerges and the more advanced its preparation becomes, the more weight it will be attributed.

The Selby District Core Strategy Local Plan 2013 (CS), adopted October 2013

17.2.36. The Core Strategy (CS) Local Plan (Selby District Council, 2013) is the first part of the replacement for the 2005 SDLP (Selby District Council, 2005). This sets out the high-level strategic policies for the District for the period 2012 - 2028. The policies in the CS replace many of the SDLP policies. The CS does not set out any principles for the assessment of MA&D.

17.2.37. An assessment of the relevant policies is detailed further in the **Planning Statement** (document reference 5.2).

17.3. CONSULTATION

17.3.1. **Table 17.1** provides a summary of the consultation undertaken in support of the preparation of this assessment.

Table 17.1 - Consultation Summary Table

Date and Method of Consultation	Consultee	Summary of Key Topics discussed and Key Outcomes
20 December 2021 Meeting with Selby District Council and	SDC and NYCC	In the meeting it was noted that the Examining Authority would anticipate the Major Accidents and Disasters methodology to fall under the remit of the Health and Safety Executive (HSE) rather than the LPA.

Date and Method of Consultation	Consultee	Summary of Key Topics discussed and Key Outcomes
North Yorkshire County Council		It was suggested that similar wording therefore be used in the Statement of Common Ground with NYCC and SDC as was provided for Drax Repower, with the option to revisit this at Examination if encouraged to do so by the Examining Authority.
12 January 2022 Response to HSE's Section 42 Consultation Comments	HSE	Confirmation of consultation with major hazard sites whose Consultation Zone (CZ) the Proposed Scheme overlaps. Confirmation that hazard identification studies have been undertaken which have identified potential major accidents and considered whether these could impact Lytag Ltd and the Existing Drax Power Station Complex. In addition, these studies have also considered whether an event (such as an explosion) at Lytag Ltd or the Existing Drax Power Station could impact the operations of the Proposed Scheme. Confirmation that the assessment of occupied buildings will be captured in the updated COMAH Safety Report for the Power Station site. Confirmation that an application for a Hazardous Substances Consent will be submitted, if required. It was suggested that a Statement of Common Ground could be entered into with the HSE.
28 January 2022 Drax Bioenergy with Carbon Capture and Storage Project – Update Meeting	The Planning Inspectorate	Confirmation that the methodology for Major Accidents and Disasters is being consulted upon with relevant Statutory Consultees, as requested by PINS. An explanation as to why low consequence events will not be considered in the ES was provided.

17.3.2. An **EIA Scoping Opinion Appendix 1.2** (document reference 6.3.1.2) was received by the Applicant from the Planning Inspectorate (PINS) on behalf of the Secretary of State (SoS) on 26 February 2021, including formal responses from Statutory Consultees. The responses from PINS in relation to MA&D and how these requirements are addressed by the Applicant are set out in the **Scoping Opinion Responses Appendix 4.2** (document reference 6.3.4.2).

17.4. KEY DEFINITIONS

17.4.1. The definition of key terms used in this chapter are included in the **Glossary** for the Proposed Scheme (document reference number 1.7) but have been reproduced in **Table 17.2** below to assist the reader. These definitions have been developed by reference to the definitions used in EU and UK legislation, (including the Seveso III Directive, The Control of Major Accident Hazard Regulations 2015, The Major Accident Off-Site Emergency Plan (Management of Waste from Extractive Industries) (England and Wales) Regulations 2009 and The Pipelines Safety Regulations 1996) and guidance relevant to major accidents and / or disasters, (The International Federation of Red Cross and Red Crescent Societies, 2021), (Department for Environment, Food & Rural Affairs, 2011), (Health and Safety Executive, 2015), (COMAH Competent Authority, 2016) as well as professional judgement in the context of the Proposed Scheme.

Table 17.2 - Key Definitions

Term	Definition
(Major) Accident	In the context of the **Proposed Scheme**, an event that threatens immediate or delayed serious damage to human health, welfare and / or the environment and requires the use of resources beyond those of **the Applicant** or its contractors. Serious damage includes the loss of life or permanent injury and / or permanent or long-lasting damage to an environmental **receptor** that cannot be restored through minor clean-up and restoration efforts (which consitutes the definition of significance of likely effects).The significance of this effect will take into account the extent, severity and duration of harm and the sensitivity of the receptor. Major accidents are low likelihood, high consequence events.
ALARP	ALARP stands for "*as low as reasonably practicable*". Reasonably practicable involves weighing a risk against the trouble, time and money needed to control it. Thus, ALARP describes the level to which the Health & Safety Executive (HSE) expect to see workplace risks controlled.

