Permit with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Viridor Energy Runcorn CCUS Limited

Runcorn CC Facility
Barlow Way
Runcorn
Cheshire
WA7 4HG

Permit number

EPR/QP3724SE

Runcorn CC Facility
Permit number EPR/QP3724SE

Introductory note

This introductory note does not form a part of the permit

The main features of the permit are as follows.

Multi-operator Installation

The Installation is located in an area known as Weston Point. The town of Runcorn is approximately 2km to the northeast. It is a multi-operator installation which has two operators: Viridor Energy Runcorn CCUS Limited and Viridor Energy Limited. Viridor Energy Limited operates the Runcorn Energy from Waste facility (EfW) under permit number EPR/XP3005LB. Viridor Energy Runcorn CCUS Limited operates the carbon capture (CC) plant under this permit which will treat the flue gas stream from the EfW. Together these comprise a single installation.

Brief description of the process

This permit controls the operation of the post combustion carbon capture plant. Flue gases generated at the EfW facility are transferred to the CC plant. Carbon dioxide (CO_2) is captured and pressurised on site before being injected into the CO_2 transport pipeline for underground sequestration. The relevant listed activity is 6.10 Part A(1)(a) Capture of carbon dioxide streams from an Installation for the purposes of geological storage.

The CC plant is located on land to the northwest of the EfW facility. The Manchester Ship Canal is located to the west of the facility and, beyond that, the Mersey Estuary. The Mersey Estuary at its nearest point is located approximately 200 metres to the west of the site, beyond Weston Docks. The estuary is a Special Protection Area (SPA), designated for its nature conservation importance for feeding and roosting ducks and waders and is also a Ramsar site and Site of Special Scientific Interest (SSSI).

A back pressure turbine provides heat/steam and power to the CC plant. High pressure steam will be bled from the incineration plant and expanded through the back pressure turbine. The CC plant will use heat for CO_2 stripping, amine solvent regeneration and flue gas re-heating.

The CO_2 will be scrubbed out of the flue gases via a reaction with monoethanolamine (MEA) solvent in a counter current flow regime. The CO_2 is absorbed into the MEA solution creating a CO_2 rich amine solution. The CO_2 depleted flue gases will pass through a water wash prior to release to atmosphere via a stack on the absorber column. The reaction in the absorber column is exothermic, increasing the temperature of the flue gas aiding dispersion on release. The CO_2 rich amine solution is then pumped to the stripper column where heat from the reboiler raises the temperature of the solution releasing the captured CO_2 and producing a hot lean-amine solution which is recirculated back to the absorber tower. The CO_2 gas is cooled and conditioned before being compressed and exported for storage offshore in the Liverpool Bay sub-sea aquifer (beyond the boundaries of the Installation and the scope of this permit). The CC plant will capture approximately 900,000 tonnes of CO_2 per annum.

Over time the amine solution accumulates impurities and degrades reducing the effectiveness. Solvent reclamation is required via a thermal solvent reclaiming process. The reclaimer will produce a waste sludge which will be transported off site for disposal.

The blowdown from the hybrid cooling towers will be discharged to the Manchester Ship Canal. Clean surface water run-off will be collected in a dedicated surface water drainage system prior to discharge into the disused Runcorn and Weston Canal. A penstock valve will be installed on the surface water drainage system to enable the system to be isolated in the event of an incident. Condensate from the direct contact cooler will be routed to the wastewater treatment plant prior to being used as make-up water for the hybrid cooling towers. The resultant sludge from the wastewater treatment plant will be transported off site for disposal.

Viridor's integrated management system which applies to Viridor Energy Limited will be extended to incorporate the CC facility.

The status log of the permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Application EPR/QP3724SE/A001	Duly made 02/02/24	Application for carbon capture facility as part of multi-operator installation
Additional information received	17/05/24	Response to first Schedule 5 Notice including information on multi-operator installation, air quality assessment, CO_2 management, solvent selection, effluent treatment, storage of chemicals, energy efficiency and site plans.
Additional information received	10/06/24	Water quality modelling report and CORMIX model files
Additional information received	20/06/24	Response to second Schedule 5 Notice including information on CO_2 venting assessment.
Additional information received	25/07/24	Response to second Schedule 5 Notice including further information on noise impact assessment.
Additional information received	09/08/24	Response to second Schedule 5 Notice including revised noise impact assessment.
Additional information received	16/08/24	Response to RFI email dated 05/08/24 including information on CO2 conditioning and updated environmental risk assessment.
Additional information received	02/09/24	Response to RFI follow-up questions including further clarification on effluent treatment processes.
Additional information received	10/12/24	Response to third Schedule 5 Notice including revised noise impact assessment.
Draft permit for consultation	16/05/25	

Other Part A installation permits relating to this installation		
Operator	**Permit number**	**Date of issue**
Viridor Energy Limited	EPR/XP3005LB	18/12/2020

End of introductory note

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/QP3724SE

The Environment Agency hereby authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2016

Viridor Energy Runcorn CCUS Limited ("the operator"),

whose registered office is

Ardley ERF
Middleton Stoney Road
Ardley
OX27 7AA

company registration number 16036431

to operate part of an installation at

Runcorn CC Facility
Barlow Way
Runcorn
Cheshire
WA7 4HG

to the extent authorised by and subject to the conditions of this permit.

