



Hornsea Project Four

G1.2: Environmental Risk Assessment of the Onshore Substation and Energy balancing Infrastructure

Section 51 update, Date: 14 January 2022
Document Reference: G1.2
Revision: 01

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G1.2
Ver. no. A

Revision Summary

<i>Rev</i>	<i>Date</i>	<i>Prepared by</i>	<i>Checked by</i>	<i>Approved by</i>
01	14/01/2022	Royal HaskoningDHV, January 2022	Thomas Watts, January 2022	Julian Carolan, January 2022

Revision Change Log

<i>Rev</i>	<i>Page</i>	<i>Section</i>	<i>Description</i>
01	N/A	N/A	Submitted as part of Applicant response to Section 51 advice.

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1 Environmental Risk Assessment for potential fire risk at the Onshore Substation

1.1 Introduction

1.1.1.1 An outline environmental risk assessment has been undertaken in relation to the potential fire at the Hornsea Four Onshore Sub-station (OnSS), including the Energy Balancing Infrastructure (EBI), in response to a Section 51 request by The Planning Inspectorate (October 2021, ref. EN010098). This assessment is presented to provide more detail in relation to major accidents associated with the EBI.

1.2 Methodology

1.2.1.1 The risk assessment scores each potential risk based upon the likelihood of occurrence and potential severity to humans and the environment using the criteria defined in [Table 1](#). [Table 2](#) outlines the criteria for when control measures should be implemented to reduce potential risks to an acceptable level. A standard red-amber-green (RAG) ranking system has been applied in the tables.

1.2.1.2 The outline environmental risk assessment is presented in [Table 3](#) together with the identified control measures and is based on the following principles:

- identification of the risks associated with the proposed activities;
- identification of the receptors that could be at risk, e.g. humans, flora and fauna;
- identification of the possible pathways, e.g. drains;
- an assessment of the risks relevant to the proposed activities, whether they are acceptable, or can be screened out; and
- for risks that cannot be screened out, identification of mitigation strategies / control measures.

1.2.1.3 The hazards were selected on the basis of their potential to cause or contribute towards a fire, and where receptors could be negatively impacted as a result of a fire occurring. The assessment has concentrated on fire due to the perceived public perception of the risk as evidenced through public concern at other recent DCO Examinations.

1.3 Summary

1.3.1.1 The environmental risk assessment did not identify any significant risks, i.e., hazards scored as either medium or high risk, to human or environmental receptors due to any potential fire at the OnSS and EBI following the implementation of the control measures.

Table 1: Risk Assessment Matrix.

		Hazard Severity				
		<i>Negligible (1)</i>	<i>Slight (2)</i>	<i>Moderate (3)</i>	<i>High (4)</i>	<i>Very high (5)</i>
Risk Rating = Likelihood x Severity		Negligible impacts to environmental or human receptors.	Slight disturbance impacts to environmental or human receptors.	Unlikely to cause loss of life or serious ecological impact.	Loss of habitat or likely damage to human and ecological receptors.	Significant/ serious ecological impact with extensive loss of habitat. Significant public concern, risk to human health and economic damage.
<i>Likelihood of occurrence</i>	Very unlikely (1)	Low (1)	Low (2)	Low (3)	Low (4)	Medium (5)
	Unlikely (2)	Low (2)	Low (4)	Low (6)	Medium (8)	Medium (10)
	Possible (3)	Low (3)	Low (6)	Medium (9)	Medium (12)	High (15)
	Likely (4)	Low (4)	Medium (8)	Medium (12)	High (16)	High (20)
	Very likely (5)	Medium (5)	Medium (10)	High (15)	High (20)	High (25)

Table 2: Action Summary.

Risk Rating	Action
Low	Activity is considered acceptable and can be screened out.
Medium	The activity is considered acceptable and can be screened out. Where possible the activity should be refined to take account of hazards involved.
High	The activity must not be progressed. It should be redefined, or further control measures put in place to reduce the risk.

Table 3: Environmental Risk Assessment for potential fire risk at the Hornsea Four OnSS including EBI.

Hazard	Receptor	Pathway	Likelihood	Severity	Risk rating	Risk management techniques	Residual			Guidance
							Likelihood	Severity	Risk rating	
Fire	Human/ flora and fauna	Air	3	3	9	<p>A Design Risk Assessment will be carried out in accordance with relevant UK Health and Safety Regulations.</p> <p>The OnSS, including the EBI, will utilise established safety characteristics of available technology. For the EBI, the Applicant will consider technology safety at the time of detailed design. It is anticipated that EBI technology will continue to develop over the years prior to construction.</p> <p>F2.12: Outline Energy Balancing Infrastructure HazID Report (APP-247) has been prepared to identify risks and hazards from the EBI, and will be updated pre-construction in accordance with DCO Requirement 26</p>	2	2	4	<p>Guidance for Pollution Prevention (GPP) 1: Understanding your environmental responsibilities - good environmental practices.</p> <p>Pollution Prevention Guidance (PPG) 18: Managing fire water and major spillages.</p> <p>GPP 21: Pollution incident response planning.</p> <p>██</p> <p>██</p> <p>██</p>
Explosion	Human/ flora and fauna	Air	1	5	5	<p>Potential development of an Emergency Action Plan with key stakeholders including technology providers and Humberside Fire & Rescue Service, as part of the detailed HazID report, if considered necessary based on detailed design.</p> <p>The following operational systems and design features will be considered as part of the final installation design:</p>	1	2	2	<p>GPP 21: Pollution incident response planning.</p> <p>██</p> <p>██</p> <p>██</p>