Term	Definition
Adaptive Capacity	The capacity of receptors to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.
Consultation Zone (CZ)	The HSE sets a Consultation Distance (CD) around major hazard sites and major accident hazard pipelines after assessing the risks and likely effects of major accidents at the major hazard site / pipeline. The area enclosed within the CD is referred to as the consultation zone. The Local Planning Authority is notified of this CD and has a statutory duty to consult HSE on certain proposed developments within the zone the CD forms.
Disaster	In the context of the Proposed Scheme, a naturally occurring phenomenon such as an extreme weather event (for example storm, flood, temperature) or ground-related hazard events (for example subsidence, landslide, earthquake) with the potential to cause an event or situation that meets the definition of a Major Accident as defined above.
External Influencing Factor	A factor which occurs beyond the limits of the Proposed Scheme that may present a risk to the Proposed Scheme, e.g. if an external disaster occurred (e.g. earthquake, COMAH site major accident) it would increase the risk of serious damage to an environmental receptor associated with the Proposed Scheme.
Hazard	Anything with the potential to cause harm, including ill-health and injury, damage to property or the environment; or a combination of these.
Internal Influencing Factor	A factor which occurs within the limits of the Proposed Scheme that may present a risk to the Proposed Scheme.
Magnitude of Impact	The magnitude of an impact is typically defined by the following factors: ~ Extent – the area over which an effect occurs; ~ Duration – the time for which the effect occurs; ~ Frequency – how often the effect occurs; ~ Severity – the degree of change relative to existing environmental conditions.
Risk	The likelihood of an impact occurring combined with effect or consequence(s) of the impact on a receptor if it does occur.

Term	Definition
Risk Event	An identified, unplanned event, which is considered relevant to the Proposed Scheme and has the potential to be a Major Accident and / or Disaster subject to assessment of its potential to result in a significant adverse effect on an environmental receptor.
Sensitivity	The sensitivity of a receptor is a function of its value, and capacity to accommodate change reflecting its ability to recover if it is affected. It is typically defined by the following factors: ~ Adaptability – the degree to which a receptor can avoid, adapt to or recover from an effect. ~ Tolerance – the ability of a receptor to accommodate temporary or permanent change. ~ Recoverability – the temporal scale over and extent to which a receptor will recover following an effect.
Vulnerability	In the context of EIA, the term refers to the 'exposure and resilience' of the Proposed Scheme to the risk of a major accident and / or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact.

17.5. SCOPE OF THE ASSESSMENT

17.5.1. The scope of this assessment has been established through an ongoing Scoping process. Further information can be found in **Chapter 4 (EIA Methodology)** (document reference 6.1.4).

17.5.2. As detailed in **paragraph 17.1.2**, the construction phase and decommissioning have been considered together. In the event of decommissioning, it would be in accordance with the requirement of the Environmental Permit for the Proposed Scheme under the Environmental Permitting (England and Wales) Regulations 2016, Construction Design and Management Regulations 2015, the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999 (or subsequent replacement legislation). Details of the decommissioning would be included in the management plans which would be required under the aforementioned legislation to make the risk of a MA&D event ALARP. In addition, a Decommissioning Environmental Management Plan (DEMP) will be produced to manage the environmental impacts of decommissioning of the Scheme. The DEMP will be approved by the LPA, SDC, prior to decommissioning works commencing on Site.

17.5.3. From a MA&D perspective, the activities associated with the construction phase and decommissioning are considered to be similar. Therefore, for the purpose of this assessment, the vulnerability of the Proposed Scheme during decommissioning to a MA&D event is anticipated to be no worse than that for the construction phase following the implementation of the aforementioned management plans. Decommissioning and the construction phase have therefore been considered together.

17.5.4. This section provides an update to the scope of the assessment and re-iterates the evidence base for scoping out elements following further iterative assessment.

ELEMENTS SCOPED OUT OF THE ASSESSMENT

17.5.5. The Risk Event types to which the Proposed Scheme is not considered to be vulnerable, are shown in the Long List of potential major accident(s) and / or disaster(s) events provided in **Appendix 17.1** (**Major Accidents and Disasters Long List)** (document reference 6.3.17.1). Those MA&D types which have been scoped out have not been considered within this assessment.