Name	Date
[name of authorised person]	**[DD/MM/YYYY]**

Authorised on behalf of the Environment Agency

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.2 Energy efficiency

1.2.1 The operator shall:

(a) take appropriate measures to ensure that energy is used efficiently in the activities.

(b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and

(c) take any further appropriate measures identified by a review.

1.3 Efficient use of raw materials

1.3.1 The operator shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;

(b) maintain records of raw materials and water used in the activities;

(c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and

(d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

1.4.1 The operator shall take appropriate measures to ensure that:

(a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and

(b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and

(c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.

1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

1.5 Multiple operator installations

1.5.1 Where the operator notifies the Environment Agency under condition 4.3.1 (a) or 4.3.1 (c), the operator shall also notify without delay the other operator of the installation of the same information.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the "activities").

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in blue on the site plan at schedule 7 to this permit, which is within the area edged in red on the site plan that represents the extent of the installation covered by this permit and that of the other operator of the installation.

2.3 Operating techniques

2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.

2.3.2 If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan , and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.

2.3.3 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.

2.3.4 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:

(a) the nature of the process producing the waste;

(b) the composition of the waste;

(c) the handling requirements of the waste;

(d) the hazardous property associated with the waste, if applicable; and

(e) the waste code of the waste.

2.3.5 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.

2.4 Improvement programme

2.4.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency.

2.4.2 Except in the case of an improvement which consists only of a submission to the Environment Agency, the operator shall notify the Environment Agency within 14 days of completion of each improvement.

2.5 Pre-operational conditions

2.5.1 The activities shall not be brought into operation until the measures specified in schedule 1 table S1.4 have been completed.

3 Emissions and monitoring

3.1 Emissions to water, air or land

3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1 and S3.2.

3.1.2 The limits given in schedule 3, subject to condition 3.2.1, shall not be exceeded.

3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.2.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Odour

3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.3.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.4 Noise and vibration

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any

approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.4.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.5 Monitoring

3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring specified in the following tables in schedule 3 to this permit:

(a) point source emissions specified in tables S3.1 and S3.2;

(b) process monitoring specified in table S3.3.

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the Environment Agency.

3.5.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1 and S3.2 unless otherwise agreed in writing by the Environment Agency.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) off-site environmental effects; and

(ii) matters which affect the condition of the land and groundwater.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

4.2 Reporting

4.2.1 The operator shall send all reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to the Environment Agency by 31 January (or other date agreed in writing by the Environment Agency) each year using the annual report form specified in schedule 4, table S4.4 or otherwise in a format agreed with the Environment Agency. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;

(b) the annual production /treatment data set out in schedule 4 table S4.2;

(c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule.

(d) The function and monitoring of the carbon capture plant in a format agreed with the Environment Agency. The report shall, as a minimum requirement give an account of the running of the process (including a summary of records of process monitoring requirements of table S3.3), the emissions into air compared with the emission limits in table S3.1 and details of the waste generated.

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

(a) in respect of the parameters and emission points specified in schedule 4 table S4.1;

(b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.4; and

(c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.3 Notifications

4.3.1 In the event:

(a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

(i) inform the Environment Agency,

(ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and

(iii) take the measures necessary to prevent further possible incidents or accidents;

(b) of a breach of any permit condition the operator must immediately—

(i) inform the Environment Agency, and

(ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;

(c) of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1 shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule

4.3.3 Where the Environment Agency has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform the Environment Agency when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to the Environment Agency at least 14 days before the date the monitoring is to be undertaken.

4.3.4 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(a) the death of any of the named operators (where the operator consists of more than one named individual);

(b) any change in the operator's name(s) or address(es); and

(c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.3.6 The Environment Agency shall be given at least 14 days' notice before implementation of any part of the site closure plan.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "without delay", in which case it may be provided by telephone.

Schedule 1 – Operations

Table S1.1 activities			
Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
AR1	S6.10 Part A(1)(a)	Capture of carbon dioxide streams from an installation for the purposes of geological storage Operation of a carbon capture plant involving the treatment of exhaust gas from the incineration plant into the capture plant using an amine-based solvent to extract CO_2 followed by compression, oxygen removal and dehydration of the CO_2 for off-site transportation and long-term storage, and release of CO_2-abated flue gas to atmosphere.	From receipt of exhaust gases from the incineration plant to the carbon capture plant to the treatment of exhaust gas prior to export of CO_2 from the Installation and release to atmosphere of treated exhaust gases from emission point A7; or venting of CO_2 from emission point A8. Amine solvent is limited to monoethanolamine (MEA) solution. Only flue gases from permit EPR/XP3005LB shall be accepted and only if they are compliant with the limits in table S3.1 of that permit.
	Directly Associated Activities		
AR3	Raw materials storage for carbon capture plant	Storage of amine solvent and other reagent for use at the carbon capture plant.	From receipt of raw materials to dispatch for use.
AR4	Waste amine solvent storage	Storage of waste amine solvent generated at the carbon capture plant.	From generation of waste materials to dispatch off-site for disposal.
AR5	Water treatment plant	Water treatment plant consisting of ultra-filtration and carbon filter absorption, used for treatment of the condensate from the direct contact coolers.	From receipt of condensate to dispatch of the treated water for re-use at the carbon capture plant and dispatch of waste material for off-site disposal.
AR6	Back pressure turbine	Providing heat/steam and generation of electricity for use within the carbon capture plant.	

