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Protos ERF EP Variation



Encyclis

Site Condition Report

Document approval

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1 Introduction

An Environmental Permit (EP) (Ref: EPR/LP3132FX) was granted by the Environment Agency (EA) for the Protos Energy Recovery Facility (ERF) (herein referred to as the Facility) on 16 September 2011. This EP replaced the EP for the Facility (Ref: TP3135LS) originally granted by the EA on 21 December 2006 to Peel Environmental Ince Limited.

The EP (EPR/LP3132FX) has been varied 8 times. A variation was granted to the EP in March 2023, which amended the installation boundary and provided additional data on the baseline ground conditions for the Facility. The Variation included a Site Condition Report. The previous Site Condition Report is presented in Appendix A of this document for reference, noting this also includes all previous iterations of the Site Condition Report as appendices.

The latest variation to the EP was granted by the EA to Encyclis Limited (Encyclis) on 02 May 2023 to incorporate the requirements of the Waste Incineration BREF review process. Within this application, Encyclis is applying for a variation to the EP to incorporate the proposed carbon capture (CC) facility to capture the carbon dioxide (CO₂) produced by the ERF for sequestration.

This Site Condition Report is provided as a further update to all previous Site Condition Report to inform the baseline ground conditions associated with the additional land to be incorporated into the installation boundary to allow for the operation of the proposed CC facility.

This report has been developed in accordance with the EA's latest guidance titled 'Environmental permitting: H5 Site condition report'.

2 Site Details

2.1 Applicant

Encyclis is an internationally recognised owner and operator of large-scale ERFs. The company delivers environmentally responsible and increasingly innovative solutions for the public, local government, industry and commerce, enabling its customers to reduce their impact on the environment. Encyclis processes approximately 20 million tons of municipal solid waste each year which conserves over 25 million cubic yards of landfill space and generates 9 million megawatt hours of electricity - enough clean, renewable energy to power for one million homes. All of Encyclis's EfW projects feature state-of-the-art emission control technology.

Encyclis believes that recovering energy from the waste that remains after recycling is an important part of sustainable waste management and key to reducing the hundreds of millions of tons of waste sent to landfills each year. Energy-from-Waste (EfW) takes non-hazardous waste destined for landfills, combusts it in specially designed boilers then recovers the heat to generate steam to use in energy generation or other industrial processes.

2.2 Site address

The address for the Facility is as follows:

Protos Energy Recovery Facility
Grinsome Road
Elton
Cheshire

2.3 National grid reference

The Facility is located at grid reference:

SJ46797662

2.4 Site location

The CC facility will be located on land at Ince Marshes, Cheshire, within the Protos development area, on a plot currently named "Ecology Area E". The site lies north of Marsh Lane, Ince Bio Power plant and the Facility are located to the west. The area of land where the CC facility comprises an ecological mitigation area for the wider Protos Park.

The CF Fertilisers and Encirc manufacturing facilities, and located to the south of the CC facility. Encyclis understands that they are subject to the Control of Major Accident Hazards (COMAH) 2015 regulations. However, the CF Fertiliser facility is currently not operational and is has been mothballed, with the intention of the manufacturing facility being decommissioned and demolished.

The earthworks drawings for the attenuation ponds indicate that they vary in depth from -1.2m AOD (Above Ordnance Datum) to -2.8m AOD, with the surrounding ground being relatively flat at around 4.5m AOD.

3 Condition of the Land at Permit Issue

3.1 Environmental setting

A Groundsure Report is provided in Appendix B which has been utilised to inform the environmental setting for the CC facility.

3.1.1 Geology

The British Geological Society (BGS) records indicate the superficial geology comprises Tidal Flat Deposits, overlying Glacial Till. The superficial material is shown to be underlain by the Kinnerton Sandstone Formation.

The ground investigations associated with the ERF, as identified in section 3.3, have identified the following strata to be present:

- Topsoil and made ground;
- Tidal flat deposits, including peat;
- Fluvio glacial deposits;
- Glacial Till; and
- Sandstone.

The underlying geology for the land which the CC facility will be located is understood to be consistent with the underlying geology for the ERF.

3.1.2 Hydrogeology

Previous investigations and the Groundsure Report (Appendix B) have identified the presence of principal and secondary aquifers on the site.

The water table at the site is expected to be similar to that encountered at neighbouring sites. Groundwater levels on the adjacent sites was observed to be at or close to existing ground level at around 2-3m AOD, with some artesian water encountered during drilling.

There are no Source Protection Zones located on or within 250m of the Site.

There are no records of active licensed groundwater abstractions within 250 m of the Site, no potable water abstraction licenses recorded within 250m of the Site, and no private wells recorded within 250m of the Site.

3.1.3 Hydrology and surface waters

The Groundsure Report (Appendix B) reported hydrology and surface water condition at the site is summarised as follows:

- several minor surface water features are present within the site
- The fluvial/tidal flood risk category of the site is “high”. There are no recorded flood events within 250m of the site. The Groundsure Report denotes the site as an ‘area benefitting from flood defences’. The site lies in Flood Zone 3.
- The highest risk of surface water flooding on site is from a 1 in 30 year event, with expected flood depths of 0.1m to 0.3m.
- The site has a high risk of groundwater flooding due to the presence of high groundwater levels.

