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Protos ERF EP Variation



Encyclis

Environmental Risk Assessment

Document approval

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1 Introduction

Encyclis Limited (Encyclis) has been granted an Environmental Permit (EP) to operate the Protos Energy Recovery Facility (ERF) (the Facility). The ERF comprises two incineration lines. Encyclis is applying for a variation to the EP to incorporate a proposed carbon capture (CC) facility to capture the carbon dioxide (CO₂) produced by the ERF for sequestration.

The aim of this report is to assess the environmental risks associated with the proposed CC facility.

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 Facility, throughout its life, will not pose an unacceptable risk to the environment.

The aim of this document is to:

1. identify potential risks that the activity may present to the environment;
2. screen out those that are insignificant and don't require detailed assessment;
3. identify potentially significant risks, where appropriate;
4. choose the right control measures, where appropriate; and
5. report the findings of the assessment.

This document has been developed to consider the requirements of Environment Agency (EA) Guidance Notes H1 Annexes A, C, H and F. It is acknowledged that these guidance documents have been withdrawn; however, it is understood that the requirements of the guidance are still applicable.

1.1 Risk assessment process

This assessment has been developed in accordance with the EA Guidance Note H1. This guidance promotes four key steps:

1. identify risks from the activity;
2. assess the risks and check that they are acceptable;
3. justify appropriate measures to control the risks; and
4. present the assessment.

1.2 Step 1 – identify risks

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

1. odour;
2. noise;
3. fugitive emissions; and
4. accidents.

1.3 Step 2 – assess the risk

The report will include an assessment of risks associated with the operation of the Installation, and will identify the:

1. hazard;

2. receptor; and
3. pathway.

1.4 Step 3 – justify appropriate measures

This report will demonstrate that the risks associated with the operation of the Installation have been considered, and identify the control measures which will be in place to demonstrate that the risks are being appropriately managed.

1.5 Step 4 – present the assessment

The assessment will conclude by presenting the following:

1. possibility of exposure;
2. consequence; and
3. the overall risk.

The report will present the overall risk applying the EA's H1 criteria, defined as:

1. insignificant;
2. not significant; and
3. significant.

2 Table A1 – 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 is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance and probability and consequence.
Delivery and unloading of amine solution.	Immediate area. The nearest residential receptors are located approximately 1 km to the northwest and southwest of the Installation Boundary.	Air.	The unloading of amine solution into storage tankers will be undertaken within dedicated chemical handling areas. The displaced air from the storage tank will be vented back into the delivery tanker.	Unlikely.	Nuisance.	Not significant.
Transfer of reclaiming waste into road tankers for transport off-site.	Immediate area. The nearest residential receptors are located approximately 1 km to the northwest and southwest of the Installation Boundary.	Air.	The transfer of spent amine solution into road tankers will be undertaken within dedicated chemical handling areas. The displaced air from the road tanker will be vented back into the storage tank.	Unlikely.	Nuisance.	Not significant.

3 Table A2 – Noise and Vibration 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 is 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 process equipment and plant.	Immediate area. The nearest residential receptors are located approximately 1 km to the northwest and southwest of the Installation Boundary.	Sound propagation through air and the ground.	Noisy plant items, where practicable, will be installed inside buildings rather than outside. Where it is not possible to install noisy plant within a building, appropriate noise attenuation measures will be installed to mitigate noise impacts at receptors. Regular maintenance of process plant will be undertaken in accordance with documented maintenance procedures.	Unlikely (due to the industrial location of the site and distance to receptors).	Annoyance.	Not significant. Refer to Annex E of the Application Pack.