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application EPR/QP3724SE/A001	Application documents including: Application forms B2 and B3 and referenced supporting document; Supporting Information, reference S3530-0320-0002JRS and dated 13/12/2023.	Duly made 02/02/2024
Response to first Schedule 5 Notice dated 17/04/2024	Response to questions 1, 5, 7, 12 and 15 Appendix A- Responsibilities Matrix Appendix D- Plans and drawings	17/05/2024
Additional information	Response to questions on CO_2 conditioning	16/08/2024 and 02/09/2024

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	**<u>Calibration and verification testing</u>** The operator shall submit a written summary report to the Environment Agency to confirm by the results of calibration and verification testing that the performance of Continuous Emission Monitors for parameters as specified in Table S3.1 complies with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3. The report shall include the results of the calibration and verification testing.	Initial calibration report to be submitted to the Environment Agency within 3 months of completion of commissioning of the carbon capture plant. Full summary evidence compliance report to be submitted within 18 months of completion of commissioning of the carbon capture plant.
IC2	**<u>Monitoring standards</u>** During commissioning, the operator shall carry out tests to assess whether the air monitoring location(s) meet the requirements of BS EN 15259 and supporting Method Implementation Document (MID). A written report shall be submitted for approval setting out the results and conclusions of the assessment including where necessary proposals for improvements to meet the requirements. Where notified in writing by the Environment Agency that the requirements are not met, the operator shall submit proposals or further proposals for rectifying this in accordance with the time scale in the notification. The proposals shall be implemented in accordance with the Environment Agency's written approval.	Report to be submitted to the Environment Agency within 3 months of completion of commissioning of the carbon capture plant.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC3	**<u>Carbon capture efficiency</u>** The operator shall submit a written report to the Environment Agency for assessment and written approval detailing the carbon capture efficiency of the Carbon Capture Plant under normal operating conditions (calculated using the methodology as approved in accordance with pre-operational condition PO11 in table S1.4 of this permit) averaged over one year of operation as specified in table S3.3 of this permit. Should the carbon capture efficiency during normal operating conditions be reported to be less than the design capture performance specification of 95%, the operator shall carry out an analysis of the issues affecting the performance of the plant with respect to achievement of the 95% carbon capture rate and either: • Submit written proposals for remedial actions designed to improve capture efficiency to the Environment Agency for approval; or • provide an acceptable justification to the Environment Agency that a 95% capture rate is not reasonably achievable, and that no further remedial action is to be taken.	Within 15 months from the completion of commissioning of the carbon capture plant.
IC4	**<u>Commissioning of the carbon capture plant</u>** The operator shall submit a written report to the Environment Agency for assessment and written approval on the commissioning of the carbon capture plant. The report shall summarise the environmental performance of the plant as set out in the commissioning plan required by pre-operational condition PO4 in table S1.4 of this permit. The report shall include: • a summary of the environmental performance of the carbon capture plant as installed against the design parameters and risk assessments set out in the application EPR/QP3724SE/A001 and updated in response to the pre-operational conditions in this permit; • a review of the performance of the carbon capture plant against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions and confirm that the Environmental Management System (EMS) has been updated accordingly.	Within 6 months of the completion of commissioning of the carbon capture plant.
IC5	**<u>Amine solvent degradation</u>** The operator shall submit a written report to the Environment Agency for assessment and written approval on the degradation of absorber solvent quality. The report shall review the findings from the monitoring of absorber solvent quality over 12 months of operation, including but not limited to the monitoring carried out in accordance with table S3.3 of this permit. The report shall include: • an investigation into the reasons for solvent degradation and how degradation affects the performance of the plant over time;	Within 15 months from the completion of commissioning of the carbon capture plant.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	• a review of the options for reducing the rate of solvent degradation; and • proposals for the implementation of any measures identified from the review. The proposals shall be implemented in accordance with Environment Agency's written approval.	
IC6	**Air emissions risk assessment (Carbon capture plant)** The operator shall submit a written report to the Environment Agency for technical assessment and written approval. The report must contain an emissions to air risk assessment in line with the Environment Agency's guidance which is based on sampled and monitored emissions data from emission point A7 in table S3.1 and on the parameters set out in table S3.1 of permit EPR/XP3005LB. Emissions monitoring data obtained during the first year of operation shall be used to compare the actual emissions with those assumed in the impact assessment submitted with the permit application EPR/QP3724SE/A001. For any parameters not included in the original impact assessment, or those showing to be at concentrations higher than those assumed in the impact assessment submitted in the application, an assessment shall be made of the impact to human health and habitats of each parameter using the 'Air emissions risk assessment for your environmental permit - GOV.UK (www.gov.uk)' guidance. Where Environmental Assessment Levels (EALs) for emitted substances are not available on the current published EAL list on gov.uk the operator should propose a new EAL. To derive a new EAL, the operator should follow the Environment Agency's published guidance on air emissions risk assessments.	Within 15 months of commencement of operation of the carbon capture plant.
IC7	**Emissions to water** The operator shall submit a written report to the Environment Agency for technical assessment and written approval. The report must contain: • a full characterisation of the discharge to Manchester Ship Canal from emission point W2 • the collected monitoring data and results from a minimum of 12 months of sampling and monitoring of effluent discharges from emission point W2 at a minimum frequency of a minimum of one sample a month • confirmation and evidence that the sampling and monitoring has been undertaken in line with the Environment Agency guidance on 'Surface water pollution risk assessment for your environmental permit' and 'Monitoring discharges to water: guidance on selecting a monitoring approach' (found on www.gov.uk) • a completed H1 assessment(s) and/or modelling output results which take into consideration relevant environmental standards as specified in Environment Agency guidance 'Surface water pollution risk assessment for your environmental permit' (found on www.gov.uk)	Within 15 months of commencement of operation of the carbon capture plant.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	• a comparison of the conclusions of the updated H1 assessment and/or modelling results against the conclusions of the H1 assessment submitted in application EPR/QP3724SE/A001 • where the results of the updated H1 assessment and/or modelling show that significant/adverse impact is likely from the emissions of any of the parameters, the operator shall cease further discharge of the site effluent and shall provide proposals and timescales on how to manage the effluent to ensure discharges have insignificant impact on receiving waters.	