17.5.6. Receptors that have been excluded from the assessment, are set out in **Table 17.3** below for the reasons described. The Inspectorate agrees that this matter can be scoped out of the assessment (**Appendix 1.2** (**EIA Scoping Opinion)**).

Table 17.3 - Excluded Receptors

Term	Definition
Employees of Drax Power Station and / or its suppliers, whether during the construction phase, operational phase or maintenance of the Proposed Scheme.	Employer's commitment and obligations to manage risks to employees are addressed in the Health and Safety At Work etc Act 1974.

ELEMENTS SCOPED INTO THE ASSESSMENT

Construction Phase and Decommissioning

17.5.7. The Proposed Scheme is considered to be potentially vulnerable to the following risk event types during the construction phase and decommissioning of the Proposed Scheme and have therefore been considered within this assessment:

a. Fluvial flooding;
b. Major Accident Hazard (MAH) chemical sites;
c. Dam breaches;
d. Transport accidents – road; and
e. Flood defence failure.

Operational Phase

17.5.8. The Proposed Scheme is considered to be potentially vulnerable to the following risk event types during the operation of the Proposed Scheme and have therefore been considered within this assessment:

- **a.** Fluvial flooding;
- **b.** MAH chemical sites;
- **c.** Dam breaches;
- **d.** Air pollution accidents; and
- **e.** Flood defence failure.

17.5.9. The Long List in **Appendix 17.1** (**Major Accidents and Disasters Long List)**. provides the justification for the inclusion of these risk event types in the assessment.

17.6. ASSESSMENT METHODOLOGY

17.6.1. To date, there is no specific guidance on how to consider MA&D within the context of EIA. However, the assessment takes account of the following emerging EIA good practice:

- **a.** EIA Quality Mark Article: What is this MADness? (AMEC, 2017);
- **b.** EIA Quality Mark Article: Major Accidents and Disasters in EIA (Temple Group, 2018);
- **c.** Disasters in EIA (TUV SUD, 2018);
- **d.** Major Accidents and Disasters in EIA: A Primer (Institute of Environmental Management & Assessment, 2020);
- **e.** Guidelines for Environmental Risk Assessment and Management (Department for Environment, Food & Rural Affairs, 2011);
- **f.** Guideline – Environmental Risk Tolerability for COMAH Establishments (Chemical and Downstream Oil Industries Forum, 2013); and
- **g.** ISO 31000: 2018 Risk Management –Guidelines (International Standards Organisation, 2018).

17.6.2. In addition, other relevant documentation, including the Cabinet Office's National Risk Register (HM Government, 2020) has been considered.

17.6.3. The assessment of major accident(s) and / or disaster(s) has been achieved through a review of available documentation and regulatory requirements. It should be noted that the assessment does not involve evaluation from 'first principles', given that existing health and safety legislation already identifies risks and control measures to protect human beings and the environment.

17.6.4. The assessment presents any identified risks and considers whether these are managed to be ALARP or whether further mitigation actions (beyond those already integrated into the design) are required for the Proposed Scheme.

17.6.5. The potential for identified relevant major accident(s) and / or disaster(s) to result in a significant adverse environmental effect have been evaluated using a risk-based approach. The approach has considered the environmental consequences of a MA&D, the likelihood of these consequences occurring, taking into account planned design and embedded mitigation, and the acceptability of the subsequent risk to the relevant receptor (as presented in **Appendix 17.2 (ES Risk Record)** (document reference 6.3.17.2)). The following process has been applied to each of the included MA&D categories:

a. Identifying risks;

b. Screening these risks;

c. Defining the impact;

d. Assessing the risk; and

e. Appraising risk management options.

Identify Risks

17.6.6. The major accident(s) and / or disaster(s) considered in the assessment are rare events.

17.6.7. All low consequence events, whatever their likelihood, do not meet the definition of MA&D as defined in the Institute of Environmental Management and Assessment's (IEMA) Primer (Institute of Environmental Management & Assessment, 2020). For example, minor spills which may occur during the construction phase, 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 construction contractor's Environmental Management System (EMS) and do not fall within the scope of this assessment. Similar events occurring during the operational phase and decommissioning would adopt the same approach.

17.6.8. This assessment focuses on low likelihood, but potentially high consequence events as illustrated in **Plate 17.1**. which is based on Figure 2 in IEMA's Primer (Institute of Environmental Management & Assessment, 2020).