4 Table A3 – 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 is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance and probability and consequence.
Spillage of chemicals during delivery and offloading activities.	Immediate area – air, land, water.	Air, surface runoff.	<p>Chemical unloading activities will be undertaken within dedicated chemical storage and handling areas.</p> <p>Chemical unloading areas will have contained drainage systems to contain the chemicals in event of a spill/leak.</p> <p>Spillages of chemicals will be cleaned up in accordance with documented management systems.</p> <p>Drains will be equipped with penstocks to contain any chemicals within the site, preventing emissions to wider Protos drainage network.</p>	Unlikely.	Nuisance and dust.	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 is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance and probability and consequence.
Chemical discharges when filling chemical storage tanks.	Immediate area – air.	Air, surface runoff, direct contact.	<p>Amine solution will be delivered in sealed tankers and off-loaded via a standard hose connection. Air displaced from the storage tanks will be vented back into the delivery tanker.</p> <p>Unloading activities will only be undertaken in areas of hardstanding with contained drainage. Unloading activities will be supervised by suitably trained personnel.</p> <p>Drains will be equipped with penstocks to contain any chemicals within the site, preventing emissions to wider Protos drainage network.</p>	Unlikely.	Nuisance.	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 is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance and probability and consequence.
Spillage of amine solution/ spent solvent when transferring to tankers for transfer off-site.	Immediate area – air, land, water.	Air, surface runoff.	Chemical unloading activities will be undertaken within dedicated chemical storage and handling areas. Chemical unloading areas will have contained drainage systems to contain the chemicals in event of a spill/leak. Spillages of chemicals will be cleaned up in accordance with documented management systems. Drains will be equipped with penstocks to contain any chemicals within the site, preventing emissions to wider Protos drainage network.	Unlikely.	Nuisance and dust.	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 is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance and probability and consequence.
Chemical discharges when transferring of amine solution/ reclaimer waste from storage tanks to tankers for transfer off-site.	Immediate area – air.	Air, surface runoff, direct contact.	Reclaimer waste will be transferred to sealed tankers and off-loaded via a standard hose connection. Air displaced from the tanker will be vented back into the storage tank. Unloading activities will only be undertaken in areas of hardstanding with contained drainage. Unloading activities will be supervised by suitably trained personnel.	Unlikely.	Nuisance.	Not significant.

5 Table A4 – 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 is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance and probability and consequence.
Uncontrolled release of CO ₂ due to damage to the CO ₂ pipeline infrastructure.	Immediate area – air.	Air.	The CO ₂ pipeline infrastructure will be installed with leak detection systems. A planned preventative maintenance system will be implemented on the CO ₂ pipeline infrastructure.	Unlikely	Vapour release. Unsafe atmospheres if humans (employees or local residents) are exposed.	Not significant.
Leaks from the amine solution/ solvent storage facilities.	Immediate area – land, water.	Land, water.	The amine storage facilities will be located above ground in a dedicated bund.	Unlikely	Liquid or vapour release.	Not significant.
Spillage/leak of spent amine solution/ solvent when transferring to tankers for transfer off-site.	Immediate area – land, water.	Land, water.	The amine storage facilities will be located above ground in a dedicated bund.	Unlikely.	Liquid or vapour release.	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 is 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.	Off-loading of liquid chemicals will be from sealed tankers and off-loaded via dedicated hoses. Spillages will be prevented by good operating procedures, high tank level alarm/trips etc. Storage tanks will be located within suitably designed secondary containment. Unloading of liquid chemicals will be undertaken on areas of contained drainage to prevent the release of contaminated effluent off-site through any spillages.	Unlikely	Liquid or vapour release.	Not significant.

6 Detailed Assessment

The environmental impact of the Installation has been evaluated using the H1 software tool as described in Part 2 of Technical Guidance Note EPR-H1. The H1 software tool is presented in Appendix A of this report.

6.1 Emissions to air

Detailed air quality assessments, including a Dispersion Modelling Assessment and Dioxin Pathway Assessment, have been undertaken to assess the air quality impacts associated with the implementation of the CC facility. The assessments are presented in Annex D of the Application Pack.

As concluded in the Dispersion Modelling Assessment:

“the assessment has shown that the air quality impact of the Proposed Facility would not have a significant impact on local air quality, the general population or the local community. As such there should be no air quality constraint in granting a variation to the existing EP to include the CC facility.”