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
PO1	**Environmental Management System** Prior to the commencement of commissioning, the operator shall send a summary of the site Environmental Management System (EMS) to the Environment Agency and obtain the Environment Agency's written approval to the EMS summary. The operator shall make available for inspection all documents and procedures which form part of the EMS. The EMS shall be developed in line with the requirements set out in Environment Agency web guide on developing a management system for environmental permits (found on www.gov.uk). The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit.
PO2	**Storage and secondary containment** At least 3 months prior to the commencement of commissioning of the carbon capture plant, the operator shall submit a written report to the Environment Agency for assessment and written approval. The report must contain: • Detailed design for all containment structures which contain relevant hazardous substances including tanks and pipework as well as secondary and tertiary containment where required. The operator must implement the proposals in the report in accordance with the Environment Agency's written approval.
PO3	**Pollution prevention measures** At least 3 months prior to the commencement of commissioning of the carbon capture plant, the operator shall submit a written plan to the Environment Agency for assessment and written approval. The plan must contain: • Pollution prevention measures including inspection and maintenance plans and procedures around the storage and use of all chemicals identified as relevant hazardous substances in the Stage 1-3 assessment of the Site Condition Report. The operator must implement the proposals in the report in accordance with the Environment Agency's written approval.
PO4	**Commissioning plan**

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
	At least 3 months prior to the commencement of commissioning of the carbon capture plant, the operator shall submit a written commissioning plan, including timelines for completion, for assessment and written approval by the Environment Agency. The commissioning plan shall include, but not be limited to: • The timelines for the commissioning and the expected durations of these activities. • The expected emissions to the environment during the different stages of commissioning; risk assessment demonstrating that the environmental risks are not significant throughout all the phases of commissioning; the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. • A Commissioning Monitoring Plan. • A methodology for approval to demonstrate the carbon capture efficiency of the plant. The approved methodology shall be used to demonstrate the carbon capture efficiency of the plant as part of the commissioning activities, and, after the commissioning phase, for process monitoring and reporting purposes in compliance with the conditions of the permit. • A methodology for approval for quantifying total mass of CO_2 emissions during short duration venting that may be required during the start-up sequence of the carbon capture plant and during other than normal operating conditions. The commissioning activities shall be carried out in accordance with the commissioning plan approved by the Environment Agency.
PO5	**Process monitoring methods** Following the completion of the final design of the carbon capture plant and at least 6 months prior to the commencement of commissioning the operator shall submit to the Environment Agency for assessment and written approval proposed methodologies for the following process monitoring requirements for absorber amine solvent quality as required in table S3.3 of this permit: • percent active amine (MEA) • carbon dioxide loading (rich amine) • heat stable salts • soluble iron concentration (rich and lean amine) • colour • degradation products
PO6	**CO_2 venting assessment** Following the completion of the final design of the carbon capture plant and at least 12 months prior to the commencement of commissioning, the operator shall submit to the Environment Agency for assessment and written approval a report that reviews the outcomes of the CO_2 venting emissions to air risk assessment presented in the application EPR/QP3724SE/A001. This report shall include but not be limited to: • confirmation of the vent location(s) • information on how modelling has been used to inform the process design and manage risks associated with CO2 venting. This should include a description of the different potential venting scenarios • confirmation that the design is in line with industry best practice, such as that produced by the Energy Institute, or other equivalent guidance • description of the operating techniques to minimise the risks associated with venting CO2 to atmosphere and limit venting scenarios to those considered in their application • a vent management plan which is in keeping with our published guidance on emerging techniques for post-combustion carbon capture and industry best

