Contents

1 Introduction

1.1.1 Cory Environmental Holdings Limited (referred to throughout as 'Cory' or 'the Applicant') is applying to the Environment Agency (EA) under The Environmental Permitting (England and Wales) Regulations 2016 (Environmental Permitting Regulations) for an Environmental Permit (EP) to operate a Carbon Capture Facility (CCF).

1.2 Project Description

1.2.1 A detailed description of the CCF is presented in Section 1 of the Technical Support Document. The CCF will be constructed on land immediately adjacent to Cory's existing Riverside Resource Recovery Facility (RRRF) (Riverside 1) and the soon to be operational Riverside Energy Park (REP) (Riverside 2), within the London Borough of Bexley and would serve the operation both Riverside 1 and Riverside 2.

1.2.2 The CCF and permit will comprise the following landside activities:

- Carbon Capture Plant(s), each comprising:
  - Flue Gas Pre-Treatment;
  - Absorber Column(s) and Stack(s);
  - Back Pressure Turbine and Generator;
  - Solvent Regeneration System;
  - Rich Solvent/Lean Solvent Heat Exchanger; and
  - Solvent Storage.
- CO2 Processing Plant, each comprising:
  - Compression;
  - Dehydration;
  - Liquefaction; and
  - CO2 Vents.
- LCO2 Buffer Storage Area comprising:
  - Temporary Storage; and
  - Boil Off Gas Processing.
- LCO2 Pipelines;
- Flue gas Supply Ductwork;

- Supporting Plant, consisting:
  - Cooling System;
  - Chemical Storage and Distribution Handling Facilities; and
  - Effluent Treatment Plant.
- Amenities and other, comprising:
  - Gatehouse;
  - Control Room;
  - Welfare Facilities; and
  - Stores and Workshop.

1.3 The Objective

1.3.1 The aim of this report is to assess the environmental risks from the activities undertaken at the CCF.

1.3.2 Within the permit application, the applicant is required to demonstrate that the necessary measures are in place to protect the environment and ensure that the CCF, throughout its operation, will not pose an unacceptable risk to the environment. The scope of this permit application covers activities and operations undertaken with the defined installation boundary (red line) as shown in Figure 1 (Appendix A of the Technical Supporting Document)

1.3.3 This report will:

a. identify potential risks that the proposed activities may present to the environment;
b. screen out those that are insignificant and do not require detailed assessment;
c. identify potentially significant risks, where appropriate;
d. choose the right control measures, where appropriate; and
e. report the findings of the assessment.

1.3.4 This document has been developed to consider the requirements of Environment Agency web guidance Risk assessments for your environmental permit - GOV.UK.

Risk Assessment Process

1.3.5 This assessment has been developed in accordance with the Environment Agency's web guidance. This guidance promotes five key steps:

a) identify and consider the risks for the activities, and the sources of the risks;

b) identify the receptors (people, animals, property and anything else that could be affected by the hazard) at risk from the activities;

c) identify the possible pathways from the sources of the risks to the receptors;

d) assess risks relevant to the activities and check they are acceptable and can be screened out; and

e) state what will be undertaken to control risks if they are too high.

1.3.6 This assessment considers the risk of potential accidents associated with the proposed activities occurring at the CCF and the measures which will be implemented to limit accidents when operational.

Step 1 – Identify Risks

1.3.7 The following report will identify the activities that present different types of risk to the environment associated with the operation of the CCF, including:

a. odour;

b. noise;

c. fugitive emissions;

d. accidents; and

e. visible emissions.

Step 2 – Assess the Risk

1.3.8 The report will include an assessment of risks associated with the operation of the CCF. For each risk that applies the following will be considered:

a. hazard;

b. the process that causes the hazard;

c. receptor; and

d. pathway.

Step 3 – Justify Appropriate Measures

1.3.9 The report will demonstrate that the Applicant has considered the risks associated with the operation of the regulated activities and its directly associated activities and has appropriately identified the control measures which will be in place to demonstrate that the risks are being appropriately managed.

Step 4 – Present the Assessment

1.3.10 The assessment will conclude by presenting the following:

a. probability of exposure;

b. consequence; and

c. the overall risk.

2 Odour Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Odorous emissions may occur during the delivery of raw materials, reception of raw materials and the storage of raw materials at the CCF.	Immediate area. The nearest residential receptor to the CCF is located approximately 120m from the southern site boundary.	Air – Winds generally blow from a south westerly direction.	Embedded mitigation measures and design of plant will reduce and contain odour. This may include: The CCF will use and store chemicals, which will be managed in accordance with appropriate management procedures. All chemicals are supervised during delivery and off-loading. All chemicals stored in sealed containers/vessels when not in use.	Minimal	Odour annoyance will have more of an impact in summer when people are outdoors, and temperatures are higher.	Not significant with management practices adhered to.

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Where necessary bulk storage tanks will have abated breather vents. The amine-based solvent has low volatility and is not considered to pose an odour risk. Tanker deliveries of substances with a risk of odour, for example ammonia, will be back vented to the delivery tankers. Site subject to a daily site inspection and any unusual odours would be addressed in accordance with EMS procedures. Any odours would be logged along with any corrective actions undertaken.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Any odour complaints would be dealt with under the procedures in the EMS. In advance of the Environmental Permit Application, a Statutory Nuisance Statement[1] ,prepared to support the DCO application, reports that no significant effects for human receptors from fumes, gases or smells have been identified, with the mitigation measures in place as set out in the Environmental Statement. Further appropriate assessment in line with the EA guidance will be conducted as part this application.			