This assessment has considered the impact of the additional products released from the CC facility such as amines, nitrosamine and nitramines.

6.2 Habitats assessment

There are a number of habitat sites present within a 10 km radius of the Facility. The following habitat features presented in Table 6-1 have been considered within the Dispersion Modelling Assessment:

Table 6-1: Sensitive Ecological Receptors

ID	Site	Designation	Distance from Facility at closest point (km)
European and UK designated sites			
E1	Mersey Estuary	SPA, Ramsar and SSSI	1.0
E2	Midland Mere and Mosses	Ramsar	9.2
Local sites			
E3	Frodsham and Helsby and Ince Marshes	LWS	Surrounding the Facility
E4	Station Road Railway Site	LWS	1.7

In addition, the Dispersion Modelling Assessment considered the impact at land identified as being functionally linked to the Mersey Estuary.

As concluded in the Dispersion Modelling Assessment given that the CC facility is likely to abate emissions of acid gases and ammonia by more than 90%, it is unlikely that impacts would exceed the 1% of the long term Critical Level or Critical Load at any ecological site. Therefore, impacts would be insignificant at the identified ecological receptors.

6.3 Emissions to water

The CC facility will generate effluent from the direct contact cooler and the CO₂ treatment (drying and compression).

Effluent from the water wash will be directed back to the absorber, reducing the demands of the column and reducing the need to treat and dispose of this effluent stream.

The process effluents will be discharged to the wastewater treatment system for the Facility prior to use within the hybrid condensers. The blowdown from the condensers will subsequently be transferred to the ERF for reuse.

Therefore, are no process effluents discharged from the CC facility.

The only emissions to water from the CC facility will be uncontaminated surface water run-off (W3). Therefore, Encyclis does not consider that emissions to water will result in the release of contaminated effluent and an assessment of the impact of discharges to water has been undertaken.

6.4 Noise

The impact of noise from the Installation is considered in the noise assessment contained in Annex E of the Application Pack. The assessment concludes that the combined noise impacts from the ERF and CC facility at sensitive receptors would have a low impact with noise levels at the sensitive receptors being no higher than 8 dB below the prevailing background sound levels in the worst-case which suggests that complaints are unlikely. Therefore, noise impacts are considered to be 'not significant'.

The EP for the Facility does not include a requirement for a Noise Management Plan. Therefore, as the noise impacts associated with the operation of the CC Facility are considered to be 'not significant', it is not proposed to develop a Noise Management Plan within this application. In accordance with condition 3.5 of the EP, in the event that the Facility was to give rise to off-site noise impacts, Encyclis is committed to developing a Noise Management Plan to manage and mitigate noise impacts from the Facility.

6.5 Visual impact

The visual impact of the Installation has not been considered in the EP application, since this is primarily a matter for the planning authorities. However, the potential for visible plumes from the CC facility has been considered in the Dispersion Modelling Assessment. The initial analysis showed that the exhausts from the absorber columns and the hybrid coolers are relatively dry and there are not predicted to be any visible plumes from the CC facility.

6.6 Odour

The CC facility is not anticipated to introduce any additional risk of odour impacts.

The EP for the Facility does not include a requirement for an Odour Management Plan. Therefore, as the odour impacts associated with the operation of the existing Facility are considered to be 'not significant', it is not proposed to develop an Odour Management Plan within this application. In accordance with condition 3.4 of the EP, in the event that the Facility was to give rise to off-site odour impacts, Encyclis is committed to developing an Odour Management Plan to manage and mitigate odour impacts from the Facility.

6.7 Global warming

The CC facility will remove emissions of CO₂ from the combustion of waste in the ERF. Therefore, the CC facility will have a positive impact on global warming.

6.8 Disposal of wastes and residues

The only residue which will be generated by the CC facility will be reclaimer waste. This will be transferred for recovery or disposal at a suitably licensed waste treatment facility.

7 Conclusions

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

Appendices

A H1 Assessment Tool

Included as an excel spreadsheet in Application pack

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