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
	practice, such as that produced by the Energy Institute, or other equivalent guidance.
PO7	**<u>Carbon capture plant other than normal operating conditions (OTNOC) plan</u>** Following the completion of the final design of the carbon capture plant and prior to the commencement of commissioning of the carbon capture plant, the operator shall submit to the Environment Agency for assessment and written approval a post combustion carbon capture (PCC) plant OTNOC management plan. The plan shall include: (i) Any potential 'other than normal operating conditions (OTNOC)' for the carbon capture plant, taking into consideration both internal and external causes of OTNOC. (ii) Details of measures to: • minimise the occurrence of OTNOC that are within the operator's control; and • reduce the impact of all OTNOC events. (iii) Proposals for reviewing and optimising capture performance periodically so capture rates are as high as reasonably practicable during these periods. The OTNOC plan shall be included in the EMS.
PO8	**<u>Monitoring standards</u>** At least six months before (or other date agreed in writing with the Environment Agency) the commencement of commissioning of the carbon capture plant, the operator shall submit a written report to the Environment Agency, and obtain the Environment Agency's written approval for it, specifying arrangements for continuous and periodic monitoring of emissions to air from the CC plant's emission points to comply with EN 15259 and Environment Agency guidance notes on monitoring stack emissions measuring locations, techniques and standards for periodic monitoring and TGN M20 for quality assurance of CEMS. The report shall include the following: • Details of monitoring locations, access and working platforms. • Evidence that CEMS are MCERTS certified at the appropriate range. • Evidence that data handling and acquisition systems are MCERTS certified. • Methods and standards for periodic monitoring. • Procedures for the quality assurance of CEMS, which includes evidence of completion of CEMS' functional tests and setting up quality assurance level (QAL) 3 checks, prior to completing a QAL2.
PO9	**<u>Site condition report</u>** Prior to the commencement of commissioning, the operator shall submit a report, and obtain the Environment Agency's written approval to it, on the baseline conditions of soil and groundwater at the CC plant. The report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for in Article 22(3) of the IED. The report shall contain information, supplementary to that already provided in application Site Condition Report, needed to meet the information requirements of Article 22(2) of the IED.
PO10	**<u>Noise Impact Assessment (NIA)</u>**

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
	Following the completion of the final design of the carbon capture plant and at least 6 months prior to the commencement of commissioning, the operator shall submit an updated NIA for assessment and written approval by the Environment Agency. The NIA shall be in accordance with BS4142:2014+A1:2019 (Rating industrial noise affecting mixed residential and industrial areas) or other methodology in accordance with the Environment Agency. The assessment shall be based on the final design of the Installation.
PO11	**Carbon capture efficiency** At least 3 months prior to the commencement of commissioning, the operator shall submit the following to the Environment Agency for approval: • a methodology to demonstrate the carbon capture efficiency of the plant. The approved methodology shall be used to demonstrate the carbon capture efficiency of the plant as part of the commissioning activities, and, after the commissioning phase, for process monitoring and reporting purposes in compliance with the conditions of the permit. • a methodology for quantifying total mass of CO_2 emissions during short duration venting that may be required during the start-up sequence of the carbon capture plant and during other than normal operating conditions.
PO12	**Water treatment plant** Following the completion of the final design of the carbon capture plant and at least 6 months prior to the commencement of commissioning, the operator shall submit a report, and obtain the Environment Agency's written approval to it, specifying the design of the water treatment plant
PO13	**CO_2 conditioning and compression** Following the completion of the final design of the carbon capture plant and at least 6 months prior to the commencement of commissioning, the operator shall submit a report, and obtain the Environment Agency's written approval to it, specifying the arrangements for the captured CO_2 conditioning and compression.

Schedule 2 – Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	**Specification**
Monoethanolamine (MEA)	Diethanolamine (DEA) not exceeding 0.2% content (unless otherwise agreed with the Environment Agency).

Schedule 3 – Emissions and monitoring

Table S3.1 Point source emissions to air – emission limits and monitoring requirements.						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard(s) or method(s)**
A7 as shown on site plan in Schedule 7 Note1	Ammonia (NH_3)	Carbon capture absorber tower stack	5 mg/m^3	daily average	Continuous	EN 14181
A7 as shown on site plan in Schedule 7 Note1	Acetaldehyde	Carbon capture absorber tower stack	5 mg/m^3	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic based on CEN TS 17638
A7 as shown on site plan in Schedule 7 Note1	Formaldehyde	Carbon capture absorber tower stack	5 mg/m^3	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic CEN TS 17638, or as agreed in writing with the Environment Agency
A7 as shown on site plan in Schedule 7 Note1	Total Amines (expressed as MEA) CAS No 141-43-5	Carbon capture absorber tower stack	10 mg/m^3	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	Total Nitrosamines expressed as N-nitrosodimethylamine (NDMA) CAS No 62-75-9	Carbon capture absorber tower stack	0.0001 mg/m^3	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing

Table S3.1 Point source emissions to air – emission limits and monitoring requirements.						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard(s) or method(s)**
A7 as shown on site plan in Schedule 7 Note1	Monoethanolamine (MEA) CAS No 141-43-5	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	Ethylamine (EA) CAS No 75-04-7	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	Methyl diethanolamine (MDEA) CAS No 105-59-9	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	Diethanolamine (DEA) CAS No 111-42-2	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	Dimethylamine (DMA) CAS No 124-40-3	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing

Table S3.1 Point source emissions to air – emission limits and monitoring requirements.						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard(s) or method(s)**
A7 as shown on site plan in Schedule 7 Note1	Morpholine (MOR) CAS No 110-91-8	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	Monomethylamine (MMA) CAS No 74-89-5	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	2-(ethylamine) ethanol CAS No 110-73-6	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosodimethylamine (NDMA) CAS No 62-75-9	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosomorpholine CAS No 59-89-2	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing

Table S3.1 Point source emissions to air – emission limits and monitoring requirements.						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard(s) or method(s)**
A7 as shown on site plan in Schedule 7 Note1	N-nitrosomethylethylamine CAS No 10595-95-6	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosodiethylamine CAS No 55-18-5	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosodiisopropylamine CAS No 601-77-4	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosodipropylamine CAS No 621-64-7	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosodibutylamine CAS No 924-16-3	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosodibenzylamine CAS No 5336-53-8	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed,	Isokinetic impinger method based on EN 14791 to be

Table S3.1 Point source emissions to air – emission limits and monitoring requirements.						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard(s) or method(s)**
					then as agreed with the Environment Agency	agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-(2-hydroxyethyl)ethylene diamine CAS No. 111-41-1	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosodiethanolamine (NDELA) CAS No. 1116-54-7	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	N-nitrosopyrrolidine CAS No. 930-55-2	Carbon capture absorber tower stack	No limit set	Periodic average over the sampling period	Monthly until the requirements of IC6 have been agreed, then as agreed with the Environment Agency	Isokinetic impinger method based on EN 14791 to be agreed with the Environment Agency in writing
A7 as shown on site plan in Schedule 7 Note1	As required by the Method Implementation Document for BS EN 15259 (Homogeneity test)	Carbon capture absorber tower stack	No limit set	-	Pre-operation and when there is a significant operational change	BS EN 15259
A7 as shown on site plan in Schedule 7 Note1	Carbon dioxide	Carbon capture absorber tower stack	No limit set	Continuous	Continuous	EN 14181

Table S3.1 Point source emissions to air – emission limits and monitoring requirements.						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard(s) or method(s)**
A7 as shown on site plan in Schedule 7	Exhaust gas temperature	Carbon capture absorber tower stack	No limit set	-	Continuous	Traceable to national standards
A7 as shown on site plan in Schedule 7	Exhaust gas pressure	Carbon capture absorber tower stack	No limit set	-	Continuous	Traceable to national standards
A7 as shown on site plan in Schedule 7	Exhaust gas flow	Carbon capture absorber tower stack	No limit set	-	Continuous	BS EN 16911-2
A7 as shown on site plan in Schedule 7	Exhaust gas oxygen content	Carbon capture absorber tower stack	No limit set	-	Continuous	EN 14181
A7 as shown on site plan in Schedule 7	Exhaust gas water vapour content	Carbon capture absorber tower stack	No limit set	-	Continuous	EN 14181
A8 as shown on site plan in Schedule 7	Carbon dioxide	Carbon dioxide vent stack	No limit set	-	-	-
A9 and A10 as shown on site plan in Schedule 7	-	Hybrid coolers	No limit set	-	-	-
Note 1: Reference conditions for these parameters are as follows: the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 11% dry.						

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
W2 as shown on site plan in Schedule 7	Cooling tower blowdown	No parameters set	No limit set	-	-	-
Discharge to EPR/XP3005LB prior to discharge at W1 as shown on site plan in Schedule 7	Surface water drainage	No parameters set	No limit set	-	-	-

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Absorber amine solvent quality, activity AR1 in table S1.1	Percent active amine (MEA)	Weekly, or otherwise agreed in writing with the Environment Agency	As agreed in writing with the Environment Agency in accordance with PO5 in table S1.4.	
Absorber amine solvent quality, activity AR1 in table S1.1	Carbon dioxide loading (rich amine)	Weekly, or otherwise agreed in writing with the Environment Agency	As agreed in writing with the Environment Agency in accordance with PO5 in table S1.4.	
Absorber amine solvent quality, activity AR1 in table S1.1	Heat stable salts	Every day during the first month of operation then once per week, or otherwise agreed in writing with the Environment Agency.	As agreed in writing with the Environment Agency in accordance with PO5 in table S1.4.	
Absorber amine solvent quality, activity AR1 in table S1.1	Soluble iron concentration – rich amine	Every day during the first month of operation then once per week, or otherwise agreed in writing with the Environment Agency.	As agreed in writing with the Environment Agency in accordance with PO5 in table S1.4.	
Absorber amine solvent quality, activity AR1 in table S1.1	Soluble iron concentration – Lean amine following stripper	Once per week, or otherwise agreed in writing with the	As agreed in writing with the Environment Agency in	