[1] STATUTORY NUISANCE STATEMENT: 5.9

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Odour releases from CCF processes during normal operations.	Immediate area. The nearest residential receptor to the CCF is located approximately 120m from the southern site boundary.	Air – Winds generally blow from a south westerly direction.	The CCF will be operated in accordance with manufacturer recommendations. The CCF will be designed to ensure fugitive emissions will be minimised as far as possible through detailed design. The amine-based solvent has low volatility and is not considered to pose an odour risk. Solvent dosing and reaction rates will be controlled in accordance with the set parameters. These will be monitored through an automated control system.	Minimal	Odour annoyance will have more of an impact in summer when people are outdoors, and temperatures are higher.	Not significant with management practices adhered to.

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			The process is designed for maximum solvent capture, but some will break down into amines which can be oxidised to ammonia. These can then be removed through the post absorber gas treatment system which includes for an acid solution designed to capture any amines. The acid solution will be monitored to ensure that it retains its effectiveness. Any odour complaints would be dealt with under the procedures in the EMS.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			In advance of the Environmental Permit Application, a Statutory Nuisance Statement, prepared to support the DCO application, reports that no significant effects for human receptors from fumes, gases or smells have been identified, with the mitigation measures in place as set out in the Environmental Statement. Further appropriate assessment in line with the EA guidance will be conducted as part this application.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Odour from Carbon Capture Effluent Treatment Plant (ETP).	Immediate area. The nearest residential receptor to the CCF is located approximately 120m from the southern site boundary.	Air – Winds generally blow from a south westerly direction.	The ETP will be designed to ensure fugitive emissions will be minimised as far as possible through detailed design. The transfer of spent amine solution into road tankers will be conducted within designated chemical handling areas. Site subject to a daily site inspection and any unusual odours would be addressed in accordance with EMS procedures. Any odours would be logged along with any corrective actions undertaken.	Minimal	Odour annoyance will have more of an impact in summer when people are outdoors, and temperatures are higher.	Not significant with management practices adhered to.

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Wastes from the ETP will be collected promptly, and in alignment to manufacturers specification, to be stored appropriately ahead of off-site removal, all subject to good management practice and site procedures. Any odour complaints would be dealt with under the procedures in the EMS.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			In advance of the Environmental Permit Application, a Statutory Nuisance Statement, prepared to support the DCO application, reports that no significant effects for human receptors from fumes, gases or smells have been identified, with the mitigation measures in place as set out in the Environmental Statement. Further appropriate assessment in line with the EA guidance will be conducted as part this application. The displaced air from the road tanker will be vented back into the sealed storage tank.			

3 Noise Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Operational noise from process plant and machinery including consideration of backup Air Source Heat Pump Fans.	Immediate area. The nearest residential receptor to the CCF is located approximately 120m from the southern site boundary. Flora and Fauna.	Sound propagation through air and the ground.	Noisy plant items, where practicable, will be “housed” rather than located externally. Locate plant items where shielded by other plant and buildings, acting as a barrier, where practicable. When buildings cannot provide sufficient shielding, acoustic barriers will be installed as required. Where it is not possible to “house” potential noise sources, appropriate noise mitigation and attenuation measures will be installed to minimise impacts at receptors.	Minimal	Annoyance. Potential for more of an impact in summer when people are outdoors, and temperatures are higher.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Regular maintenance of process plant will be undertaken in accordance with documented maintenance procedures. Detailed design of the plant will select quieter fans and locate equipment further away from sensitive receptors where practicable. Activities from the site will be subject to operational noise limits set within the DCO. Any noise complaints would be dealt with under the complaints' procedures in the EMS and as per the Operational Noise Management Plan.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			In advance of the Environmental Permit Application, a Statutory Nuisance Statement, prepared to support the DCO application, reports that no significant effects for human receptors from fumes, gases or smells have been identified, with the mitigation measures in place as set out in the Environmental Statement.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Further appropriate assessment in line with the EA guidance has been conducted as part this application including a Noise Impact Assessment and the writing of a Noise and Vibration Management Plan in accordance with EA guidance[2] (see Appendix G and H of the Technical Support Document).			

[2] Develop a management system: environmental permits - GOV.UK

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Noise monitoring will be carried out annually at locations within the Site boundary to identify significant increases in noise from the CCF. In addition, noise-related complaints will be reviewed on a case-by-case basis to determine if additional noise monitoring is warranted in response to the individual complaint consistent with Cory's Managing Complaints Procedure (RIV-WI-40). Monitoring will also be in place to ensure the CCF complies with the requirements of the DCO, which includes a commitment in terms of receptor noise limits as described in the Noise and Vibration Management Plan (Appendix H).			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Once the detailed design is finalised, the Noise and Vibration Management Plan[3] will be reviewed and updated to provide further details of the locations, parameters and frequency of noise monitoring.			
Venting	Immediate area. The nearest residential receptor to the CCF is located approximately 120m from the southern site boundary. Flora and Fauna.	Sound propagation through air and the ground.	The CCF including LCO_2 Buffer Storage Area will be designed to ensure venting and respective noise emissions will be minimised as far as possible through detailed design.	Minimal	Annoyance. Likely to have more of an impact in summer when people are outdoors, and temperatures are higher.	Not significant

[3] As per EA Guidance: Noise and Vibration Management, the term “noise” includes vibration, unless otherwise indicated
Noise and vibration management: environmental permits - GOV.UK