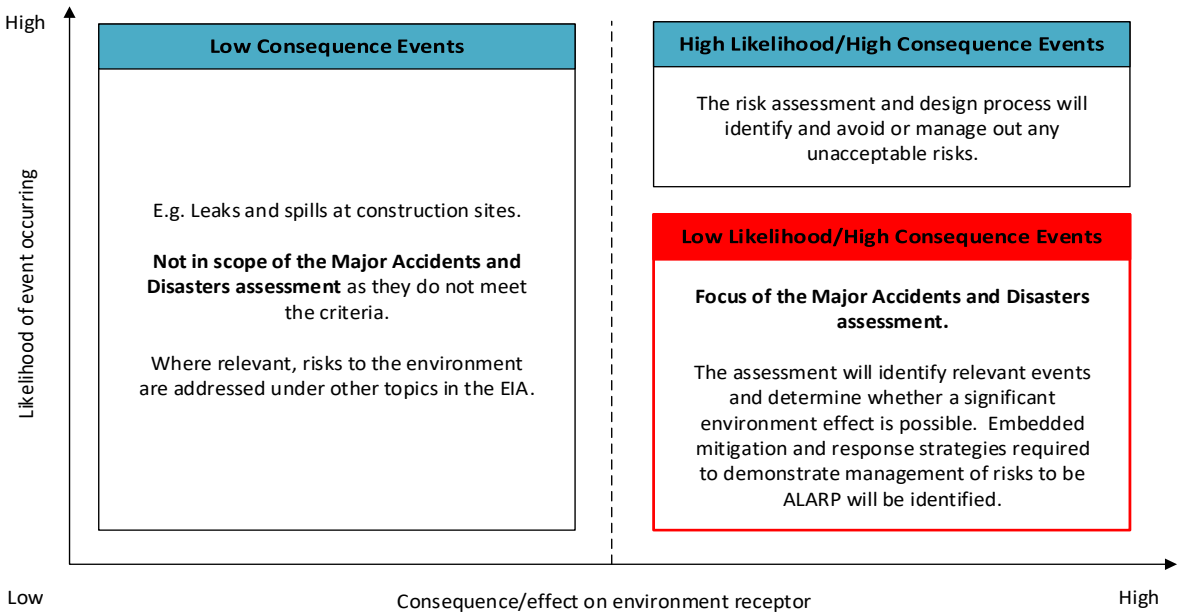

Plate 17.1 - Graphical Representation of Major Accidents and Disasters Consequence Significance

17.6.9. Low likelihood is defined for the purposes of this assessment, as: 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.

17.6.10. 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.

17.6.11. High consequence events are considered to lead to a significant adverse effect, as defined in Plate 17.1 above.

17.6.12. The risk identification process has used existing sources of information wherever possible, as described in **paragraph 17.6.3** 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 (HM Government, 2020). No additional risk assessments have been undertaken and the risk identification activity has focused on collating and reviewing the existing sources.

17.6.13. In order to identify whether a Risk Event has the potential to be a MA&D, 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 (Department for Environment, Food & Rural Affairs, 2011), the assessment uses the following conceptual model:

a. The source is the original cause of the hazard, which has the potential to cause harm;

b. The pathway is the route by which the source can reach the receptor; and

c. The receptor, which is the specific component of the environment that could be adversely affected, if the source reaches it.

17.6.14. Risk Events which do not have all three components have been screened out from the assessment.

Screen Risks

17.6.15. The following major accident(s) and / or disaster(s) screening process has been used to identify those Risk Events which would require further consideration within the assessment as illustrated in Plate 17.2 below:

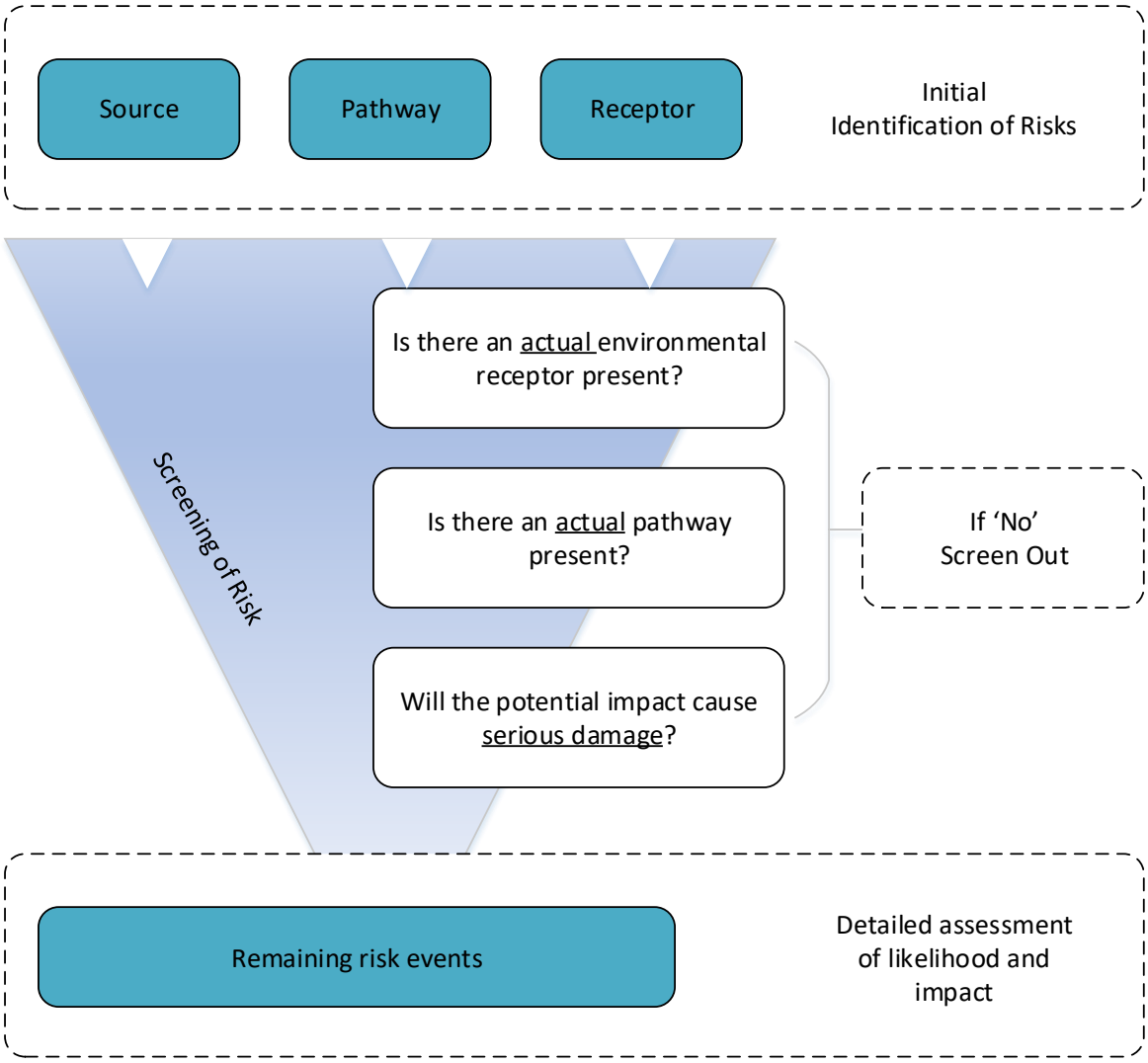

Plate 17.2 - Screening Process Flow Diagram

17.6.16. 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.

Define Impact

17.6.17. Several mechanisms are in place to reduce the vulnerability of the Proposed Scheme to major accident(s) and / or disaster(s) or mitigate significant effects on the environment should they occur. All measures to manage and reduce the risk of significant adverse effects occurring as a result of the vulnerability of the Proposed Scheme to major accident(s) and / or disaster(s) are considered to be primary mitigation measures for the purposes of the assessment. It has been assumed that:

a. The design, installation, commissioning, operation and maintenance of plant, drainage systems, equipment and machinery, including associated systems, will take into account Good Engineering Practice to ensure compliance with applicable regulatory regimes; and

b. The construction stage(s) of the Proposed Scheme will be managed through the implementation of the Construction Phase Plan (required under the CDM Regulations 2015) and mitigation measures relating to MA&D would be set out by the Contractor for approval prior to the construction phase as part of the Construction Environmental Management Plan (CEMP).

17.6.18. A reasonable worst-case environmental impact(s) has been identified for each scoped-in Risk Event. Impacts have been identified in consultation with relevant disciplines for each environmental factor assessed within this ES. The environmental impacts are identified through a qualitative process which seeks to 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 Proposed Scheme are considered. **Appendix 17.2 The Risk Record** records the outcome of this process.

Assess Risk

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

a. The likelihood of the Risk Event occurring considering the measures already embedded into the design and execution of the Proposed Scheme; and

b. The likelihood that an environmental receptor is affected by the Risk Event.

17.6.20. Likelihood assessments evaluate whether the effect (for example, loss of life) is a possible outcome of the Risk Event.

