

Permit with introductory note

Environmental Permitting (England & Wales) Regulations 2016

RWE Generation UK plc

Pembroke Power Station
West Pennar
Pembroke
Pembrokeshire
SA71 5SS

Permit number
EPR/DP3333TA

Pembroke Power Station

Permit number EPR/DP3333TA

Introductory note

This introductory note does not form a part of the notice.

This permit controls the operation of a large combustion plant. The relevant listed activity is Section 1.1 A(1)(a) of the Environmental Permitting (England and Wales) Regulations 2016: Burning any fuel in an appliance with a rated thermal input of 50 megawatts or more. The permit implements the Chapter III requirements for large combustion plant (LCP) of the EU Directive on Industrial Emissions and implements requirements of chapter II, application of Best Available Techniques.

Pembroke Power Station is operated by RWE Generation UK plc (formerly RWE Npower plc) and is a combined-cycle gas-fired power station located adjacent to the site of a former oil-fired power station at West Pennar, Pembroke, centred approximately at National Grid Reference SM 9270 0260. The Installation occupies approximately 10 hectares and the immediate surroundings are rural. To the north of the Installation runs the Milford Haven estuary, a Site of Special Scientific Interest (SSSI) and a marine Special Area of Conservation (SAC). To the west of the Installation, approximately 1km distant, is the Valero oil refinery. Other industrial facilities, including two LNG terminals and fuel storage terminal, are located to the north on the opposite side of the Milford Haven Waterway. To the south of the Installation rural land predominates, with a small number of scattered dwellings. To the east of the Installation is the mouth of the Pembroke River at its confluence with the Milford Haven Waterway and beyond is a small residential development (Pennar Park) and the fringe of the Pembroke Dock urban area. The Installation centres around five CCGT units with a combined total thermal input of approximately 4.2GW and capable of a total maximum production output of approximately 2.1GW of electricity. Each unit consists of:

1. An Alstom GT26 gas turbine and a three-stage triple-pressure re-heat steam turbine on a common shaft, connected to a hydrogen-cooled generator and located in a turbine house;
2. An air intake and filter house located at turbine house roof level, with silencer to minimise noise emission from the gas turbine compressor;
3. A generator-transformer stepping up the voltage of the power generated from 21kV to 400kV for transmission via the existing 400kV Grid sub-station;
4. An unfired Heat Recovery Steam Generator (HRSG) within a separate building adjacent to the turbine house to which hot exhaust is ducted from the gas turbine and from which steam is ducted to the steam turbine; and
5. A 75 metre stack.

There is no provision for back-up firing of the gas turbines with distillate fuel oil. The following plant is also included as part of the Installation:

- One diesel driven firewater pump with an input of 587kWth;
- A Gas Reception Facility (GRF) at which the gas is metered and maintained at the specified temperature and pressure for use by the gas turbines. Three gas-fired heaters are utilised to warm the gas supply with a total input of 12.3MWth; and
- Five standby generators, each at 1.59MWth input, present solely for the purpose of safe run-down of the plant in the event of loss of Grid supply.
- Sewage treatment plant which treats waste generated from RWE staff as well as contractors.

The permit also regulates less than 500 hour emergency operation to cover open cycle running. There are five Large Combustion Plants (LCPs) within the Installation boundary as defined by chapter II of the Industrial Emissions Directive (IED). The Installation as configured will not operate as a CHP plant. However, the following measures are provided at the Installation for the purposes of ensuring CHP-readiness:

- Steam extract tees;
- Spacing for associated pipework runs;
- The capability to extend the water treatment plant for the purposes of supplying up to 100 tonnes per hour of high-pressure steam; and
- The capability to modify the instrumentation and control system so as to accommodate high-pressure steam extraction.

Neither the South Haven Gas Pipeline (which connects Pembroke Power Station to the National Transmission System on the north side of the Haven) nor the Pipeline Inspection Gauge (PIG) trap and its associated infrastructure form part of the Installation. The boundary of the Installation is on the immediate downstream side of the main stop valve that sits between the power station and the pipeline. Cooling is provided by a once-through direct arrangement, abstracting estuarine water from the mouth of the Pembroke River and discharging the spent cooling water to the Milford Haven waterway. HRSG make-up water is sourced from a mains raw water supply and is further purified prior to its use in a reverse osmosis and mixed bed polishing plant (Water Treatment Plant). Monitoring points W1(a), (b) and (c) monitor the discharge into the cooling water prior to discharge via W1.

The permit also regulates the Emergency Back-up Generating Plant (EBGP). The EBGP will provide auxiliary power to start one main generating unit at Pembroke at any given time, independently of external power supplies following the loss of the latter. It may also provide essential power supplies to the other main generating units as well as essential common Station services during an interruption to power supplies from the Grid. The EBGP will not itself export power to the Grid via the existing power station's Grid connections.

The EBGP will consist of 3 No. reciprocating natural gas engine generator units, each with a rated thermal input of approx. 7.6 MWth (22.8MWth aggregated) and electrical output of approx. 3.4 MWe combined with a lithium-ion battery energy storage system (BESS) with a rated storage capacity of 6.27 MWh and a maximum output of 10 MWe when supplying power. The gas engine units are located within individual cells within a single power house structure. Each engine has an individual exhaust stack extending up to 15 m above local ground level incorporating a vertically mounted silencer.

Associated with the EBGP is the following equipment:

- A resistive load bank, a new transformer and a new switchroom, located to the south of the Unit 31 turbine building.
- Gas Pressure Reduction Facility including gas heaters.
- Other Directly associated activities (DAA's) such as storage of oils and chemicals (principally lubricating oil) required for the operation and maintenance.

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

Status log of the permit		
Description	Date	Comments
Application EA/EPR/DP3333TA/A001	25/03/10	Date on which application was duly made.
Further information requested	20/07/10	Further information requested relating to impacts on conservation sites.
Further information received	30/07/10	Response to request for further information dated 20/07/10.
Further information requested	04/08/10	Further information requested relating to consideration of Combined Heat and Power (CHP).
Further information received	17/08/10	Revised noise receptor drawing.
Further information requested	24/08/10	Further information requested relating to impact on Limestone Coasts of South-West Wales SAC.
Further information received	01/09/10	Response to request for further information dated 24/08/10 (Limestone Coasts of South-West Wales SAC).

Status log of the permit		
Description	Date	Comments
Further information received	03/09/10	Response to request for further information dated 04/08/10 (CHP).
Further information received.	12/10/10	Noise model input data.
Further information requested	22/10/10	Further information requested relating to noise, impacts on terrestrial habitats, water treatment plant effluent composition and findings in respect of the impact of the proposed cooling water discharge on the Pembrokeshire Marine SAC.
Further information received	12/11/10	Noise model input data (including national grid references for noise sources)
Further information received	16/11/10	Response to terrestrial habitats, noise and water treatment plant effluent composition elements of request for further information dated 22/10/10 (water treatment plant element subsequently superseded).
Further information received	26/11/10	Response to elements of request for further information dated 22/10/10 relating to water treatment plant effluent composition and findings in respect of the impact of the proposed cooling water discharge on the Pembrokeshire Marine SAC (water treatment plant element subsequently superseded).
Further information received	30/11/10	NOx conversion information.
Further information received	01/12/10	NOx conversion and noise information.
Further information received	23/12/10	HRS blow-down information.
Further information requested	14/01/11	Further information relating to noise.
Further information received	17/01/11	First order decay modelling of TRO plume and addendum.
Further information received	28/01/11	Revised response to water treatment plant composition element of request for further information dated 22/10/10 (subsequently superseded).
Further information received	09/02/11	Second addendum to first order decay modelling of TRO plume.
Further information received	18/02/11	Revised response to water treatment plant composition element of request for further information dated 22/10/10 (subsequently superseded).
Further information received	08/03/11	Air quality information
Further information received	15/03/11	Consideration of thermal plume impact on inter-tidal benthos.
Further information received	22/03/11	Consideration of the potential for formation of chlorination by-products and amended permit application documentation (revised Supporting Document for a New Environmental Permit Application).
Further information received	24/03/11	Further information in respect of sodium hypochlorite dosing of the main cooling water system and drum screens (subsequently superseded).
Further information received	29/03/11	Information received in respect of inter-cooling and plan received showing pump house drainage detail. Summary of 2011 noise survey data also submitted.
Further information received	11/04/11	Response to noise further information request dated 14/01/11 (revised noise impact assessment (Chapter 2 of Part II of Volume 2 of the permit application)). This was subsequently superseded.