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Suitable automated systems will be installed to provide early detection and warning of CO2 release to allow personnel to move to a safe place and avoid harm occurring. Any noise complaints would be dealt with under the complaint's procedures in the EMS.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			In advance of the Environmental Permit Application, a Statutory Nuisance Statement, prepared to support the DCO application, reports that no significant effects for human receptors from fumes, gases or smells have been identified, with the mitigation measures in place as set out in the Environmental Statement. Further appropriate assessment in line with the EA guidance will be conducted as part this application.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Noise from vehicle movement on site.	Immediate area. The nearest residential receptor to the CCF is located approximately 120m from the southern site boundary.	Sound propagation through air and the ground.	There will be limited heavy vehicle movements during standard operating times. Speed limits and designated traffic management routes will be imposed. Vehicle engines will not be left idling. Route management at site should minimise the use of reversing alarms. Vehicle movements to and from site predominantly take place during normal office hours.	Minimal	Annoyance	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Any noise complaints would be dealt with under the complaint's procedures in the EMS.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			In advance of the Environmental Permit Application, a Statutory Nuisance Statement, prepared to support the DCO application, reports that no significant effects for human receptors from fumes, gases or smells have been identified, with the mitigation measures in place as set out in the Environmental Statement. Further appropriate assessment in line with the EA guidance will be conducted as part this application.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Backup Power Generator.	The nearest residential receptor to the CCF is located approximately 120m from the southern site boundary. Flora and Fauna.	Sound propagation through air and the ground.	Backup power generator is positioned as far away from sensitive receptors as is practicable. Acoustic housing will be used as part of the design where appropriate. Backup power generator would only operate when main electrical systems had failed. Backup power generator will be maintained in accordance with manufacturers recommendations. Any noise complaints would be dealt with under the complaints' procedures in the EMS.	Minimal	Annoyance	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			In advance of the Environmental Permit Application, a Statutory Nuisance Statement, prepared to support the DCO application, reports that no significant effects for human receptors from fumes, gases or smells have been identified, with the mitigation measures in place as set out in the Environmental Statement. Further appropriate assessment in line with the EA guidance will be conducted as part this application.			

4 Fugitive Emissions Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Drips from residual liquids stored in pipes / outlets / inlets.	Localised contamination of the soil/surface water features.	Surface runoff	The CCF will be constructed to appropriate design standards. Leak detection systems will be implemented across the site. Material unloading activities will be undertaken within dedicated material and chemical storage and handling areas.	Very unlikely	Pollution of watercourse and soil.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Material unloading areas will have contained drainage systems to contain the materials in event of a spill/leak. Spillages of materials and chemicals will be cleaned up in accordance with documented management systems. Management systems will be in place for preventative maintenance including inspection and integrity checks.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			The CCF will be situated above concrete hardstanding, and the storage tanks will be located in a bunded area designed to contain 110% of the storage tank inventory. Pipework will be located above ground where possible. In the event of any leaks from these tanks / pipes the contents would be captured by the site's bunds / drip trays / sealed drainage system.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Regular monitoring with regards to the condition of all Intermediate Bulk Containers (IBCs), tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Emissions from backup power generator.	Local environment – air. Workers. Local communities. Flora/Fauna. Local species.	Air	The backup power generator is positioned as far away from sensitive receptors as is practicable and at least 25m from the Crossness Local Nature Reserve where practicable, to minimise the impact of noise and emissions. Backup power generator will be used infrequently. Backup power generator will be maintained and operated in accordance with manufacturers recommendations.	Low	Pollution of atmosphere and health impacts.	Not significant with management practices adhered to.

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Delivery/storage of solvent (e.g. amines).	Localised contamination of the soil/surface water features.	Surface runoff	The amine-based solvent has low volatility and is not considered to pose a fugitive emissions risk. Material unloading activities will be undertaken within dedicated storage and handling areas. Back venting will be implemented to reduce the risk of fugitive emissions from the activities.	Very unlikely	Pollution of watercourse and soil.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Material unloading areas will have contained drainage systems to contain the substances in event of a spill/leak. Spillages of materials and chemicals will be cleaned up in accordance with documented management systems. The CCF will be constructed to appropriate design standards.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Management systems will be in place for preventative maintenance including inspection and integrity checks. The CCF will be situated above concrete hardstanding, and the storage tanks will be located in a bunded area designed to contain 110% of the storage tank inventory.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Pipework will be located above ground where possible. Pipework layout will be determined as part of the detailed design. In the event of any leaks from these tanks / pipes the contents would be captured by the site's sealed drainage system.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Operational venting occurring during: • Startup & Shutdown; • Outage / Maintenance; • Compressor/liquefaction trip; • CO_2 Boil off; and • Over pressure after compression.	Local environment - air	Air	Any operational venting of CO2 will be required to meet any environmental limits set out in the future Environmental Permit. Flue gas from the Stack(s) to be continuously monitored via a Continuous Emissions Monitoring System (CEMS) pursuant to the Environmental Permit. The venting of liquid CO_2 should be avoided where possible, and the vent system after the initial	Likely	Pollution of atmosphere.	Not significant with management practices adhered to.

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			valve should be designed to promote the phase change from liquid to gas during expansion/release to atmosphere. In addition, the flow rate should be managed by appropriate sizing of the vent valves to prevent the formation of solid CO_2 upstream of the vent. This will be incorporated in the Venting Management Plan as part of the Sites Environmental Management System as detailed in Sections 12.10 and 13.2.2 of the Technical Supporting			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Document submitted as part of this staged permit application.			
Re-suspension of dust from road surface vehicle movements.	Immediate area – air, land, water.	Air, surface runoff.	Control speeds, maintain the condition of the road, and take due care and attention of trafficking conditions. An adequate water supply will be maintained on site for appropriate dust / particulate matter suppression / mitigation, should it be required.	Low	Nuisance, dust on cars and road.	Insignificant.