17.6.21. This evaluation refers to existing risk assessments as well as consultation with relevant discipline specialists.

17.6.22. The assessment of the risk has been carried out in line with IEMA’s Primer (Institute of Environmental Management & Assessment, 2020). 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 environmental topics, 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 would be required. The Risk Record presented in **Appendix 17.2** records the outcome of the assessment.

Appraise Risk Management Options

17.6.23. Risk management options fall into the following categories:

- **a.** Eliminate (or 'avoid') the risk, by adopting alternative processes in order to eliminate the source of the hazard, or remove the receptor;
- **b.** Reduce the risk by adapting proposed processes such that either the likelihood or the impact of the Risk Event can be reduced;
- **c.** 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;
- **d.** Control the risk, by ensuring that appropriate control measures are in place (for example emergency response) so that should a Risk Event occur, it can be controlled and managed appropriately. The mitigation hierarchy of repair and compensate any significant damage to environmental receptors may then apply following a control measure; and
- **e.** Exploit the risk, if it presents potential benefits or new opportunities.

ASSESSMENT OF SIGNIFICANCE

17.6.24. By definition, a major accident and / or disaster would have a major significant effect on the environment (see **Table 17.2**). Accordingly, any risks that could result in a MA&D without suitable mitigation, management or regulatory controls in place will be assessed as significant.

METHOD OF BASELINE DATA COLLECTION

Desk Study

17.6.25. A desk-based assessment has been undertaken to collate baseline data within the 100 m study area. This information has been collated from the following sources which have also been used to support the identification of potential MA&D:

- **a.** The Cabinet Office National Risk Register (2020 Edition) (HM Government, 2020);
- **b.** The International Federation of Red Cross & Red Crescent Societies Early Warning, Early Action (The International Federation of Red Cross and Red Crescent Societies, 2021);
- **c.** The International Disaster Database (Centre for Research on the Epidemiology of Disasters, 2021);
- **d.** HSE COMAH 2015 Public Information (Health and Safety Executive, 2021); and
- **e.** Chapter 5 (Traffic and Transport), Chapter 6 (Air Quality), Chapter 8 (Ecology), Chapter 11 (Ground Conditions), Chapter 12 (Water Environment) and Chapter 14 (Climate Change Resilience).

Site Visit and Surveys

17.6.26. No site visits or surveys have been undertaken as part of the assessment of the vulnerability of the Proposed Scheme to MA&D.

Guidance and Data

17.6.27. The following have been reviewed to support the identification of potential MA&D and inform the baseline of this assessment:

- **a.** The Cabinet Office National Risk Register (2020 Edition) (HM Government, 2020).
- **b.** The International Federation of Red Cross & Red Crescent Societies Early Warning, Early Action (The International Federation of Red Cross and Red Crescent Societies, 2021).
- **c.** The International Disaster Database (Centre for Research on the Epidemiology of Disasters, 2021).

Assessment Assumptions and Limitations

17.6.28. The following assumptions and limitations apply to this chapter:

- **a.** The design of the Proposed Scheme and its implementation is 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;
- **b.** The construction phase(s) of the Proposed Scheme will be managed through the implementation of the Construction Phase Plan (required under the CDM Regulations 2015) and a CEMP which will include those measures identified in the REAC (document reference 6.5) which will accompany the ES;
- **c.** The Existing Drax Power Station Health, Safety, Environmental and Quality Management Systems will be updated take into account the construction phase, operational phase and maintenance of the BECCS scheme;
- **d.** The design, installation, commissioning, operation and maintenance of plant, drainage systems, equipment and machinery, including associated systems, will take into account Good Engineering Practice;
- **e.** In accordance with good environmental and safety management principles, it has been 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;
- **f.** The assessment is based on currently available information;
- **g.** Detailed construction information is not yet available for the Proposed Scheme and this assessment therefore draws on the professional experience of the assessor of other similar projects; and
- **h.** As described in **Chapter 2 (Site and Project Description)**, the Applicant has full planning permission for the demolition of the redundant Flue Gas Desulphurisation (FGD) Plant and associated restoration works at Drax Power

Station (2020/0994/FULM). The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place prior to the start of the construction phase of the Proposed Scheme, which has therefore been considered as part of the baseline of the assessment, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. The demolition of Units 1, 2 and 3 are assessed in **Chapter 18 (Cumulative Effects)** (document reference 6.1.18).

17.7. STUDY AREA

17.7.1. Major accident(s) and / or disaster(s) types have been considered both within and outside the Proposed Scheme boundary along with potential internal and external influencing factors.