Status log of the permit		
Description	Date	Comments
Further information received	13/04/11	Section 36 stack height information. Revised drainage plan and plan of air and water release points (incorporating revised installation boundary). Both were subsequently superseded.
Further information received	20/04/11	Further information received in respect of noise associated with vessels in the Haven. Information also received in respect of plant thermal inputs and accounting for cooling water pump acoustic panels in the modelling of noise emissions.
Further information received	05/05/11	Revised Appendix 2.3 of permit application (Cooling water system vulnerability to bio-fouling). This has subsequently been superseded.
Further information received	09/05/11	Further information received in respect of BAT for noise minimisation.
Further information received	11/05/11	Revised plan of air and water release points (showing revised installation boundary), revised plan of site layout and installation boundary, and revised plan of permanent operational drainage (showing revised installation boundary). Further information also received in respect of plant thermal inputs (additional to that previously received).
Further information received	17/05/11	Further information received in relation to nutrients.
Further information received	18/05/11	Further information received in relation to metals and cooling water retention time.
Further information received	27/05/11	Further information received in respect of noise impact (at Pwllcrochan and Hundleton)
Further information received	02/06/11	Further information received on water quality modelling in response to CEFAS queries.
Further information received	10/06/11	Revised short- and long-term assessment of nutrient and metal contributions to W1 discharge from HRSG blow-down, water treatment plant and HRSG chemical clean effluent.
Further information received	13/06/11	Further revised response to water treatment plant composition element of request for further information dated 22/10/10 (subsequently superseded).
Further information received	15/06/11	Further revised Appendix 2.3 of permit application (Cooling water system vulnerability to bio-fouling) and further information on sodium hypochlorite dosing of the main cooling water system and drum screens also received (subsequently superseded). Confirmation of capacity to isolate drum screens received.
Further information received	16/06/11	Further revised noise impact assessment (Chapter 2 of Part II of Volume 2 of the permit application). This supersedes all previous versions. Further revised Appendix 2.3 of permit application (Cooling water system vulnerability to bio-fouling) and further information on sodium hypochlorite dosing of the main cooling water system and drum screens also received (supersedes all previous versions).
Further information received	28/06/11	Confirmation of the use of hydrofluoric acid in the commissioning process.
Further information received	01/07/11	Confirmation that all substances have been accounted for in W1 discharge screening document

Status log of the permit		
Description	Date	Comments
Further information received	07/07/11	Further revised Supporting Document for a New Environmental Permit Application, revised Chapter 2 of Part 1 of Volume 2 of the permit application and revised Chapter 3 of Part 2 of Volume 2 of the permit application (all amended to include hydrofluoric acid).
Further information received	27/07/11	Confirmation of TRO dispersion modelling at fixed value of 50µg/l.
Further information received	03/08/11	Confirmation of approach to screening of water treatment plant emissions
Further information received	22/08/11	Further information in respect of nutrient load
Further information received	23/08/11	Further information in respect of phosphorus, nitrogen and unionised ammonia
Further information received	24/08/11	Further information in respect of phosphorus emissions and effects on eelgrass beds
Further information requested	12/09/11	Further information requested in respect of the effect of nutrient emissions on macro-algal growth, the toxicity of phosphonates and updates to the W1 emissions screening report.
Further information received	13/09/11	Information regarding mitigation of phosphate emissions
Further information received	15/09/11	Further information regarding mitigation of phosphate emissions
Further information received	19/09/11	Response to further information request dated 12/09/11 regarding assessment of the impact of nutrient emissions on macro-algal growth
Further information received	23/09/11	Response to further information request dated 12/09/11 regarding phosphonates, updated W1 emissions screening report and revised assessment of the impact of nutrient emissions on macro-algal growth
Further information received	26/09/11	Further revised response to further information request dated 12/09/11 regarding assessment of the impact of nutrient emissions on macro-algal growth
Further information received	27/09/11	Response to further information request dated 12/09/11 (MSDS for new anti-scalant)
Further information received	29/09/11	Further revised W1 emissions screening report
Further information received	06/10/11	Further updated W1 emissions screening report
Further information received	07/10/11	Further information regarding mitigation of phosphate emissions
Further information received	10/10/11	Further information regarding mitigation of phosphate emissions
Further information received	11/10/11	Further updated W1 emissions screening report, amended to account for the change in the Applicant's proposals from dosing with trisodium phosphate to dosing with sodium hydroxide.
Application determined	10/11/11	Permit issued
Application EPR/DP3333TA/V002	Duly made 07/01/13	Application to vary the permit to include an onsite sewage treatment plant
Variation determined EPR/DP3333TA/V002	26/07/13	Varied permit issued

Status log of the permit		
Description	Date	Comments
Regulation 60 Notice sent to the Operator	14/11/14	Issue of a Notice under Regulation 60(1) of the EPR. Natural Resources Wales initiated review and variation to vary the permit under IED to implement the special provisions for LCP under Chapter III, introducing new Emission Limit Values (ELVs) applicable to LCP, referred to in Article 30(2) and set out in Annex V. The permit is also updated to modern conditions.
Regulation 60 Notice response	30/03/15	Response received from the Operator.
Additional information received	30/07/15	Response to request for further information (RFI) dated 08/06/15.
Variation determined EPR/DP3333TA/V003	22/12/2015	Varied and consolidated permit issued in modern condition format. Variation effective from 01/01/2016.
Regulation 61 Notice sent to the Operator	10/05/2018	Issue of a Notice under Regulation 60(1) of the EPR. Natural Resources Wales initiated review and variation to vary the permit, introduce new Emission Limit Values (ELVs) following the publication of the revised Best Available Techniques (BAT) Reference Document (BRef) for Large Combustion Plants (LCP).
Regulation 61 Notice response	16/11/2018	Response received from the Operator.
Additional information received	28/08/2019	Response to request for further information (RFI) dated 10/06/2019
Variation determined EPR/DP3333TA/V004	02/07/2020	Varied and consolidated permit issued in modern condition format. Variation effective from 02/07/2020.
Application EPR/DP3333TA/V005	Duly made 28/07/2020	Application to vary the permit to regulate an Emergency Back-up Generation Plant.
Variation determined EPR/DP3333TA/V005	16/10/2020	Varied and consolidated permit issued to operator.

Other Part A installation permits relating to this installation		
Operator	Permit number	Date of issue
RWE Generation UK plc	GB-EA-ETCO2-1399 (EU ETS permit)	12/02/08
RWE Generation UK plc	22/61/6/156 (abstraction licence)	03/02/09
RWE Generation UK plc	EPR/HP3820XU (water discharge activity permit pertaining to site drainage)	14/06/11

End of introductory note

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/DP3333TA

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/DP3333TA/V005 authorising,

RWE Generation UK plc (“the operator”),

whose registered office is

Windmill Hill Business Park

Whitehill Way

Swindon

Wiltshire

SN5 6PB

company registration number 03892782

to operate an installation at

Pembroke Power Station

West Pennar

Pembroke

Pembrokeshire

SA71 5SS

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

Name	Date
Holly Noble	16/10/2020

Team Leader, Installations and RSR Permitting

Authorised on behalf of Natural Resources Wales

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) take appropriate measures to ensure the efficiency of energy generation at the permitted installation is maximised;
 - (c) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and
 - (d) take any further appropriate measures identified by a review.
- 1.2.2 The operator shall review the viability of Combined Heat and Power (CHP) implementation at least every 4 years, or in response to any of the following factors, whichever comes sooner:
- (a) new plans for significant developments within 15 km of the installation;
 - (b) changes to the Local Plan;
 - (c) changes to the UK CHP Development Map or similar; and
 - (d) new financial or fiscal incentives for CHP.

The results shall be reported to Natural Resources Wales within 2 months of each review, including where there has been no change to the original assessment in respect of the above factors.

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;
 - (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.

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 green on the site plan at schedule 7 to this permit.