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Any dust complaints will be investigated in accordance with procedures within the EMS. Any corrective actions identified will be implemented accordingly.			

5 Accidents Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Spillage/leak when unloading from delivery vehicles chemical containers (IBC's, Flexible Intermediate Bulk Containers (FIBC's), drums, etc)	Immediate area – air, land.	Air, direct contact.	Deliveries will be from road vehicles and off-loaded via mobile plant. Potential leaks/spills will be prevented by experienced mobile equipment operators undertaking unloading activities.	Low	Hazardous liquid or vapour release.	Insignificant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Unloading activities will only be undertaken in areas of hard standing with contained drainage. Chemical containers will be stored within suitably designed secondary containment. Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Material unloading activities will be undertaken within dedicated material and chemical storage and handling areas. Material unloading areas will have contained drainage systems to contain the materials in event of a spill/leak. Spillages of materials and chemicals will be cleaned up in accordance with documented management systems. Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Spillage/leak of liquid chemicals, when tanker off-loading.	Immediate area – air, land.	Air, direct contact.	Deliveries will be from sealed tankers and off-loaded via a hose. Spillage will be prevented by good operating procedures, high tank level alarm/trips etc. Tanks will be located within suitably designed secondary containment.	Low	Liquid or vapour release.	Insignificant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling. Material unloading activities will be undertaken within dedicated material and chemical storage and handling areas.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Material unloading areas will have contained drainage systems to contain the materials in event of a spill/leak. Spillages of materials and chemicals will be cleaned up in accordance with documented management systems. Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Overfilling of waste solvent road tanker due to operator error.	Localised contamination of the soil/surface water features.	Surface runoff	The solvent storage facilities will be situated above ground, sealed, and within a dedicated bund. In case of overfilling, any discharge will be collected and transported offsite via tankers. The surface water drainage system incorporates measures to ensure that this discharge remains uncontaminated. Trained and competent operators will be present during loading. Solvent loading procedures. Road tanker loading performed within bunded area.	Unlikely	Low	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Use of high-level detection / alarm during loading activities. Fail-closed valve on solvent loading line. Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Leakage of chemicals (caustic soda, sulphuric acid or similar chemicals) during unloading activities.	Localised contamination of the soil/surface water features.	Surface runoff	Storage tanks, IBCs and associated pipework will be constructed to appropriate design standards. Management systems will be in place for preventative maintenance including inspection and integrity checks. Trained and competent operators will be present during unloading. Chemicals offloading procedures. Interlocked offloading valve and road tanker offloading performed within bunded area.	Unlikely	Pollution of surface water.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Fail closed valve on chemical offloading lines. Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling. Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Leak / Spill of waste solvent during road tanker loading.	Localised contamination of the soil/surface water features.	Surface runoff	Trained and competent operators will be present during loading. Solvent loading procedures. Interlocked loading valve and road tanker loading performed within bunded area. Fail-closed valve on solvent loading line. Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.	Unlikely	Pollution of surface water	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Overfilling of fresh solvent storage tank.	Localised contamination of the soil/surface water features.	Surface runoff	The solvent storage facilities will be situated above ground, sealed, and within a dedicated bund. In case of overfilling, any discharge will be collected and transported offsite via tankers. The surface water drainage system incorporates measures to ensure that this discharge remains uncontaminated. Trained and competent operators will be present during unloading. Solvent offloading procedures. Level indication and alarm on solvent storage tank.	Unlikely	Low	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			The storage tanks will be located in a bunded area, designed to contain 110% of the storage tank inventory. Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			
Leakage of solvent (e.g. amines) during unloading from road tanker to storage tank.	Localised contamination of the soil/surface water features.	Surface runoff	Road tanker offloading will be undertaken in a bunded area with sealed systems and dedicated locked hose connections. Trained and competent operators will be present during unloading. Solvent offloading procedures will be in place.	Very unlikely	Pollution of watercourse and soil.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Interlocked offloading valve to prevent road tanker offloading unless the connection is correct. Fail-closed valve on solvent offloading line to minimise any leakages from the pipework. Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			
Leakage from flue gas ductwork due to poor CCF/ damage to/ corrosion of ductwork.	Workers	Air	The flue gas ductwork will be constructed to appropriate design standards. Leak detection systems, monitors and personnel detectors will be implemented at the CCF. Management systems will be in place for preventative maintenance including inspection and integrity checks.	Very unlikely	Pollution of atmosphere and health impacts.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Ductwork will be elevated. Ductwork will be fitted with expansion joints. System will operate at near atmospheric pressure.			
Loss of containment event from the LCO_2 Buffer Storage Area or the LCO_2 above ground pipeline.	Workers including asphyxiation. Noxious atmosphere local communities. Acidification impact on flora and fauna.	Air Air Direct contact	Cory will be undertaking a programme of hazard studies of the Carbon Capture Facility to produce an inherently safe design and to ensure residual risks are managed to be ALARP. Beyond this, Cory will manage this risk through: Environmental, Health & Safety Management systems.	Minimal	Vapour release. Unsafe atmosphere for human exposure. Exposure to soils causing acidification.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			An Emergency Response and Preparedness Plan (EPRP) will be prepared in accordance with the Outline Emergency Preparedness and Response[4] as prepared for the DCO. The design of the LCO2 pipework will be installed with leak detection systems. A planned preventative maintenance system will be implemented at the CCF. Continuous monitoring of pressure and flow as appropriate.		CO_2 toxicity and fogging hazard affects neighbouring properties and/or those people in the immediate area (including users of public rights of way and open spaces).	