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
		Environment Agency	accordance with PO5 in table S1.4.	
Absorber amine solvent quality, activity AR1 in table S1.1	Colour	Weekly, or otherwise agreed in writing with the Environment Agency.	As agreed in writing with the Environment Agency in accordance with PO5 in table S1.4.	
Absorber amine solvent quality, activity AR1 in table S1.1	Degradation products – including but not limited to amines, nitrosamines, nitramines (in absorber amine prior to reclaiming and after reclaiming)	Monthly, or otherwise agreed in writing with the Environment Agency	BS EN ISO 10695, or otherwise agreed in writing with the Environment Agency	
Carbon capture performance	Carbon capture efficiency (%) during normal operation.	Continuous	Calculation by method traceable to national standards, to be agreed in writing with the Environment Agency as part of PO11 in Table S1.4 of this permit.	Note 1
Venting of CO_2 from Carbon Capture Plant – emission point A8	- Duration of event - Total mass of CO_2 emissions (tonnes / event)	Event specific, total annual	Calculation by method traceable to national standards compliant with UK ETS, to be agreed in writing with the Environment Agency as part of PO11 in Table S1.4 of this permit.	The operator shall identify the root cause of the venting event and consider ways to prevent or reduce the frequency and duration of reoccurrence.
Carbon dioxide metering package	Exported CO_2 mass flow (tonnes/hour)	Continuous	Mass flow metering traceable to national standards compliant with UK ETS, to be agreed in writing with the Environment Agency as part of PO11 in table S1.4 of this permit.	
Custody transfer point	Composition of exported CO_2,	To be agreed in writing with the	By method traceable to national standards compliant	CO_2 transport and storage

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
	including but not limited to: - Water content - H_2 content	Environment Agency	with UK ETS, to be agreed in writing with the Environment Agency as part of PO11 in table S1.4 of this permit.	system specification
Note 1: Instantaneous and annual average Carbon Capture Efficiency to be monitored. Annual average Carbon Capture Efficiency to be averaged over 1 year of operations (from 1st of January) during normal operation. Excluding periods of OTNOC. OTNOC includes venting of CO_2 during periods of time when the CO_2 transport and storage system is not available due to causes external to the operations of the installation.				

Schedule 4 – Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Emissions to air Parameters as required by condition 3.6.1.	A7	Quarterly	1 Jan, 1 Apr, 1 Jul and 1 Oct

Table S4.2: Annual production/treatment	
Parameter	**Units**
-	-

Table S4.3 Performance parameters		
Parameter	**Frequency of assessment**	**Units**
Water usage	Annually	m^3
Energy usage	Annually	Electricity usage- MWh Heat usage- MWth
Efficiency of carbon dioxide capture (Carbon Capture Plant) during normal operation	Annually	%
Total (thermal and electrical) energy use per tonne of carbon dioxide captured	Annually	Electrical energy- kW/tonne CO_2 captured Thermal energy- kWth/tonne CO_2 captured
Amine solvent usage	Annually	tonnes
Total CO_2 captured	Annually	tonnes
Total CO_2 vented to atmosphere	Annually	tonnes
Water consumption per unit carbon dioxide captured	Annually	m^3/t
Period carbon capture plant is not available	Annually	No of occasions and cumulative hours for current calendar year

Table S4.4 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Point source emissions to air	Emissions to Air Reporting Form, or other form as agreed in writing by the Environment Agency	Version 1, 08/03/2021

Table S4.4 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Water use	Water Usage Reporting Form, or other form as agreed in writing by the Environment Agency	Version 1, 08/03/2021
Energy use	Energy Usage Reporting Form, or other form as agreed in writing by the Environment Agency	Version 1, 08/03/2021
Other performance indicators	Other Performance Parameters Reporting Form, or other form as agreed in writing by the Environment Agency	Version 1, 08/03/2021

Schedule 5 – Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	
Name of operator	
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution	
To be notified within 24 hours of detection	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) Notification requirements for the breach of permit conditions not related to limits	
To be notified within 24 hours of detection	
Condition breached	
Date, time and duration of breach	
Details of the permit breach i.e. what happened including impacts observed.	
Measures taken, or intended to be taken, to restore permit compliance.	

(d) Notification requirements for the detection of any significant adverse environmental effect	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B – to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	

Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

“abatement equipment” means that equipment dedicated to the removal of polluting substances from releases from the installation to air or water media.

“accident” means an accident that may result in pollution.

“application” means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

“authorised officer” means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

“bi-annually” means twice per year with at least five months between tests.

“CAS number” means the unique and unambiguous identifier for a specific substance.