3.2 Pollution history

3.2.1 Site history

The Groundsure Report (Appendix B) sets out the site history as follows:

- The Site was undeveloped until 1990, when unspecified commercial/industrial uses were shown on maps.
- The surrounding land use is commercial/industrial with multiple off-site developments relating to energy and industrial process works

3.2.2 Historical pollution incidents

The Groundsure Report (Appendix B) sets out the site historical pollution incidents as follows:

Since 2006, published data has only included Category 1 (major) and 2 (significant) pollution incidents.

There are 3 records of pollution incidents within 500m of the site: two Category 3 (Minor) incidents in 2001 and a Category 2 (significant) incident in 2008.

3.2.3 Historical pollution potential

There are no records of sites determined as ‘contaminated land’ within 500m of the Site. There are two COMAH sites adjacent to the site.

3.2.4 Licenses and authorisations

Distance/ direction from the site	Details
Licensed industrial activities (Part A(1))	
60m (W)	Covanta Energy Ltd - Protos Refuse Derived Fuel Plant The incineration of non-hazardous waste in an incineration or co-incineration plant with a capacity exceeding 3 tonnes per hour Status: Determination
176m (NW)	Covanta Energy Ltd - Protos Refuse Derived Fuel Plant THE INCINERATION OF NON-HAZARDOUS WASTE IN AN INCINERATION OR CO-INCINERATION PLANT WITH A CAPACITY EXCEEDING 3 TONNES PER HOUR Status: Effective
241m S	Cf Fertilisers Uk Limited Chemical fertilisers; producing etc Phosphorous, nitrogen or potassium based fertilisers etc Status: Effective
	Refer to Groundsure Report (Appendix B) for full list
Licensed discharges to controlled waters	

Distance/ direction from the site	Details
27m (W)	Plot 8, ince park, chester, ch2 4nr Effluent Type: Sewage Discharges – Final/Treated Waters – Not Water Company Effective Dates: 2021
	Refer to Groundsure Report (Appendix B) for full list
List 2 Dangerous Substances	
	None active
COMAH sites	
On Site	Growhow UK Ltd
On Site	CF Fertilisers UK Limited
Hazardous substance storage/usage	
	None active/no details/historical consents

3.2.5 Recent industrial land uses

The Groundsure Report (Appendix B) sets out the potentially contaminative industrial uses as follows:

- Numerous Chimneys, Tanks and features associated with adjacent industrial
- Two Electricity substations

3.2.6 Landfill and waste sites

The Groundsure Report (Appendix B) does not have any records of active or historical landfill sites within 500m of the site.

The Groundsure Report (Appendix B) contains records of 4 historical waste sites and 0 active licensed waste sites within 500m of the site.

3.2.7 Environmental designations

The European and UK Environmental designations within 2km of the Facility are provided in the following table.

Site	Location	Details
Sites of Special Scientific Interest (SSSI)	874m N, 984m NE, 1102m NE	Mersey Estuary
Conserved wetland sites (Ramsar sites)	873m N	Mersey Estuary
Special Protection Areas (SPA)	873m N	Mersey Estuary
Nitrate Vulnerable Zones	On site	Peckmill Brook, Hoolpool Gutter at Ince Marshes. NVZ

3.3 Baseline soil and groundwater reference data

At this stage, there are no records from intrusive investigations to inform the baseline conditions associated with the additional land. A scope of intrusive site investigations is proposed to be undertaken to inform the design of the CC facility, as well as the existing ground conditions, refer to section 8.

The following borehole log is available within the site boundary:

- BGS Borehole ID 163357, BGS Reference SJ47NE91

The following reports have previously been collated to inform the baseline ground conditions for the ERF, and have been incorporated into the previous Site Condition Reports, refer to Appendix A:

- Ince Resource Recovery Park Desktop Study and Appraisal, November 2005, by RSK
- Ince Resource Recovery Park Phase 2 Interpretive Report, September 2006, by WSP
- Ince Resource Recovery Park Environmental Site Investigation Report, February 2011, by RSK
- Project Shark Phase 1 Desktop Study, November 2017, by SLR
- Protos EFW Phase 1 & Phase 2 Factual and Interpretive Report, August 2018, by Terraconsult
- Protos EFW Factual Report On Ground Investigation, July 2021, by Socotec
- Unexploded Bomb Report Protos EFW site Careys Nov 2019

4 EC Guidance: Stage 1 – 3 Assessment

In accordance with European Commission Guidance concerning baseline reports under Article 22(2) of the IED, a Stage 1 – 3 assessment has been undertaken to identify hazardous substances used at the CC facility.

Stages 1 – 3 of the assessment are described as follows:

1. Identify which hazardous substances are used, produced or released at the installation.
2. Identify which of these substances are classed as ‘relevant hazardous substances’ (defined within Article 3 of EC Regulation 1272/2008). Justify any hazardous substances which have been excluded due to their incapability to contaminate soil or groundwater.
3. For each relevant hazardous substance, identify the actual possibility for soil or groundwater contamination at the Site (including probability of release), taking into account quantities, storage and transport, risk of release.