[4] OUTLINE EMERGENCY PREPAREDNESS AND RESPONSE PLAN: 7.11

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			On detection of a potential leak, the above ground pipelines will be shut down and isolated to minimise the volume of CO2 released. The storage tanks and pipework will be constructed to appropriate design standards. Management systems will be in place for preventative maintenance including storage tank and pipeline inspection and integrity checks.			
Spill during unloading of chemicals.	Immediate area – air, land, water.	Direct contact.	Training in unloading practices. Under manual control, continual observation.	Unlikely	Low	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Impervious surfaces outdoors. Containment of drainage from chemical handling areas. Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			
Reaction of incompatible materials.	Workers and Immediate area – air, land, water.	Direct contact, air, surface runoff.	Training in unloading practices. Retention of Material data sheets and implementation of storage measures and approach aligned to identified hazard warnings. Under manual control, continual observation. Impervious surfaces outdoors.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Containment of drainage from chemical handling areas pursuant to site's management of surface water drainage. Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			
Overfilling of vessels.	Local environment air, land, water.	Surface runoff, wind.	Material unloading activities will be undertaken within dedicated material and chemical storage and handling areas. Material unloading areas will have contained drainage systems to contain the materials in event of a spill/leak.	Unlikely	Low	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Spillages of materials and chemicals will be cleaned up in accordance with documented management systems. Training in unloading practices. Under manual control, continual observation. Impervious surfaces outdoors. High level alarms. Secondary containment for storage vessels.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Regular monitoring with regards to the condition of all tanks, tanker loading areas and pipework takes will be adopted in accordance with preventative maintenance procedures. High-level alarms and level indication equipment will be fitted to relevant tanks to prevent overfilling. Any issues such as leaks, overflows, or accidental spills will be reported to relevant site management and addressed appropriately.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Flue gas leak	Local environment – air, flora and fauna, Flora and Fauna.	Air	Cory have committed to constructing and managing the Proposed Scheme in accordance with the following non-exclusive list of standards and systems: - programme of hazard studies of the Carbon Capture Facility to produce an inherently safe design and to ensure residual risks are managed to be ALARP; Environmental, Health & Safety Management systems; risk management systems; and	Very unlikely	Pollution of atmosphere, health impacts.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Outline EPRP for operation phase emergency preparedness and response planning. Design standards. Inspection and maintenance programme. Controls and alarms for pressure. Most of the systems are retained at negative pressure. Management systems will be in place for preventative maintenance including inspection and integrity checks.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Failure of emission monitoring systems.	Immediate area – air.	Air - Winds generally blow from a south westerly direction.	All monitoring equipment will be regularly inspected and maintained as per the manufacturer's recommendations. Any faulty equipment will be repaired or replaced. In the event that repair, or replacement of monitoring equipment is required, periodic monitoring would resume in the interim period to check compliance against the permitted Emissions Limit Values (ELVs). Backup Continuous Emissions Monitoring System (CEMS) will be in place.	Unlikely	Lack of data, public concern.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Monitoring equipment is MCERTS (Monitoring Certification Scheme) where available and calibrated in accordance with requirements. Only fully competent staff are responsible for ensuring that monitoring equipment is operating efficiently and as expected.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Relevant emergency procedures will be in place to address the event of monitoring equipment failure which could lead to discharges of effluent not conformant to the emission limit values / parameters established in the site's environmental permit, when issued.			
Catastrophic failure of containment (e.g. bund)	Immediate area – water, land and Flora and Fauna.	Surface runoff, wind, leaching.	Redundancy of critical equipment or spares on stock.	Unlikely	Pollution of surface water.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Storage vessels and process tanks will be situated above ground within dedicated containment systems fitted with level, pressure and leak detection systems.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			In the event of a catastrophic failure of the storage vessels or process tanks, the chemicals will be securely contained within secondary containment measures. The liquid that accumulates within the containment will either be pumped back into the storage vessel or tank or transferred into a road tanker for transport to a suitably licensed waste management facility. Regular monitoring with regards to the condition of all bunds and will be adopted in accordance with preventative maintenance procedures.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Loss of power.	None	N/A	Back-up generation for combustion control systems. Controlled shutdown of the Carbon Capture Facility and associated systems.	Low	None	Not significant.
Steam and condensate leak to plant building/atmosphere.	Noise, Visual.	Air	Statutory design, fabrication and inspection standards for steam and condensate systems. Controls and alarms for pressure. Routine operator checks.	Low	Annoyance from noise and visual impact.	Not significant
Failure of the Effluent Treatment Plant.	Immediate area – water. Flora and Fauna.	Surface runoff, direct contact.	The process is zero liquid discharge.	Low	Pollution of water.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Treated process effluent will be analysed prior to being taken off site. Any batch which does not achieve the required standards will be returned to the treatment plant for further treatment. The plant will be bunded to ensure any failure of containment can be captured and managed safely.			
Fire from ignition of lube oil leak.	Immediate area – air	Wind, direct contact.	Use of fire-proof lube oil. Fire detection and protection systems.	Low	Visual	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Contaminated fire water.	Immediate area – water, land, Flora and Fauna.	Surface runoff, leaching.	Site drainage will be fitted with a shut-off alarm, linked to the fire detection systems to contain any firefighting water. Additional storage will be available from site kerbing. Firewater can be tested prior to either treatment on site or tankering off-site for treatment.	Low	Pollution of surface water.	Not significant
Failure to contain firewater.	Land	Land, water, ground water	Maintenance of the shut-off valve within the drainage system.	Unlikely	Release of chemicals to water.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Inspection and maintenance of roadways and areas of hardstanding. Additional storage will be available from site kerbing. Firewater can be tested prior to either treatment on site or tankering off-site for treatment.			
Vandalism	Immediate area	Land, air, water.	Security fences, controlled entrance to the site. The site will be manned 24/7.	Low	Release of substances to any environment	Not significant