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 Natural Resources Wales.
- 2.3.2 For the following activities referenced in schedule 1, table S1.1: LCP286, LCP382, LCP383, LCP384 and LCP385. Without prejudice to condition 2.3.1, the activities shall be operated in accordance with the “Electricity Supply Industry IED Compliance Protocol for Utility Boilers and Gas Turbines” revision 1 dated December 2015 (as amended) or any later version unless otherwise agreed in writing by Natural Resources Wales.
- 2.3.3 If notified by Natural Resources Wales that the activities are giving rise to pollution, the operator shall submit to Natural Resources Wales for approval within the period specified, a revision of any plan or other documentation (“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 Natural Resources Wales.
- 2.3.4 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.
- 2.3.5 For the following activities referenced in schedule 1, table S1.1: LCP286 (open cycle), LCP382 (open cycle), LCP383 (open cycle), LCP384 (open cycle) and LCP385 (open cycle). The activities shall not operate for more than 500 hours per year.
- 2.3.6 For the following activities referenced in schedule 1, table S1.1: LCP286, LCP382, LCP383, LCP384 and LCP385. The end of the start-up period and the start of the shutdown period shall conform to the specifications set out in Schedule 1, tables S1.2 and S1.5.

- 2.3.7 For the following activities references in schedule 1, table S1.1: LCP286, LCP382, LCP383, LCP384 and LCP385. The effective dry low NO_x threshold shall conform to the specifications set out in Schedule 1 table S1.2 and S1.6.
- 2.3.8 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.
- 2.3.9 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.
- 2.3.10 Dosing of the main cooling water system with a chemical bio-fouling control agent shall be carried out only between the months of April and December (inclusive).
- 2.3.11 The Operator shall:
- review their hydrodynamic modelling in light of the identified best available climate change projections by 31 December 2017 and every 6 years thereafter unless otherwise agreed by Natural Resources Wales. The review shall assess whether any changes are necessary to the manner in which the activities are carried out or to this permit. The results of the review, including any changes assessed and their likely impact, shall be reported to Natural Resources Wales in writing within 2 months of each review; and
 - implement any appropriate measures identified by the review in accordance with Natural Resources Wales' written approval.
- 2.3.12 For the following activities referenced in schedule 1, table S1.1 (AR13) the activities shall be operated using the techniques and in the manner described in schedule 1, table S1.2A.

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 Natural Resources Wales.
- 2.4.2 Except in the case of an improvement which consists only of a submission to Natural Resources Wales, the operator shall notify Natural Resources Wales 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 S3.1a, S3.1b and S3.2
- 3.1.2 The limits given in schedule 3 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.
- 3.1.4 For the following activities referenced in schedule 1, table S1.1 (AR13) Limited Operating Hours MCPs shall:
- (a) not exceed 500 hours operation in a 12 month period as a rolling average over a 3 year period, and thereafter assessed annually.
 - (b) Not operate for more than 750 hours in any single year

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 Natural Resources Wales that the activities are giving rise to pollution, submit to Natural Resources Wales 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 Natural Resources Wales.
- 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 Natural Resources Wales, 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 Natural Resources Wales that the activities are giving rise to pollution outside the site due to odour, submit to Natural Resources Wales 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 Natural Resources Wales.

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 Natural Resources Wales, 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 Natural Resources Wales that the activities are giving rise to pollution outside the site due to noise and vibration, submit to Natural Resources Wales 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 Natural Resources Wales.

3.5 Monitoring

- 3.5.1 The operator shall, unless otherwise agreed in writing by Natural Resources Wales, undertake the monitoring specified in the following tables in schedule 3 to this permit:
 - (a) point source emissions specified in tables S3.1a, S3.1b and S3.2; and
 - (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 continuous), 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 Natural Resources Wales.
- 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 S3.1a, S3.1b, S3.2 and S3.3 unless otherwise agreed in writing by Natural Resources Wales.
- 3.5.5 Where required by a condition of this permit to check the measurement equipment the operator shall submit a report to Natural Resources Wales in writing, within 28 days of the completion of the check.
- 3.5.6 For the following activities referenced in schedule 1, table S1.1 (AR13) the first monitoring measurements shall be carried out within four months of the issue date of the permit or the date when the MCP is first put into operation, whichever is later.
- 3.5.7 For the following activities referenced in schedule 1, table S1.1 (AR13) Monitoring shall not take place during periods of start up or shut down.

3.6 Monitoring for Large Combustion Plant

- 3.6.1 All monitoring required by this permit shall be carried out in accordance with the provisions of Annex V of the Industrial Emissions Directive and the LCP Bref BAT conclusions.
- 3.6.2 If the monitoring results for more than 10 days a year are invalidated within the meaning set out in condition 3.6.7, the operator shall:
 - (a) within 28 days of becoming aware of this fact, review the causes of the invalidations and submit to Natural Resources Wales for approval, proposals for measures to improve the reliability of the continuous measurement systems, including a timetable for the implementation of those measures; and
 - (b) implement the approved proposals.
- 3.6.3 Continuous measurement systems on emission points from the LCP shall be subject to quality control by means of parallel measurements with reference methods at least once every calendar year.
- 3.6.4 Unless otherwise agreed in writing by Natural Resources Wales in accordance with condition 3.6.5 below, the operator shall carry out the methods, including the reference measurement methods, to use and calibrate continuous measurement systems in accordance with the appropriate CEN standards.

- 3.6.5 If CEN standards are not available, ISO standards, national or international standards which will ensure the provision of data of an equivalent scientific quality shall be used, as agreed in writing with Natural Resources Wales.
- 3.6.6 Where required by a condition of this permit to check the measurement equipment, the operator shall submit a report to Natural Resources Wales in writing, within 28 days of the completion of the check.
- 3.6.7 Where Continuous Emission Monitors are installed to comply with the monitoring requirements in schedule 3, tables S3.1a, S3.1b and S3.2; the Continuous Emission Monitors shall be used such that:
- a) for the continuous measurement systems fitted to the LCP release points defined in Tables S3.1, S3.1(a) and S3.2 the validated hourly, monthly, annual and daily averages shall be determined from the measured valid hourly average values after having subtracted the value of the 95% confidence interval;
 - b) the 95% confidence interval for nitrogen oxides and sulphur dioxide of a single measured result shall be taken to be 20%;
 - c) the 95% confidence interval for dust releases of a single measured result shall be taken to be 30%;
 - d) the 95% confidence interval for carbon monoxide releases of a single measured result shall be taken to be 10%;
 - e) an invalid hourly average means an hourly average period invalidated due to malfunction of, or maintenance work being carried out on, the continuous measurement system. However, to allow some discretion for zero and span gas checking, or cleaning (by flushing), an hourly average period will count as valid as long as data has been accumulated for at least two thirds of the period. Such discretionary periods are not to exceed more than 5 in any one 24-hour period unless agreed in writing. Where plant may be operating for less than the 24-hour period, such discretionary periods are not to exceed more than one quarter of the overall valid hourly average periods unless agreed in writing; and
 - f) any day, in which more than three hourly average values are invalid shall be invalidated.

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 Natural Resources Wales, 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 Natural Resources Wales.
- 4.1.3 For the following activities referenced in schedule 1, table S1.1 (AR13) The operator shall maintain a record of the type and quantity of fuel used and the total annual hours of operation for each MCP

- 4.1.4 For the following activities referenced in schedule 1, table S1.1 (AR13) The operator shall maintain a record of any events of non-compliance and the measures taken to ensure compliance is restored in the shortest possible time

4.2 Reporting

- 4.2.1 The operator shall send all reports and notifications required by the permit to Natural Resources Wales using the contact details supplied in writing by Natural Resources Wales.
- 4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 March (or other date agreed in writing by Natural Resources Wales) each year. 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; and
 - (b) the annual production /treatment data set out in schedule 4 table S4.2; and
 - (c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule.
 - (d) where condition 2.3.5 applies the hours of operation in any year shall be reported to Natural Resources Wales.
- 4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by Natural Resources Wales, 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 Natural Resources Wales, 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 Natural Resources Wales,
 - (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 Natural Resources Wales, 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(a)(i) or 4.3.1 (b)(i) where the information relates to the breach of a condition specified in the permit 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 Natural Resources Wales has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform Natural Resources Wales when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to Natural Resources Wales at least 14 days before the date the monitoring is to be undertaken.
- 4.3.4 Natural Resources Wales 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:
- (c) any change in the operator's name or address; and
 - (d) any steps taken with a view to the dissolution of the operator.
- In any other case:
- (e) the death of any of the named operators (where the operator consists of more than one named individual);
 - (f) any change in the operator's name(s) or address(es); and
 - (g) 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) Natural Resources Wales 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 Natural Resources Wales shall be given at least 14 days notice before implementation of any part of the site closure plan.
- 4.3.7 Where the operator has entered into a climate change agreement with the Government, Natural Resources Wales shall be notified within one month of:
- (a) a decision by the Secretary of State not to re-certify the agreement;
 - (b) a decision by either the operator or the Secretary of State to terminate the agreement; and
 - (c) any subsequent decision by the Secretary of State to re-certify such an agreement.
- 4.3.8 The operator shall inform Natural Resources Wales in writing of the closure of any LCP within 28 days of the date of closure.