The full stage 1 – 3 assessment of the raw materials consumed and residues generated at the CC facility are presented in Table 1. The raw materials consumed and residues generated at the Facility are identified in the context of their hazards and theoretical pollution risk, with justification as to whether the substance is of concern or not in the context of the sensitivity of the Site.

Table 1: Stage 1 - 3 assessment of materials at the Facility

Stage 1: Chemicals handled	Stage 2: Chemical characteristics and toxicity						Stage 3: Site specific characteristics			Stage 4: Site specific risk	
Substance	Concentration / State	CAS No.	EC/List No.	Hazard statements (CLP)	Hazard substance under Stage 2?	Environmental fate / behaviour	Potential Pollution Risk?	Approx. Quantity Stored	Storage Arrangements/ Containment	Delivery, Storage and use details	Comments/ Chemical of concern?
Raw materials											
MEA solvent	Liquid	141-43-5	205-483-3	H302 H312 H332 H314 H335 H412	No	Completely miscible in water. Toxic effects. Potential for mobility in soils.	Yes	8.5 tonnes	Enclosed tanks with bunding/sumps	Delivered by chemical tanker and transferred into bunded tank using flexible hose. Injected into process to replace degraded solvent.	Periodic inspections of tank undertaken (preventative maintenance), site drainage will be able to be isolated in a spill event, air emissions system is subject to advanced control measures. Storage silos will be located above concrete hardstanding, and fitted with high-level alarms for unloading operations.
Sodium hydroxide	Solid pellets	1310-73-2	215-185-5	H290 H314 H318	No	Soluble in water Toxic effects Potential for mobility in soils.	Yes	2.8 tonnes	Enclosed tanks with bunding/sumps	Delivered by chemical tanker and transferred into bunded tank by flexible hose. Direct feed into direct contact cooler/condensate.	Periodic inspections of tank undertaken (preventative maintenance), site drainage will be able to be isolated in a spill event. Any spillages easily swept up, site containment and handling procedures are good. Storage silos will be located above concrete hardstanding, and fitted with high-level alarms for unloading operations.
Residues											
Reclaimer waste	Solid	-	-	-	Yes	Potentially miscible in water. Toxic effects. Potential for mobility in soils.	Yes	9.7 tonnes	Enclosed tanks with bunding/sumps	Residue from amine reclamation process. Stored in bunded tank. Direct feed into tankers (enclosed) for transfer to disposal facility.	Periodic inspections of tank undertaken (preventative maintenance), site drainage will be able to be isolated in a spill event. Storage silos will be located above concrete hardstanding and fitted with high-level alarms for unloading operations.

5 Changes to the Activity

Carbon capture and storage is listed a regulated activity within section 6.10 of Part 2 of Schedule 1 of the EPRs as per the following definition:

(a) Capture of carbon dioxide streams from an installation for the purposes of geological storage pursuant to Directive 2009/31/EC of the European Parliament and of the Council on the geological storage of carbon dioxide.

During pre-application discussions with the EA, it was confirmed that the CC facility would require an additional activity to be incorporated within the EP, refer to the Supporting Information for further details.

6 Measures Taken to Protect Land

Detailed design of the CC facility is ongoing and any relevant pollution prevention measures will be incorporated into the design and operation of the CC facility.

Therefore, at this stage, there are no records available associated with the inspection and testing of pollution prevention measures. These records will be available following completion of construction and commissioning of the CC facility.

7 Pollution Incidents and Remediation

Detailed design of the CC facility is ongoing and any relevant pollution prevention measures will be incorporated into the design and operation of the CC facility.

Therefore, at this stage, there are no records available associated with the pollution incidents at the land associated with the CC facility which could impact on the ground conditions within the additional land to be incorporated into the installation boundary. Encyclis will ensure that the Site Condition report will be updated to maintain a record of any pollution incidents during the lifetime of the ERF and the CC facility.

8 Soil, Gas and Water Quality Monitoring

A scope of intrusive site investigations is proposed to be undertaken to inform the design of the CC facility, as well as the existing ground conditions. This will include the following:

- intrusive testing such as boreholes and trial pits;
- laboratory testing for geotechnical and geo-environmental parameters; and
- in-situ groundwater and ground gas monitoring.

Records collated from the proposed site investigations, will be utilised to update the baseline ground conditions for the additional land which will be incorporated into the installation boundary.

In addition, a programme of periodic soil and groundwater monitoring has been developed to identify any pollution which may occur throughout the lifetime of the ERF, and to inform a subsequent Surrender to the EP at the end of its lifetime. The programme of periodic monitoring will be extended to include the additional land associated with the operation of the CC facility.

Appendices

A Previous Site Condition Report

Included as separate documents within the Application pack

B Groundsure Report

Included as separate documents within the Application pack

C Plans

Included as separate documents within the Application pack

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