Diesel Spills	Immediate area – water	Water, surface runoff.	Appropriate design features will be incorporated in the CCF at the detailed design stage. This includes containment measures and barriers to prevent damage to pipelines, pressure monitoring and pressure relief systems to prevent over pressurisation situations and leak detection systems, features to minimise, isolate or shut down systems in the event of an abnormal plant performance; isolation valves contained in the surface water drains and attenuation system, to be closed in the event of accidental spillage into the uncontaminated surface water drainage system and the inclusion of pollution prevention / control measures, such as the use of bunding. Maintenance and inspection of all containment systems and measures including the shut-off valves within the drainage system. Inspection and maintenance of roadways and areas of hardstanding.	Low	Pollution of surface water.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Trained and competent operators. Interlocked offloading valve and road tanker offloading performed within bunded area. The surface water drainage network for the CCF will include oil separators/downstream defenders as required during detailed design in accordance with standard practice. A Surface Water Management and Drainage Plan has been submitted in support of this application.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Emergency Venting may occur during outages or unscheduled shutdowns.	Local environment – air.	Air	Any operational venting of CO2 will be required to meet any environmental limits set out in the future Environmental Permit as issued by the Environment Agency. Flue gas from the Stack(s) to be continuously monitored via a CEMS pursuant to the Environmental Permit. Reroute of exhaust gases available through Riverside 1 and Riverside 2 Stack systems as required and in line with site permit ELVs.	Low	Pollution of atmosphere.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Loss of containment of hazardous materials/ waste into the soil/groundwater.	Immediate area – groundwater, soil air. Hazardous materials/ wastes will be stored in appropriate containers. The storage area will be provided with secondary containment (i.e. bunded/ concrete hardstanding). Local water features and Flora and Fauna.	Surface runoff, air.	Hazardous materials/ wastes will be stored in appropriate containers. The storage area will be provided with secondary containment (i.e. bunded) upon concrete hardstanding with a sealed drainage system (tertiary containment).	Low	Release of hazardous material.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Loss of containment of ammonia or propane during the first fill of the refrigeration plant (closed loop system).	Workers	Air	Plant will be designed to minimise risk from transfer of materials. Dedicated inlet and outlet points will be installed with necessary alarming and fail-safe equipment. Trained and competent operators will be undertaking commissioning activities. Method statement and risk assessment for handling and use of hazardous materials during commissioning.	Low	Release of hazardous material, toxic atmosphere, impact to local users / receptors.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Flooding from the River Thames.	Carbon Capture Facility and surrounding infrastructure, workers, watercourse.	Breach of the River Thames Flood Defences.	Embedded mitigation to manage this risk includes raising the platform for the CCF in line with maximum platform level of 1.3m AOD to the north of the Thames Water Access Road, and a level of 1.5m AOD to the south of the Thames Water Access Road.	Low	Flooding of the CCF.	Not significant

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Equipment that is considered to be sensitive to flood water inundation will be protected by either locating equipment on a platform raised to a height above the maximum breach flood level (including welfare facilities required for safe refuge), or protecting equipment by an impervious bund raised to a height above the maximum breach flood level. Floodplain storage compensation will be provided and approved by the DCO further to the DCO to create replacement floodplain.			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			Cory have committed to constructing and managing the Proposed Scheme in accordance with the following non-exclusive list of standards and systems: programme of hazard studies of the Carbon Capture Facility to produce an inherently safe design and to ensure residual risks are managed to be ALARP; Environmental, Health & Safety Management systems; risk management systems; flood risk assessment;			

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
			drainage strategy; and Outline EPRP for operation phase emergency preparedness and response planning.			

6 Visual Risk Assessment and Management Plan

What Do You Do That Can Harm and What Could Be Harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Possibility of Exposure**	**Consequence**	**What is the Overall Risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs who is responsible for what?**	**How likely it this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance and probability and consequence.**
Plumes from the Stack(s).	Workers and local communities.	Visual	The treated flue gas emitted from the Stack(s) will be reheated prior to discharge in order to mitigate against visible plumes across most weather conditions. Plumes are abated as the wet air mixes with, and is heated by, dry air prior to exiting the cooling towers, negating plume visibility.	Likely	Annoyance	Not significant

7 Detailed Assessment

7.1 Emissions to Air

7.1.1 The environmental impact of the CCF has been evaluated using the H1 software tool as detailed within the Environment Agency's web guidance[5]. This assessment has been expanded by a more comprehensive Air Quality Assessment & Detailed Modelling.

7.1.2 All emission points will be within the confines of the minimum and maximum parameters set by the DCO for the stack height and will adhere to the assumptions of the Air Quality Risk Assessment prepared for this permit application and as detailed within Section 6.1 of the Technical Support Document.

7.1.3 The stack height and emission temperatures required to deliver acceptable impacts on air quality receptors has been determined, in part, via detailed air quality impact assessment but within the confines of the minimum and maximum parameters set by the DCO for the stack height. A preliminary point source emission plan has been included in Appendix A of the Technical Support Document and includes the following emission points:

Table 7-1: Emission Points

Emission Point	Description	Stack height (m)
A1	Train 1 - Stack	Maximum height of Absorber Column(s) and Stack(s) - 110m (113m Above Ordnance Datum (AOD)). Minimum height of the top of Stack(s) - 100m from development platform as built. Minimum distance between top of Absorber Column(s) and top of Stack(s) - 30m.
A2	Train 2 - Stack	Maximum height of Absorber Column(s) and Stack(s) – 110m (113m AOD). Minimum height of the top of Stack(s) - 100m from development platform as built.