17.7.2. At the Scoping stage, a 2.5 km distance around the Proposed Scheme was used in order to capture internal and external influencing factors which may have high adverse consequences on the Proposed Scheme.

17.7.3. During the preliminary environmental assessment which was reported in the Preliminary Environmental Information Report (WSP, October 2021), the key external influencing factors (such as fluvial, pluvial and groundwater flooding, flood risk from reservoirs, major accident hazard sites, road transport accidents, flood defence failure) that may have high adverse consequences on the Proposed Scheme were identified to be within 100 m of the Proposed Scheme (as assessed in **Appendix 17.1 Major Accidents and Disasters Long List**). Therefore, the extent of the study area used for the major accident(s) and / or disaster(s) ES assessment has been reduced to 100 m.

17.8. BASELINE CONDITIONS

17.8.1. The baseline relevant to this topic comprises:

- **a.** Features external to the Proposed Scheme that contribute a potential source of hazard to it **(**see **Appendix 17.1 (Major Accidents and Disasters Long List))**;
- **b.** Sensitive environmental receptors at risk of significant effect (see **section 17.9**); and
- **c.** Current (without the Proposed Scheme) MA&D risks for the existing locality (see **Appendix 17.1 (Major Accidents and Disasters Long List**)).

EXISTING BASELINE

17.8.2. Major accident(s) and / or disaster(s) risks relevant to the baseline in the absence of the Proposed Scheme include extreme weather events and associated flooding and air pollution accidents (as assessed in **Appendix 17.1 (Major Accidents and Disasters Long List)**. Baseline ‘without Development’ conditions are described in detail in the following Chapters: **Chapter 5 (Traffic and Transport)**, **Chapter 6 (Air Quality)**, **Chapter 8 (Ecology)**, **Chapter 11 (Ground Conditions)**, **Chapter 12 (Water Environment)** and **Chapter 14 (Climate Change Resilience)**.

17.9. SENSITIVE RECEPTORS

17.9.1. The following sensitive receptors were considered with respect to major accident(s) and / or disaster(s):

- **a.** Population and human health;
- **b.** Biodiversity;
- **c.** Land, soil, water, air and climate;
- **d.** Material assets, cultural heritage and the landscape; and
- **e.** The interaction between the factors above.

17.9.2. The specific potential receptors of effects resulting from major accident(s) and / or disaster(s) are reported in the relevant ES Chapters.

17.10. PRELIMINARYASSESSMENT OF VULNERABILITY TO THE RISK OF MAJOR ACCIDENTS AND DISASTERS

17.10.1. The MA&D assessment adopts a different assessment approach from other topic chapters whereby all mitigation measures are collectively considered at the same time to determine whether potential MA&D events to which the Proposed Scheme may be vulnerable are managed to be ALARP. A preliminary assessment of the vulnerability of the Proposed Scheme to the risk of a MA&D during the construction phase, operational phase and decommissioning without mitigation being in place has therefore not been carried out.

17.10.2. The assessment of the vulnerability of the Proposed Scheme to MA&D events is presented in **Section 17.12** below.

17.11. DESIGN, MITIGATION AND ENHANCEMENT MEASURES

17.11.1. The measures outlined below and the specific mitigation measures which are detailed in **Appendix 17.2** are considered to be Primary mitigation measures which will be in place for the construction phase and operational phase of the Proposed Scheme to ensure that any potential MA&D events are managed to be ALARP. **Appendix 17.2** provides details of mitigation measures for each potential MA&D event identified.

17.11.2. The Applicant has committed to constructing and managing the Proposed Scheme in accordance with the following non-exclusive list of standards and systems:

- **a.** Programme of hazard studies of the Carbon Capture infrastructure to produce an inherently safe design and to ensure residual risks are managed to be ALARP as required by H&S legislative drivers;
- **b.** Environmental, Health & Safety Management systems as required by the Environmental Permitting Regulations 2016 (as amended) and the COMAH Regulations 2015;
- **c.** Manage all construction phase risks in accordance with the CDM Construction Phase Plan as required by the CDM Regulations 2015;

d. Supplier management environmental, health & safety standards (e.g., Construction Skills Certification Scheme) as required by H&S legislative drivers;

e. Risk management systems as required by H&S legislative drivers; and

f. Construction and operational Environmental Management systems (including the CEMP).

17.11.3. No additional design, mitigation or enhancement measures have been identified as being required to further mitigate any significant effects arising from the vulnerability of the Proposed Scheme to the risk of MA&D events.