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 “immediately”, 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	Section 1.1 A(1) (a): Burning any fuel in an appliance with a rated thermal input of 50 megawatts or more.	LCP286, LCP382, LCP383, LCP384 and LCP385: Production of electricity in five combined cycle gas turbines (CCGT) each with a thermal input of approximately 756MWth operating on natural gas.	From receipt of natural gas from the stop valve on the South Haven Gas Pipeline to the discharge of combustion gases from the associated stacks.
		LCP286 (open cycle), LCP382 (open cycle), LCP383 (open cycle), LCP384 (open cycle) and LCP385 (open cycle): Production of electricity from five gas turbines in open cycle.	Open cycle operation using natural gas only.
AR2		Gas Reception Facility (GRF) containing three gas heaters (with a total input of 12.3MWth)	From receipt of natural gas at Grid temperature and pressure to dispatch of natural gas at the temperature and pressure required for input to the gas turbines.
AR3		Five standby electricity generators (each with an input of 1.59MWth)	From receipt of distillate fuel oil at the Installation to the discharge of combustion gases from the exhausts of the generators.
AR4		One fire pump (with an input of 587kWth).	From receipt of distillate fuel oil at the Installation to the discharge of combustion gases from the exhaust of the diesel driven fire pump.
AR13		Emergency gas engine No 1, 2 and 3 (EBGP) of ~7.6 MWth each fuelled on natural gas (New Medium Combustion Plant)	From receipt of natural gas through to the discharge of combustion gases from the stacks Emergency Back Up Generating Plant (EBGP) for emergency use as well as planned testing and maintenance use. No electricity shall be exported to the grid from the emergency generator.

Table S1.1 activities			
Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
AR14		Gas pressure reduction facility containing 2 gas-fired boilers for gas heating (~100 kWth aggregate rating)	From receipt of natural gas through to the discharge of combustion gases from the stacks
Directly Associated Activity			
AR5		Five hydrogen-cooled electricity generators.	Connection by common shaft with the steam turbines and the gas turbines.
AR6		Five Heat Recovery Steam Generators (HRSGs).	From receipt of hot exhaust gas from the gas turbines to the supply of steam to the steam turbines (including blow-down).
AR7		Water treatment plant for the supply for treated water to the HRSGs.	From receipt of raw water from the mains supply to the dispatch of treated water to the HRSGs and the discharge of effluent.
AR8		Main cooling water system and closed cooling water system.	From abstraction of estuarine cooling water to the discharge of spent cooling water to the Milford Haven waterway (including the operation of a closed cooling system serving auxiliary plant).
AR9		Raw materials storage	From receipt of raw materials to their use and the dispatch from the Installation of any wastes arising.
AR10		Five three-stage steam turbines.	From receipt of steam from the HRSGs to the supply of condensed steam back to the HRSGs.
AR11		Surface water drainage	From collection of rainwater through operation of oil-water separators, sumps and drainage systems to the discharge of surface water drainage to the Pembroke River through emission point W2.
AR12		Sewage treatment plant	From receipt of sewage effluent generation to dispatch of treated effluent via W1(c).

Table S1.1 activities			
Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
AR15		Operation of battery energy storage system to store electrical energy to supply power station auxiliary plant at times of peak auxiliary power demand (in the absence of external power supplies, including but not limited to during an emergency start of a main generating unit, and for commissioning and testing purposes.	The import and export of electrical energy to and from the battery energy storage system including voltage step-down and AC/DC power conversion and v.v. on the battery side of the connections to the Station auxiliary electrical system.
AR16		Operation of one resistive electrical load bank to absorb power from a main CCGT unit during an emergency start-up until power commences to be exported to the Grid, and for commissioning and testing purposes.	Activities on the load bank side of the load bank's connections to the power station auxiliary electrical system.

Table S1.2 Operating techniques		
Description	Parts	Date Received
Application	<p>The following elements of Pembroke EP Application Appropriate Assessment Supporting Document – Chapter 2, Part 1, Volume 2:</p> <ul style="list-style-type: none"> • Paragraphs 2.5.1.4 to 2.5.1.13 inclusive (main plant design) • Paragraph 2.5.2.1.2 (installation of DLN burners) • Paragraph 2.5.2.2.8 (combustion optimisation) • Paragraph 2.5.3.4.1 in so far as it specifies the provision of coarse screens with vertical bar spacing of not greater than 50mm. • Paragraphs 2.5.3.4.6 to 2.5.3.4.9 inclusive (drum screens and cooling water pumps) • Paragraphs 2.5.3.4.10 and 2.5.3.4.11 (holding tank and fish return) • Paragraph 2.5.4.3.4 to 2.5.4.3.6 inclusive (surface water drainage) 	25/03/10

Table S1.2 Operating techniques		
Description	Parts	Date Received
Further information on CHP-readiness works set out in the response received 03/09/10 to the Schedule 5 further information request dated 04/08/10.	Section 4.2	03/09/10
Document entitled 'Supporting Document for a New Environmental Permit Application Ref: JP3638LK' in Volume 1 of the Pembroke Environmental Permit Application (revised and re-submitted following submission of original permit application).	<ul style="list-style-type: none"> Section 2.5 Third paragraph of the section entitled 'Cooling' in section 2.4.1 (i.e. the commitment to undertake a water efficiency audit). 	22/03/11
Updated plan of permanent operational drainage (drawing number Figure 4.	<ul style="list-style-type: none"> All 	11/05/11
Pembroke Environment Permit Application Appropriate Assessment Supporting Document – Volume 2 Part 2 (revised and re-submitted following submission of original permit application).	<ul style="list-style-type: none"> The abatement measures set out Table 2.11 'BAT assessment for principal noise sources N1-N6' in Chapter 2 (noise) Paragraph 2.3.4.1 of Chapter 2 (noise) 	16/06/11
Further information entitled 'Pembroke Power Station Sodium Hypochlorite Dosing v2 June 2011'	<ul style="list-style-type: none"> All 	16/06/11
Further information entitled 'Clarification on Biocide Dosing to Cooling Water Intake Drum Screen Chambers v2 June 2011'	<ul style="list-style-type: none"> All 	16/06/11
Revised Appendix 2.3 of permit application 'Cooling water system vulnerability to bio-fouling v3 June 2011'	<ul style="list-style-type: none"> Section 7.3.2 (as regards cooling water system design), 7.3.3 (as regards the design of the auxiliary cooling system) and 7.4 (as regards dosing locations and temperature below which dosing will not occur). 	16/06/11