[5] Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Emission Point	Description	Stack height (m)
		Minimum distance between top of Absorber Column(s) and top of Stack(s) - 30m.
A3	Back-up Power Generator	Maximum height of 6m.
A4	Train 1 - CO_2 Vent	Maximum height of 45m (48m AOD).
A5	Train 2 - CO_2 Vent	Maximum height of 45m (48m AOD).

Habitats Assessment

7.1.4 There are a number of habitat sites within a 15km radius of the Carbon Capture Facility. These habitat and geological sites are presented in Table 7-2.

7.1.5 A pre-application Screening Report: Bespoke CCF (EPR/JP3020LL/P001) nature heritage and conservation report was received from the Environment Agency which has been reviewed as a part of this risk assessment. The habitat features within Table 7-2 have been derived from the Screening Report.

Table 7-2: Habitat sites

Habitat Site	Designation	X	Y	Distance from Centre of Site (km)
Abbey Wood	SSSI	548100	178600	2.25
Elmstead Put	SSSI	542320	170660	12.10
Inner Thames Marshes / Rainham Marshes	SSSI	551371	181256	2.06
Oxleas Woodland	SSSI	544721	176156	6.39
Gilbert's Pit (Charlton)	SSSI	541871	178756	7.80
Epping Forest	SSSI	540475	186542	10.92
Epping Forest	SAC / SSSI	539771	188106	12.41
Ingrebourne Marshes	SSSI	552071	182506	3.32
Hainault Forest	SSSI	548065	193118	12.79
Hornchurch Cutting	SSSI	554671	187356	8.66
Purfleet Chalk Pits	SSSI	555971	178556	6.73
West Thurrock Lagoon & Marshes	SSSI	557271	176756	8.58
Lion Pit	SSSI	559771	178256	10.49

Habitat Site	Designation	X	Y	Distance from Centre of Site (km)
Grays Thurrock Chalk Pit	SSSI	560771	179106	11.35
Hangman's Wood & Deneholes	SSSI	563121	179456	13.65
Swanscombe Skull Site	SSSI	559771	174356	11.92
Bakers Hole	SSSI	561071	174506	12.97
Darenth Wood	SSSI	557971	173106	11.18
Farningham Wood	SSSI	553721	168706	12.43
Ruxley Gravel Pits	SSSI	547571	170406	10.17
Wansunt Pit	SSSI	551496	173931	6.769
Crossness LNR	LNR	549321	179956	0.48
Lesnes Abbey LNR	LNR	548821	178856	1.68
Rainham Marshes	LNR	551371	181256	2.06
Franks Park	LWS	549682	178874	1.54
Wennington, Aveley and Rainham Marshes	LWS	551359	181214	2.03
River Thames and Tidal Tributaries	LWS	551065	181078	1.71
Dagenham Breach and the lower Beam River in Dagenham	LWS	550009	181463	1.18
Lower River Beam and Ford Works Ditches	LWS	549897	181533	1.20
Goresbrook and the Ship & Shovel Sewer	LWS	548078	182155	2.26
Thamesmead Ecological Study Area	LWS	547854	181088	1.78
Crossway Park and Trump 52	LWS	548135	180660	1.39
Southmere Park &YarntonWay/Viridion Way	LWS	548805	179545	1.10
The Ridgeway	LWS	547974	180474	1.53
Lesnes Woods and Bostall Woods	LWS	548850	178870	1.66
Erith Marshes	LWS	549428	180754	0.36

Habitat Site	Designation	X	Y	Distance from Centre of Site (km)
Erith Marshes	LWS	549428	180773	0.38
Thamesview Golf Course	LWS	548405	181084	1.29
Belvedere Dykes	LWS	549686	180510	0.22
Church Manorway Nature Area	LWS	550642	179604	1.39
Crossness Sewage Treatment Works Pond	LWS	548524	180780	1.05
Hollyhill Open Space	LWS	549747	178237	2.11
St John the Baptist Churchyard, Erith	LWS	550657	178791	1.89
Crossways Lake Nature Reserve and Thameside Walk Scrub	LWS	547786	181179	1.98
Crossways Lake Nature Reserve and Thameside Walk Scrub	LWS	547807	181160	1.95
Riverside Sewage Treatment Works	LWS	551466	182155	2.61
Streamway, Chapman's Land and Erith Cemetery	LWS	549518	178025	2.32

7.1.6 Additionally, within 2km, the following Protected Species and Habitats have been identified within the aforementioned Screening Report:

a. European Water Vole;
b. Twait Shad Migratory Route;
c. Smelt Migratory Route;
d. Allis Shad Migratory Route; and
e. Coastal and Floodplain Grazing Marsh.

7.1.7 An assessment of the impact of the CCF upon habitat sites and features is presented in the Air Emissions Risk Assessment (see Appendix I of the Technical Support Document).

7.1.8 Emissions to air have been the subject of detailed dispersion modelling in accordance with Environment Agency guidance: *Air emissions risk assessment for your environmental permit*[6], a copy of which is including as Appendix I of the Technical Support Document).

7.1.9 The overall conclusions of the detailed air dispersion modelling are that **no significant effects are likely** on either human health or local environmental habitats.

[6] Air emissions risk assessment for your environmental permit - GOV.UK

7.1.10 A preliminary dispersion model and assessment of CO_2 vent points has been undertaken using DNV's Phast software. Overall, this model and risk assessment is robust and precautionary; the results indicate that there is **low risk** that sensitive members of the public might experience mild but transient effects during some venting events but the general population will experience **no significant health effects** during the foreseeable venting scenarios.