17.12. ASSESSMENT OF VULNERABILITY TO THE RISK OF MAJOR ACCIDENTS AND DISASTERS

17.12.1. This section details the output of the assessment of the vulnerability of the Proposed Scheme to the risk of MA&D events, taking account of the mitigation measures detailed in **Section 17.11** above.

17.12.2. MA&D events to which the Proposed Scheme may be vulnerable during the construction phase, operational phase and decommissioning are summarised below.

CONSTRUCTION PHASE AND DECOMMISSIONING

17.12.3. Two MA&D events have been identified to which the Proposed Scheme may be vulnerable during the construction phase and decommissioning as detailed in **Table 17.4** below. All events that have been considered are set out in **Appendix 17.2**.

Table 17.4 - Potential Major Accident and / or Disaster Events during the Construction Phase and Decommissioning Grouped by High Level Risk Event

Risk Record Entry Number	Risk Description	Risk Event (High Level)	Reasonable Worst Consequence if Event Did Occur
8	Earthworks and construction activities adjacent to operational areas of the existing structures cause damage to industrial / highway infrastructure leading to death and / or injury of workers and road users.	Harm to people.	Collapse / impact leads to harm to construction and other workers and road users in the vicinity.
10	Increased road accidents due to additional road traffic associated with the construction phase.	Major road traffic accident.	Death and / or injury to a member of the public.

17.12.4. Based on the assumptions and mitigation measures (presented in **Appendix 17.2**) put forward in other relevant ES Chapters, it is considered that the identified potential major accident(s) and / or disaster(s) events above would all be managed to be ALARP.

OPERATIONAL PHASE

17.12.5. Three MA&D events have been identified to which the Proposed Scheme may be vulnerable during the operational phase as detailed in **Table 17.5** below. All events that have been considered are set out in **Appendix 17.2**.

Table 17.5 - Potential Major Accident and / or Disaster Events during Operation Grouped by High Level Risk Event

Risk Record Entry Number	Risk Description	Risk Event (High Level)	Reasonable Worst Consequence if Event Did Occur
4	Major fire on the BECCS plant initiating a major event on the existing COMAH installation(s).	Fire and / or explosion or release of harmful gas.	Fire contained within the Site with drift of airborne combustion products off-Site.
13	Loss of containment of CO_2 leading to a gas cloud with potential off-Site toxicity and fogging effects.	Fire and / or explosion or release of harmful gas.	Fire and / or explosion affects neighbouring property and / or those people in the immediate area.
14	Loss of containment of CO_2 leading to a gas cloud with potential off-Site toxicity and fogging effects.	Fire and / or explosion or release of harmful gas.	Fire and / or explosion affects neighbouring property and / or those people in the immediate area.

17.12.6. Based on the assumptions and mitigation measures (presented in **Appendix 17.2**) put forward in other relevant ES Chapters, it is considered that the identified potential major accident(s) and / or disaster(s) events above would all be managed to be ALARP.

17.13. CUMULATIVE EFFECTS

17.13.1. The MA&D assessment has, by its very nature, implicitly considered interactions with external factors such as other proposed developments which may impact on the study area. The assessment approach for MA&D, which considers the vulnerability of

the Proposed Scheme to MA&D events, does not assess potential cumulative effects on sensitive receptors as a MA&D event, is a rare, isolated event, which does not have on-going impacts.

17.13.2. A detailed assessment of intra-project combined effects and inter-project cumulative effects for the Proposed Scheme has been carried out and is presented in **Chapter 18 (Cumulative Effects)** (document reference 6.1.18) of this ES.

17.14. IN-COMBINATION CLIMATE CHANGE IMPACTS

17.14.1. The in-combination climate change impact assessment is assessed within the individual topic **Chapters 5-16** of this ES. They consider the extent to which climate change may alter the effects which have already been identified within this chapter.

17.14.2. The potential MA&D events that have been considered within this Chapter have been assessed against likely climate hazards, as set out within **Chapter 14 (Climate Change Resilience)**, and the vulnerability of the Proposed Scheme to the risk of MA&D events identified are not anticipated to change as a result of these hazards.

17.15. MONITORING

17.15.1. No monitoring in relation to MA&D events is required.

17.16. ASSESSMENT SUMMARY

17.16.1. For the potential MA&D events identified, the assessment has concluded there is no likely requirement for secondary mitigation measures, as based on the information currently available in other relevant ES chapters, it is deemed that the risks are anticipated to be ALARP.

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