Table S1.2 Operating techniques		
Description	Parts	Date Received
Revised Chapter 3 of Part 2 of Volume 2 of the Application	<p>The following elements of Pembroke EP Application Appropriate Assessment Supporting Document – Volume 2 Part 2:</p> <ul style="list-style-type: none"> The bunding arrangements set out in the following tables in Chapter 3 (Site conditions and contamination hazards): <ul style="list-style-type: none"> Table 3.4 'Details of oil and chemical storage, site general' Table 3.5 'Details of chemical storage at Water Treatment Plant' Table 3.6 'Details of oil and chemicals stored in main turbine halls' Table 3.7a 'Transformers and oil-filled switches' Table 3.8b 'Chemical clean chemicals (commissioning only)' Paragraphs 3.5.3.1 and 3.5.3.2 (Hardstandings and bunds) Paragraphs 3.5.6.4, 3.5.6.5 and 3.5.6.6 (Surface water drainage) Paragraph 3.5.7.1 (process effluent drainage) 	07/07/11
Response to Point 2 of further information request dated 12/09/11	Dose rate declared for SERVO Antiscale AW	23/09/11
Response to Point 3 of further information request dated 12/09/11	Proposed use of sodium hydroxide as a boiler dosing chemical and proposed use of a polyacrylate material as a water treatment plant antiscalant	23/09/11
Variation application	Section 2: Foul sewer drainage on the Pembroke power station site	07/01/13
Response to regulation 60(1) Notice – request for information dated 14/11/14	Compliance route and operating techniques identified in response to questions 2 (LCP compliance route), 4 (LCP configuration), 5 (LCP net rated thermal input), 6 (MSUL/MSDL), 9 (ELVs) and 11 (Monitoring requirements).	30/03/15
Haven Monitoring Programme as agreed with NRW	All – programme for monitoring in the Pembrokeshire Marine SAC	June 2015
Receipt of additional information to the regulation 60(1) Notice – requested by letter dated 08/06/15	Additional information received in response to questions 5 (LCP net rated thermal input), 6 (MSUL/MSDL) and 9 (ELVs).	30/07/15
Reg 61 response	All parts	16/11/2018
Additional response – Reg 61	All part	28/08/2019
Review of Operating Techniques and Permit Conditions – Pembroke Power Station	All parts	31/03/2020

Table S1.2 Operating techniques		
Description	Parts	Date Received
Variation application EPR/DP3333TA/V005	All parts Additional information to support variation application - Letter 28/07/2020 to NRW re Addl Info EBGp with Appendix A-G accompanying).	30/04/2020 28/07/2020
Additional information to support variation application EPR/DP3333TA	Letter to NRW 19/08/2020 and Supply Restoration Mode, Carbon Monoxide and Formaldehyde response.	19/08/2020 and 03/09/202 respectively
Additional information to support variation application EPR/DP3333TA	Additional information to support Noise Impact Assessment – pj4055 final pdf. Addendum to Noise Impact Assessment.	22/09/2020

Table S1.2A Operating techniques for Medium Combustion Plant as detailed in Schedule 8
<p>(a) Each MCP must be operated in accordance with the manufacturer's instructions and records must be made and retained to demonstrate this.</p> <p>(b) The operator must keep periods of start-up and shut-down of each MCP as short as possible.</p> <p>(c) There must be no persistent emission of 'dark smoke' as defined in section 3(1) of the Clean Air Act 1993.</p> <p>(d) A Limited Operating Hours MCP which is an excluded generator may only be operated for the sole purpose of maintaining power supply to a site during an on-site emergency and it may not participate in any balancing services.</p>

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC1	<p>The Operator shall submit to the Environment Agency at the Reporting Address a written report on the commissioning of the Installation. It shall report in accordance with the approved commissioning plan and shall detail:</p> <ul style="list-style-type: none"> — The environmental performance of the Installation as installed against the design parameters set out in the Application; — The performance of the turbines under various operating loads and start-up (both hot and cold) and shut-downs; — A comparison of the efficiency and performance of the five units; — A review of the performance of the Installation against the conditions of this Permit; — The procedures developed during commissioning for achieving and demonstrating compliance with permit conditions and Environment Agency guidance; and — The results of the commissioning phase noise survey in line with the approved proposals. <p>The Report shall also detail any minor improvements and modifications identified as part of the commissioning and a timetable for their implementation. Any changes approved in writing by the Environment Agency shall be implemented in accordance with that approval.</p>	Completed

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC2	<p>The Operator shall:</p> <ul style="list-style-type: none"> (a) Submit to the Environment Agency at the Reporting Address for approval written proposals for carrying out a noise survey to assess the impact of the Installation when fully operational and covering the full range of potential operating techniques. The proposals shall include the comparison of measured data against the information supplied in Chapter 2 of Part 2 of Volume 2 of the Application. The proposals shall also contain details of the methods to be used for the assessment of tonal noise at sensitive receptors and proposed a timeframe within which the survey will be undertaken; (b) Carry out the noise survey in accordance with the Environment Agency's written approval; (c) Submit a written report of the findings of the noise survey the Environment Agency at the Reporting Address for approval; and (d) Submit to the Environment Agency at the Reporting Address for approval a written report which assesses whether any minor improvements and modifications are required to noise mitigation measures. Where such measures are required, the Operator shall provide a time-bound programme for their implementation. 	Completed
IC3	The Operator shall provide an acoustic screen for the cooling water pumps in accordance with the Environment Agency's written approval.	Completed
IC4	The Operator shall submit to the Environment Agency at the Reporting Address a written report detailing the baseline environmental information obtained in accordance with pre-operational measure PO4.	Completed
IC5	The Operator shall submit to the Environment Agency at the Reporting Address for approval a written site closure and decommissioning plan. The Plan shall be based on the final constructed plant design and shall demonstrate how best environmental practice will be used to ensure that the impact on the environment will be minimised during any closure or decommissioning of all or part of the Installation.	Completed
IC6	The Operator shall submit a written report to Natural Resources Wales for approval providing details of the optimisation of dosing of the main cooling water system with chemical bio-fouling control agent so as to minimise total residual oxidant emissions, within the emission limit values described in this permit, whilst maintaining the efficiency of the cooling system. The Report shall include details of the manner in which the Operator proposes to use mechanical means of bio-fouling control as far as practicable in preference to chemical dosing. The Report shall be implemented in accordance with the written approval of Natural Resources Wales.	Completed

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC7	<p>The Operator shall submit to Natural Resources Wales a report detailing the findings of the monitoring undertaken during the first 6 months of operation of the sewage treatment plant. The report will demonstrate the effectiveness of the sewage treatment plant and identify whether or not further mitigation techniques are required to reduce the discharge of Ammonia.</p> <p>On submission of the report to NRW the monitoring requirements and the emission limit for Ammonia will be reviewed.</p>	Completed
IC8	<p>The operator shall produce and submit a written Black Start Response Plan to Natural Resources Wales, for approval. The plan shall contain an impact assessment demonstrating that there is no significant environmental risk associated with black start operations and:</p> <ul style="list-style-type: none"> propose a methodology for minimisation of environmental impact during such a period of operation; and include the procedure for the notification of black start operation and its duration. <p>The methodology for operation and reporting set out in the report shall be implemented by the Operator from the date of approval by Natural Resources Wales.</p>	02/01/2021

Table S1.4 Pre-operational measures		
Reference	Pre-operational measures	Date
PO1	<p>Prior to the operation of the Installation a written commissioning plan (including timelines for completion) shall be submitted to the Environment Agency at the Reporting Address for approval. The commissioning plan shall include but not be restricted to:</p> <ul style="list-style-type: none"> The timetable for the commissioning of the five units; The expected emissions to the environment during each of the stages of commissioning; The mitigation measures that will be taken in respect of emissions to the environment during each stage; The expected duration of commissioning activities; Any additional (beyond that required by the Permit) monitoring to be undertaken; Proposals for the monthly reporting of progress to the Environment Agency; A noise impact assessment as regards the test running of equipment during the commissioning phase where there is considered to be a necessity to run individual items for short periods without full noise control mitigation measures in place. The Assessment shall evaluate the appropriateness of applying temporary attenuators to any venting activities undertaken as part of the purging of pipework and equipment before normal duty operation. The Assessment shall also detail how commissioning activities will be scheduled such that the potential impact on sensitive receptors is minimised; and Proposals for the undertaking of a noise survey to assess the impact of the Installation during commissioning and the comparison of measured data against the information supplied in Chapter 2 of Part 2 of Volume 2 of the Application. The proposals shall also detail the methods to be used for the assessment of tonal noise at sensitive receptors. <p>Commissioning shall be carried out in accordance with the commissioning plan as approved.</p>	Completed