7.1.11 Further refinement of the venting scenarios and specifications will be undertaken during detailed design.

7.2 Emissions to Water or Sewer

7.2.1 The site will operate with zero liquid discharge. Therefore, there will be no emissions to water or sewer from the process plant.

7.2.2 As part of the site's Integrated Management System and pursuant to the DCO, an EPRP will be implemented at the site to account and plan for emergency scenarios and abnormal events such as uncontrolled releases and breaches.

7.3 Noise

7.3.1 A Noise Impact Assessment has been undertaken to consider and review the potential noise impact from the CCF on the nearest sensitive receptors. The Noise Impact Assessment is based on the information from the Environmental Statement accompanying the application for a DCO for the Cory Decarbonisation Project.

7.3.2 A noise impact assessment (NIA) in accordance with BS 4142 has been undertaken and is included within the permit application.

7.3.3 The Noise Impact Assessment is included as Appendix G of the Technical Support Document.

7.3.4 A detailed acoustic model of the CCF and surrounding area was produced using CadnaA® noise mapping software.

7.3.5 The Noise Impact Assessment results showed that without any additional mitigation measures, the operational noise rating levels would exceed the operational noise limits by up to +7 dB in certain circumstances. This outcome is largely due to noise emitted from the back-up Air Source Heat Pump fans associated with the Heat Transfer Station at the CCF when in operation. These pumps would be used as a contingency on those occasions when thermal heat from R1 and R2 was unavailable and noise emitted at those times would be mitigated through the installation of a permanent acoustic barrier or similar.

7.3.6 Although the details of the final mitigation measures are yet to be determined, as part of the detailed design, through the DCO a Noise Mitigation Plan detailing the final mitigation measures, demonstrating compliance with the operational noise limits set out in the DCO will be prepared and submitted to and approved by the relevant planning authority in writing prior to the operation of the CCF. Relevant to this application, a preliminary Noise and Vibration Management plan has been prepared for the submission. This identifies the measures that can be employed to manage and mitigate noise sources. This is included within Appendix H of the Technical Supporting Document.

7.3.7 Detailed noise modelling will be carried out of the final design to confirm the actual mitigation measures proposed. The modelling results will be used to inform the procurement of equipment. During procurement, test data for fixed plant and building elements will be reviewed to confirm that the level of noise from each item of significant noise-emitting

equipment is either no higher than the level included in the noise model or, taken in combination, would comply with the commitments made in relation to noise within the DCO and would not lead to significant noise pollution. Mitigation will include:

- Acoustic barriers when required;
- Selecting quieter fans or equipment
- Locating noisy equipment farther away and behind buildings, so that the building acts as a barrier to the noise from the equipment.

7.3.8 The Noise Impact Assessment considers the results of the initial impact estimation for the CCF as well as the CCF in combination with the existing Riverside 1 facility and the Riverside 2 facility cumulatively, and that taking account of contextual evaluation and the additional mitigation measures to be implemented, it is concluded that the operation of the Proposed Scheme will not lead to a significant noise adverse impact.

7.4 Odour

7.4.1 The assessment above concludes that the risk from odour, associated with the CCF and its activities, are not significant with the appropriate plant design and management practices adhered to. Further consideration and a review of odour has been considered, as appropriate, within the Technical Support Document.

7.5 Global Warming

7.5.1 The fundamental aspect of the Carbon Capture Facility is to capture a minimum of 95% of CO_2 during normal operating conditions from Riverside 1 and Riverside 2 that would be otherwise released to the atmosphere. This results in an annual net operational emissions saving of 1.4MtCO_2e with the Carbon Capture Facility operating.

7.5.2 An assessment of the potential effects of the operation of the CCF on greenhouse gases was undertaken as part of the Environmental Statement, which concluded that there will be a significant decrease in greenhouse gas emissions as a result of the CCF.

7.5.3 The Environment Agency has withdrawn its guidance “Assess the Impact of Air Emissions on Global Warming” 23 July 2024. Given the removal of CO_2 is an environmental betterment, and in line with current Environment Agency Guidance, no further assessment has been undertaken.

7.6 Disposal of Waste

7.6.1 Waste generation and management has been considered as part of this permit application and environmental risk assessment. Best Available Techniques will be applied at the site. Methods for reducing the impact from waste disposal have been considered and details of the approach to waste management can be located in the Technical Support Document, Section 9.

8 Conclusions

8.1.1 As presented in this report, the CCF is considered to contain appropriate control measures and management systems to ensure that the CCF does not have any significant impact upon the local environment.

Further review and assessments have been undertaken, including detailed modelling for emissions to air and noise impacts, that have been undertaken in support of this new bespoke permit application.

The preliminary CO_2 (included in Appendix J of this Technical Supporting Document) venting study concluded that, the risk assessment is robust and precautionary. The results indicate that there is a **low risk** that sensitive members of the public might experience mild but transient effects during some venting events (with maximum concentrations at receptors exceeding 2000ppm) but that the general population will experience **no significant health effects** during the foreseeable venting scenarios. The assessment will be reviewed/repeated as necessary using data available following finalisation of detailed design to ensure that there is **negligible risk** of modelling unrepresentative conditions.

The overall conclusions of the detailed air dispersion modelling concluded that no significant effects are likely on either human health or local environmental habitats.

With respect to noise, it is concluded that the operation of the CCF will not lead to any significant noise adverse impacts at receptors, with the proposed mitigation and measures identified within the site Operational Noise Management Plan implemented and actioned.