“CEM” Continuous emission monitor.

“CEN” means Commité Européen de Normalisation.

“commissioning” for the carbon capture plant means testing of the carbon capture plant where flue gases from the incineration plant are directed to the absorber column.

“daily average emissions value” means the average of at least 43 valid half hourly averages or for CO the average of at least 43 valid half hourly averages or 129 valid 10 min averages.

“emissions to land” includes emissions to groundwater.

“emissions of substances not controlled by emission limits” means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission limit.

“EP Regulations” means The Environmental Permitting (England and Wales) Regulations SI 2016 No.1154 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

“groundwater” means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

“Industrial Emissions Directive” or “IED” means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions, as read in accordance with Schedule 1A to the Environmental Permitting (England and Wales) Regulations 2016

“ISO” means International Standards Organisation.

“MCERTS” means the Environment Agency’s Monitoring Certification Scheme.

“year” means calendar year ending 31 December.

Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

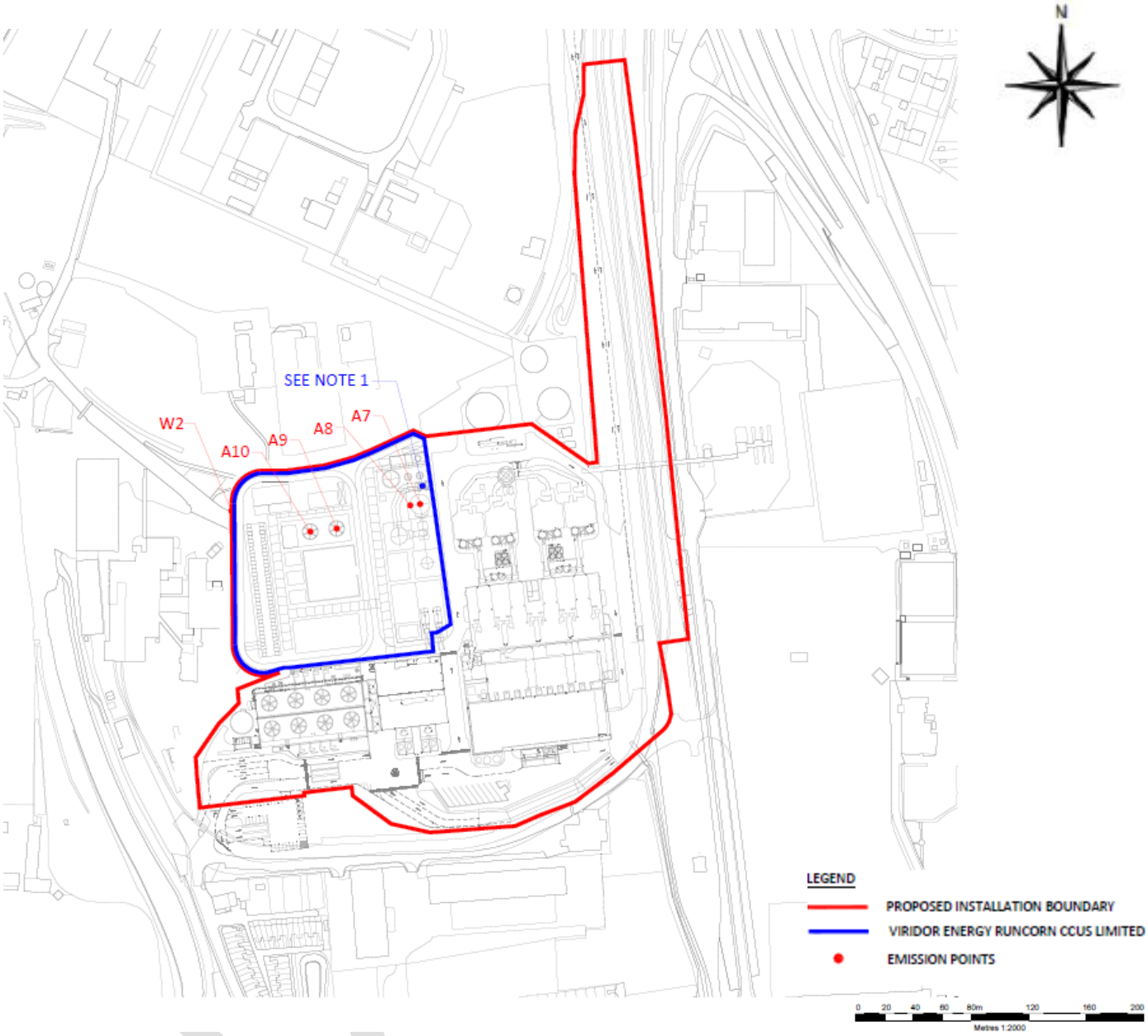
Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

(a) in relation to emissions from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid and gaseous fuels, 6% dry for solid fuels; and/or

(b) in relation to emissions from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content.

(c) in relation to gases from incineration plants other than those burning waste oil, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 11% dry.

Schedule 7 – Site plan



END OF PERMIT