Table S1.4 Pre-operational measures		
Reference	Pre-operational measures	Date
PO2	Prior to the operation of the Installation a written accident management plan shall be developed in line with Environment Agency guidance and submitted to the Environment Agency at the Reporting Address.	Completed
PO3	Prior to the operation of the Installation written proposals for the provision of an acoustic screen for the cooling water pumps which delivers the reduction in noise emission specified in section 3.2.1 of the Supplementary BAT Assessment dated May 2011, reference number ENV/474/2011, which was submitted to the Environment Agency on 09/05/11, shall be submitted the Environment Agency at the Reporting Address for approval.	Completed
PO4	<p>Prior to the discharge taking place of effluent from emission point W1 to which heat or any substance has been added by the Installation, the Operator shall:</p> <p>(a) Submit to the Environment Agency for approval a written programme for monitoring in the Pembrokeshire Marine SAC. The Programme shall include proposals for establishing baseline environmental information prior to operation of the Installation against which any effect of the Installation can be assessed and proposals for ongoing monitoring during the subsistence of this Permit. The Programme shall propose monitoring methods to determine the physical, chemical and biological characteristics of the area that could be affected by the effluent, monitoring locations and frequencies and a procedure for assessing any effect and reporting the results of the monitoring and assessment to the Environment Agency;</p> <p>(b) Obtain the baseline environmental information in accordance with the Environment Agency's written approval; and</p> <p>Submit to the Environment Agency for approval written proposals for the monitoring of chlorination by-products. The Programme shall propose monitoring methods, locations and frequencies together with a procedure for the reporting of results of the monitoring to the Environment Agency.</p>	Completed
PO5	Prior to the operation of a low part load gas turbine mode written proposals for the implementation of such an operating regime shall be submitted to Natural Resources Wales at the Reporting Address for approval. The proposals shall include an environmental impact assessment covering any increase in emission concentrations or deterioration in dispersion characteristics and changes to start up and shut down threshold criteria and loads. Any changes to start up and shut down threshold criteria and loads shall be implemented upon approval by Natural Resources Wales.	Completed

Table S1.5 Start-up and Shut-down thresholds			
Emission Point and Unit Reference		"Minimum start-up load" Generated load (MW) and percentage of rated electrical output (%)	"Minimum shut-down load" Generated load (MW) and percentage of rated electrical output (%)
A1 LCP286	Combined cycle	190MWe; 42%	190MWe; 42%

Table S1.5 Start-up and Shut-down thresholds			
Emission Point and Unit Reference		“Minimum start-up load” Generated load (MW) and percentage of rated electrical output (%)	“Minimum shut-down load” Generated load (MW) and percentage of rated electrical output (%)
A2 LCP382 A3 LCP383 A4 LCP384 A5 LCP385	Open cycle	100MWe; 35%	100MWe; 35%

Table S1.6 Effective Dry Low NO _x thresholds	
Emission Point and Unit Reference	Effective Dry Low NO _x threshold Load in MW and as percent of rated power output (%) and discrete processes
LCP286 (A1) LCP382 (A2) LCP383(A3) LCP384 (A4) LCP385 (A5)	315MW _e gross generated (equivalent to 70% of the guarantee ISO Base Load gross generation)

Schedule 2 – Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	Specification
Gas oil	Not exceeding 0.1% w/w sulphur content

Schedule 3(a) – Emissions and monitoring until 16th August 2021

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
A1 [points A1 located at longitude -4.99772 and latitude 51.68526. A2 located at longitude -4.99697 and latitude 51.68526. A3 located at longitude -4.99621 and latitude 51.68527. A4 located at longitude -4.99545 and latitude 51.68528. A5 located at longitude -4.99772 and latitude 51.68526 on site plan in schedule 7]	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	LCP286 LCP382 LCP383 LCP384 LCP385	50 mg/m ³ 70% to base load ¹	Monthly mean of validated hourly averages	Continuous	BS EN 14181
	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	Gas turbines fired on natural gas	50 mg/m ³ 70% to base load ¹ and MSUL/MSDL to base load ²	Daily mean of validated hourly averages	Continuous	BS EN 14181
	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)		50 mg/m ³ 70% to base load ¹	Maximum validated hourly average	Continuous	BS EN 14181
	Carbon monoxide	LCP286 LCP382 LCP383 LCP384 LCP385	100 mg/m ³ 70% to base load ¹	Monthly mean of validated hourly averages	Continuous	BS EN 14181
	Carbon monoxide	Gas turbines fired on natural gas	100 mg/m ³ 70% to base load ¹ 250 mg/m ³ MSUL/MSDL to base load ²	Daily mean of validated hourly averages	Continuous	BS EN 14181
	Carbon monoxide		200 mg/m ³ 70% to base load ¹	Maximum validated hourly average	Continuous	BS EN 14181
	Carbon monoxide					

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
A1 [points A1 located at longitude -4.99772 and latitude 51.68526. A2 located at longitude -4.99697 and latitude 51.68526. A3 located at longitude -4.99621 and latitude 51.68527. A4 located at longitude -4.99545 and latitude 51.68528. A5 located at longitude -4.99772 and latitude 51.68526 on site plan in schedule 7]	Oxygen	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous As appropriate to reference conditions in Schedule 6	BS EN 14181
	Water Vapour	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous or as appropriate to measurement techniques	BS EN 14181
	Stack gas temperature	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous or as appropriate to measurement techniques	Traceable to national standards
	Stack gas pressure	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous or as appropriate to measurement techniques	Traceable to national standards
	Stack gas volume flow	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous	BS EN 16911 & TGN M2

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
	Sulphur dioxide	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	6 monthly by calculation	Agreed in writing with NRW
	Dust	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	6 monthly by calculation	Agreed in writing with NRW
	Flow and Homogeneity	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	Pre-operation and when there is a significant operational change	BS EN 15259 and method Implementation Document for EN 15259.
Gas heater vents (preheater) A6, A7 and A8 on site plan in Schedule 7	No parameters set	Gas heater	No limit set	None set	None set	None set
Standby generator exhaust no. A9, A10, A11, A12, A13 on site plan in Schedule 7	No parameters set	Emergency diesel generators	No limit set	None set	None set	None set
Diesel driven fire pump exhaust A14 on site plan in Schedule 7	No parameters set	Fire pump	No limit set	None set	None set	None set

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
A16-A18 (A16 -NGR 193193, 202632. A17 - NGR 193198, 202632. A18 - NGR 193203, 202632)	Oxides of nitrogen (NO and NO2 expressed as NO2)	Emergency gas engine No 1, 2 and 3 (EBGP) 7.6 MWth fuelled on natural gas (New Medium Combustion Plant)	No limit set	None set	Once every 500 hours of operation or once every five years whichever comes first	MCERTS BS EN 14792
	CO	operated for <500 hours per year as a rolling average of 3 years	No limit set	None set	Once every 500 hours of operation or once every five years whichever comes first	MCERTS BS EN 15058
A19-A20 (A19 - NGR 193192, 202667, A20 NGR 193200, 202667)	No parameters set	Low pressure Gas Heater Vent No 1,2 and 3 fuelled on natural gas	No limit set	None set	-	-

Note 1: This ELV applies when the load is >70% throughout the reference period.

Note 2: This ELV applies when the load varies between MSUL/MSDL and base load during the daily reference period. MSUL and MSDL are defined in table S1.5.

Table S3.1b Point source emissions to air <500 hrs						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference Period	Monitoring frequency	Monitoring standard or method
<p>A1 [points A1 located at longitude -4.99772 and latitude 51.68526. A2 located at longitude -4.99697 and latitude 51.68526. A3 located at longitude -4.99621 and latitude 51.68527. A4 located at longitude -4.99545 and latitude 51.68528. A5 located at longitude -4.99772 and latitude 51.68526 on site plan in schedule 7]</p>	Oxides of nitrogen (NO and NO2 expressed as NO2)	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	Continuous	BS EN 14181 or as agreed in writing with NRW
	CO	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	Continuous	BS EN 14181 or as agreed in writing with NRW
	Sulphur dioxide	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	6 monthly by calculation	Agreed in writing with NRW
	Dust	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	6 monthly by calculation	Agreed in writing with NRW

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements

¹ Based on the mean of all valid samples obtained each day (taken at regular intervals), with a minimum of 20 valid samples to be taken each day)