Hazard	Receptor	Pathway	Likelihood	Severity	Risk rating	Risk management techniques	Residual			Guidance
							Likelihood	Severity	Risk rating	
						<ul style="list-style-type: none"> Battery Management Systems (if used, dependant on technology choice during detailed design) used on all batteries installed in EBI. HVAC / HVDC system to maintain optimum environmental settings. Use of power quality meters to check for damage to the electrical equipment and condition monitoring system installed. Ground fault detection. Buildings separated into fire zones so that a fire cannot spread from one zone to another. Fire walls utilised to separate components from each other to avoid spread. <p>The following safety systems will be incorporated as part of the final installation design:</p> <ul style="list-style-type: none"> Onsite firefighting equipment where applicable. Ground fault detection. F-Stop system installed to electrically isolate batteries (if used, dependant on technology choice during detailed design) in the event of a fire or other emergency situation. Fire detection and suppression systems installed. Oil-filled components installed with oil dump tanks so that the oil can be removed from the components quickly and there is a flame trap 				

Hazard	Receptor	Pathway	Likelihood	Severity	Risk rating	Risk management techniques	Residual			Guidance
							Likelihood	Severity	Risk rating	
						between the component and dump tank so that the fire cannot spread. <ul style="list-style-type: none"> Sprinkler systems and CO₂ systems in place where such systems can be used to eliminate a fire. 				
Fire discharge of fire water/chemicals	Land/flora and fauna	Overland	3	2	6	A3.1: Geology and Ground Conditions (APP-025) provides a description of the land and ground conditions. F-Stop system installed to electrically isolate batteries in the event of a fire or other emergency situation. Fire detection and suppression systems installed.	2	1	2	PPG 18: Managing fire water and major spillages. GPP 21: Pollution incident response planning. GPP 22: Dealing with spills. [Redacted]
	Watercourses/groundwater/flora and fauna	Drainage channel	3	3	9	A3.2: Hydrology and Flood Risk (APP-026) provides details of the watercourses within the project area and any associated flood risk. C1.1: Draft DCO (APP-203) (Requirement 15) sets out the requirements for a detailed Onshore Infrastructure Drainage Strategy. Automatic shutoff valves installed on drainage systems(s) to contain and prevent the release of fire water F-Stop system installed to electrically isolate	2	2	4	PPG 3: Use and design of oil separators in surface water drainage systems. PPG 18: Managing fire water and major spillages. GPP 21: Pollution incident response planning. GPP 22: Dealing with spills. [Redacted]

Hazard	Receptor	Pathway	Likelihood	Severity	Risk rating	Risk management techniques	Residual			Guidance
							Likelihood	Severity	Risk rating	
						batteries in the event of a fire or other emergency situation Fire detection and suppression systems installed				
Fire smoke	Human and atmosphere	Air	3	2	6	<p>A3.9: Air Quality (APP-033) provides an assessment of air quality for the project.</p> <p>F-Stop system installed to electrically isolate batteries in the event of a fire or other emergency situation.</p> <p>Fire detection and suppression systems installed.</p> <p>Volume of smoke generated by fires will be limited in nature and scope due to proposed safety measures and planned emergency response, and is expected to disperse rapidly</p>	2	1	2	N/A
Release of gases to atmosphere	Human and atmosphere	Air	3	2	6	<p>A3.9: Air Quality (APP-033) provides an assessment of air quality for the project.</p> <p>The volume of gases, e.g. Sulphur hexafluoride (SF6) and fire suppressants, used and stored on site is likely to be small</p>	2	1	2	N/A
Spill of hazardous substances, e.g. oil/chemical	Land/flora and fauna	Overland	3	2	6	<p>A3.1: Geology and Ground Conditions (APP-025) provides a description of the land and ground conditions.</p> <p>A3.2: Hydrology and Flood Risk (APP-026)</p>	2	1	2	<p>GPP 2: Above ground oil storage tanks.</p> <p>PPG 3: Use and design of oil separators in surface water drainage systems.</p>

Hazard	Receptor	Pathway	Likelihood	Severity	Risk rating	Risk management techniques	Residual			Guidance
							Likelihood	Severity	Risk rating	
					High	<p>provides details of the watercourses within the project area and any associated flood risk.</p> <p>C1.1: Draft DCO (APP-203) sets out the requirements for a Detailed Onshore Infrastructure Drainage Strategy Requirement 15).</p> <p>The volumes of hazardous substances stored onsite are likely to be small and will be stored in suitable primary containers that comply with relevant legislation and/ or best practice guidance.</p> <p>Primary containers are stored within suitable secondary containment system designed to hold 110% of largest container/ 25% of the total volume, whichever is the greater of the two.</p> <p>Suitable spill response equipment provided with personnel trained in spill response, including the provision of annual drills</p>			Low	<p>PPG 18: Managing fire water and major spillages.</p> <p>GPP 21: Pollution incident response planning.</p> <p>GPP 22: Dealing with spills.</p> <p>██</p> <p>██</p> <p>██</p> <p>The Control of Pollution (Oil Storage) (England) Regulations 2001 SI 2001/2954 -</p> <p>██</p> <p>██</p> <p>The Construction Research and Information Association (CIRIA) ██ has produced the following guidance:</p> <ul style="list-style-type: none"> • Design of containment systems for the prevention of water pollution from industrial incidents (R164). • Containment systems for the prevention of pollution (C736).