Emission point ref. & location	Parameter	Source	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 (as shown on site plan in Schedule 7)	Cooling water, HRSG blow-down and water treatment plant effluent	Flow	40 m³ per second	Maximum	Continuous	Flow meter
		Temperature	30.4°C	Absolute maximum		Standard Thermocouple
			7.6°C above intake temperature	Daily average		
		Total residual oxidant (as chlorine)	50 µg/l	Daily average ¹		Proprietary instrument
		pH	6-9 (inclusive)	-		BS6068 2.50:1995
W1 (a) sampled at effluent outlet of water treatment plant prior to its confluence with cooling water flow	Water treatment plant effluent	Flow	7.48 litres per second	Annual average	Monthly (Samples to be taken at least 21 days apart)	Flow meter
		Ammonia	0.297 mg/l	Annual Average		BS 6068:2.11
		Nitrate	12.1 mg/l			BS EN ISO 13395:1996
		Calcium	59.0 mg/l			BS EN ISO 11885
		Phosphate	0.460 mg/l			
		Iron	2.17 mg/l			
		Aluminium	13000 µg/l			
		Antimony	6.65 µg/l			
		Chromium	4.47 µg/l			
		Copper	22.1 µg/l			
		Lead	45.9 µg/l			
		Manganese	151 µg/l			
		Nickel	11.9 µg/l			
		Selenium	6.84 µg/l			
		Zinc	67.0 µg/l			
		Arsenic	4.37 µg/l			BS EN ISO 11969
		Cadmium	0.700 µg/l			
		Chloride	121 mg/l			BS EN ISO 15682:2001
		Mercury	0.370 µg/l			BS EN ISO 17852:2008

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements

¹ Based on the mean of all valid samples obtained each day (taken at regular intervals), with a minimum of 20 valid samples to be taken each day)

Emission point ref. & location	Parameter	Source	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 (b) sampled at outlet of blow-down from Heat Recovery Steam Generators prior to its confluence with cooling water flow	Heat Recovery Steam Generator blow-down	Flow	16.8 litres per second	Annual Average	Continuous	Flow meter
		Ammonia	0.776 mg/l		Monthly (Samples to be taken at least 21 days apart)	BS 6068:2.11
		Aluminium	10.0 µg/l			BS EN ISO 11885
		Mercury	0.0100 µg/l			BS EN ISO 17852:2008
		Nickel	1.00 µg/l			BS EN ISO 11885
		Iron	5.50 mg/l			BS EN ISO 11885
		Silicate	3.00 mg/l			
		Sodium & Potassium	3.00 mg/l			
W1(c) (as shown on site plan in schedule 4 of this notice)	Treated sewage effluent	Flow	23m ³ /day	Average	Quarterly	Flow meter. (Or as otherwise agreed in writing with Natural Resources Wales)
		Ammoniacal nitrogen	20mg/l		Quarterly	BS 6068:2.11
		Biochemical oxygen demand	20mg/l			BS EN 1899-1
		Suspended solids	30mg/l			BS EN 872
W2 (as shown on site plan in schedule 4)	Process drainage and uncontaminated surface runoff including roof drainage	Oil and grease	No visible oil (oil and grease to be non-visible on the surface of the receiving waters in the immediate vicinity of the emission point).	Spot	Daily	Visual check

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
Natural gas consumption	Flow	Continuous	Flow meter	-

Schedule 3(b) – Emissions and monitoring from 17th August 2021

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
A1 [points A1 located at longitude -4.99772 and latitude 51.68526. A2 located at longitude -4.99697 and latitude 51.68526. A3 located at longitude -4.99621 and latitude 51.68527. A4 located at longitude -4.99545 and latitude 51.68528. A5 located at longitude -4.99772 and latitude 51.68526 on site plan in schedule 7]	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	43 mg/m ³ Effective Dry Low NO _x to Base load ³	Annual mean of validated hourly averages	Continuous	BS EN 14181
	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)		50 mg/m ³ Effective Dry Low NO _x to Base load ³	Monthly mean of validated hourly averages	Continuous	BS EN 14181
	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)		50 mg/m ³ Effective Dry Low NO _x to Base load ³ and MSUL/MSDL to base load ²	Daily mean of validated hourly averages	Continuous	BS EN 14181
	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)		50 mg/m ³ Effective Dry Low NO _x to Base load ³	Maximum validated hourly average	Continuous	BS EN 14181

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
A1 [points A1 located at longitude -4.99772 and latitude 51.68526. A2 located at longitude -4.99697 and latitude 51.68526. A3 located at longitude -4.99621 and latitude 51.68527. A4 located at longitude -4.99545 and latitude 51.68528. A5 located at longitude -4.99772 and latitude 51.68526 on site plan in schedule 7]	Carbon monoxide	LCP286 LCP382 LCP383 LCP384 LCP385	100 mg/m ³ Effective Dry Low NOx to Base load ³	Monthly mean of validated hourly averages	Continuous	BS EN 14181
	Carbon monoxide	Gas turbines fired on natural gas	100 mg/m ³ Effective Dry Low NOx to Base load ³ 250 mg/m ³ MSUL/MSDL to base load ²	Daily mean of validated hourly averages	Continuous	BS EN 14181
	Carbon monoxide		200 mg/m ³ Effective Dry Low NOx to Base load ³	Maximum validated hourly average	Continuous	BS EN 14181
	Carbon monoxide		30 mg/m ³ Effective Dry Low NOx to Base load ³	Annual mean of validated hourly averages	Continuous	BS EN 14181
	Oxygen	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous or as appropriate to measurement techniques	BS EN 14181
	Water Vapour	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous or as appropriate to measurement techniques	BS EN 14181

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
	Stack gas temperature	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous or as appropriate to measurement techniques	Traceable to national standards
	Stack gas pressure	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous or as appropriate to measurement techniques	Traceable to national standards
	Stack gas volume flow	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	Continuous	BS EN 16911 & TGN M2
	Sulphur dioxide	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	6 monthly by calculation	Agreed in writing with NRW
	Dust	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbines fired on natural gas	No limit set	None set	6 monthly by calculation	Agreed in writing with NRW

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
	Flow and Homogeneity	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	Pre-operation and when there is a significant operational change	BS EN 15259 and Method Implementation Document for EN 15259.
Gas heater vents (preheater) A6, A7 and A8 on site plan in Schedule 7	No parameters set	Gas heater vents	No limit set	None set	None set	None set
Standby generator exhaust no. A9, A10, A11, A12, A13 on site plan in Schedule 7	No parameters set	Emergency diesel generators	No limit set	None set	None set	None set
Diesel driven fire pump exhaust A14 on site plan in Schedule 7	No parameters set	Fire pump	No limit set	None set	None set	None set
A16-A18 (A16 -NGR 193193, 202632. A17 - NGR 193198, 202632. A18 - NGR 193203, 202632)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	Emergency gas engine No 1, 2 and 3 (EBGP) 7.6 MWth fuelled on natural gas (New Medium Combustion Plant) operated for <500 hours per year as a rolling average of 3 years	No limit set	None set	Once every 500 hours of operation or once every five years whichever comes first	MCERTS BS EN 14792

Table S3.1a Point source emissions to air from Gas Turbines >100MWth						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference period	Monitoring frequency	Monitoring standard or method
	CO		No limit set	None set	Once every 500 hours of operation or once every five years whichever comes first	MCERTS BS EN 15058
A19-A20 (A19 - NGR 193192, 202667, A20 NGR 193200, 202667)	No parameters set	Low pressure Gas Heater Vent No 1,2 and 3 fuelled on natural gas	No limit set	None set	-	-

Note 1: This ELV applies when the load is >70% throughout the reference period.

Note 2: This ELV applies when the load varies between MSUL/MSDL and base load during the daily reference period. MSUL and MSDL are defined in table S1.5.

Note 3: This ELV applies between the effective dry low NO_x threshold and baseload. Effective dry low NO_x thresholds are defined in Table S1.6.

Table S3.1b Point source emissions to air <500 hrs						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference Period	Monitoring frequency	Monitoring standard or method
A1 [points A1 located at longitude -4.99772 and latitude 51.68526. A2 located at longitude	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	Continuous	BS EN 14181 or as agreed in writing with NRW

Table S3.1b Point source emissions to air <500 hrs						
Emission point ref. & location	Parameter	Source	Limit (including unit)-these limits do not apply during start up or shut down.	Reference Period	Monitoring frequency	Monitoring standard or method
-4.99697 and latitude 51.68526. A3 located at longitude -4.99621 and latitude 51.68527. A4 located at longitude -4.99545 and latitude 51.68528. A5 located at longitude -4.99772 and latitude 51.68526 on site plan in schedule 7]	CO	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	Continuous	BS EN 14181 or as agreed in writing with NRW
	Sulphur dioxide	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	6 monthly by calculation	Agreed in writing with NRW
	Dust	LCP286 LCP382 LCP383 LCP384 LCP385 Gas turbine fired on natural gas	No limit set	None set	6 monthly by calculation	Agreed in writing with NRW

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements						
¹ Based on the mean of all valid samples obtained each day (taken at regular intervals), with a minimum of 20 valid samples to be taken each day)						
Emission point ref. & location	Parameter	Source	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 (as shown on site plan in Schedule 7)	Cooling water, HRSG blow-down and water	Flow	40 m ³ per second	Maximum	Continuous	Flow meter
		Temperature	30.4°C	Absolute maximum		

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements

¹ Based on the mean of all valid samples obtained each day (taken at regular intervals), with a minimum of 20 valid samples to be taken each day)

Emission point ref. & location	Parameter	Source	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
	treatment plant effluent		7.6°C above intake temperature	Daily average		Standard Thermocouple
		Total residual oxidant (as chlorine)	50 µg/l	Daily average ¹		Proprietary instrument
		pH	6-9 (inclusive)	-		BS6068 2.50:1995
W1 (a) sampled at effluent outlet of water treatment plant prior to its confluence with cooling water flow	Water treatment plant effluent	Flow	7.48 litres per second	Annual average	Monthly (Samples to be taken at least 21 days apart)	Flow meter
		Ammonia	0.297 mg/l	Annual Average		BS 6068:2.11
		Nitrate	12.1 mg/l			BS EN ISO 13395:1996
		Calcium	59.0 mg/l			BS EN ISO 11885
		Phosphate	0.460 mg/l			
		Iron	2.17 mg/l			
		Aluminium	13000 µg/l			
		Antimony	6.65 µg/l			
		Chromium	4.47 µg/l			
		Copper	22.1 µg/l			
		Lead	45.9 µg/l			
		Manganese	151 µg/l			
		Nickel	11.9 µg/l			
		Selenium	6.84 µg/l			
		Zinc	67.0 µg/l			
		Arsenic	4.37 µg/l			
		Cadmium	0.700 µg/l			
		Chloride	121 mg/l			BS EN ISO 15682:2001
		Mercury	0.370 µg/l			BS EN ISO 17852:2008
W1 (b) sampled at outlet of blow-down from Heat Recovery Steam Generators	Heat Recovery Steam Generator blow-down	Flow	16.8 litres per second	Annual Average	Continuous	Flow meter
		Ammonia	0.776 mg/l		Monthly (Samples to be taken at	BS 6068:2.11
		Aluminium	10.0 µg/l			BS EN ISO 11885

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements

¹ Based on the mean of all valid samples obtained each day (taken at regular intervals), with a minimum of 20 valid samples to be taken each day)

Emission point ref. & location	Parameter	Source	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
prior to its confluence with cooling water flow		Mercury	0.0100 µg/l		least 21 days apart)	BS EN ISO 17852:2008
		Nickel	1.00 µg/l			BS EN ISO 11885
		Iron	5.50 mg/l			BS EN ISO 11885
		Silicate	3.00 mg/l			
		Sodium & Potassium	3.00 mg/l			
W1(c) (as shown on site plan in schedule 4 of this notice)	Treated sewage effluent	Flow	23m ³ /day	Average	Quarterly	Flow meter. (Or as otherwise agreed in writing with Natural Resources Wales)
		Ammoniacal nitrogen	20mg/l		Quarterly	BS 6068:2.11
		Biochemical oxygen demand	20mg/l			BS EN 1899-1
		Suspended solids	30mg/l			BS EN 872
W2 (as shown on site plan in schedule 4)	Process drainage and uncontaminated surface run-off including roof drainage	Oil and grease	No visible oil (oil and grease to be non-visible on the surface of the receiving waters in the immediate vicinity of the emission point).	Spot	Daily	Visual check

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
Natural gas consumption	Flow	Continuous	Flow meter	-

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
Oxides of nitrogen	A1, A2, A3, A4, A5	Every 3 months for continuous monitoring	1 January, 1 April, 1 July, 1 October
Carbon monoxide	A1, A2, A3, A4, A5	Every 3 months for continuous monitoring	1 January, 1 April, 1 July, 1 October
Sulphur dioxide	A1, A2, A3, A4, A5	Every 6 months for periodic monitoring	1 January, 1 July
Dust	A1, A2, A3, A4, A5	Every 6 months for periodic monitoring	1 January, 1 July
Emissions to water	W1 and W2	Every 3 months for periodic monitoring	1 January, 1 April, 1 July, 1 October
Oxides of nitrogen	A16, A17, A18	Once every 500 hours of operation or once every five years whichever comes first	1 January
Carbon monoxide	A16, A17, A18	Once every 500 hours of operation or once every five years whichever comes first	1 January

Table S4.2: Annual production/treatment	
Parameter	Units
Power generated	GWh

Table S4.3 Chapter III Performance parameters for reporting to DEFRA		
Parameter	Frequency of assessment	Units
Thermal Input Capacity for each LCP	Annually	MW
Annual Fuel Usage for each LCP	Annually	TJ
Total Emissions to Air of NO _x for each LCP	Annually	t
Total Emissions to Air of SO ₂ for each LCP	Annually	t

Table S4.3 Chapter III Performance parameters for reporting to DEFRA		
Parameter	Frequency of assessment	Units
Total Emissions to Air of particulate matter (dust) for each LCP	Annually	t
Operating Hours for each LCP (Load Factor)	Annually	h

Table S4.4 Reporting forms			
Media/ parameter	Reporting format	Form	Date of form
Air & Energy	Appropriate form as detailed in the ESI IED protocol (as referenced in Schedule 6) or other form as agreed by NRW	Form IED AR1 – SO ₂ , NO _x and dust mass emission and energy	As agreed with NRW
LCP	Appropriate form as detailed in the ESI IED protocol (as referenced in Schedule 6) or other form as agreed by NRW	Form IED HR1 – operating hours	As agreed with NRW
Air	Appropriate form as detailed in the ESI IED protocol (as referenced in Schedule 6) or other form as agreed by NRW	Form IED CON 2 – continuous monitoring	As agreed with NRW
CEMs	Appropriate form as detailed in the ESI IED protocol (as referenced in Schedule 6) or other form as agreed by NRW	Form IED CEM – invalidation log	As agreed with NRW
Air	Appropriate form as detailed in the ESI IED protocol (as referenced in Schedule 6) or other form as agreed by NRW	Form IED PM1 – discontinuous monitoring and load	As agreed with NRW
Water	Appropriate form as detailed in the ESI IED protocol (as referenced in Schedule 6) or other form as agreed by NRW	Form water 1 or other form as agreed in writing by NRW	As agreed with NRW
Air	-	Form air 1 or other form as agreed in writing by Natural Resources Wales	16/10/2020

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	EPR/DP3333TA
Name of operator	RWE Generation UK plc
Location of Facility	Pembroke Power Station
Time and date of the detection	

(a) Notification requirements for any activity that gives rise to an incident or accident which significantly affects or may significantly affect the environment	
To be notified immediately	
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 immediately otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

(b) Notification requirements for the breach of a limit	
To be notified immediately otherwise specified below	
Time periods for notification following detection of a breach of a limit	
Parameter	Notification period

(c) Notification requirements for the detection of any significant adverse environmental effect	
To be notified immediately	
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

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

“annual average” means the average over a period of one year of validated hourly averages obtained by continuous measurements.

“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 Natural Resources Wales 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.

“average over the sampling period” means average value of three consecutive measurements of at least 30 minutes each.

“background concentration” means such concentration of that substance as is present in:

- for emissions to surface water, the surface water quality up-gradient of the site; or
- for emissions to sewer, the surface water quality up-gradient of the sewage treatment works discharge.

“base load” means: (i) as a mode of operation, operating for >4000hrs pa; and (ii) as a load, the maximum load under ISO conditions that can be sustained continuously, i.e. maximum continuous rating.

“breakdown” has the meaning given in the ESI IED Compliance Protocol for Utility Boilers and Gas Turbines.

“Black Start Instruction” means the instruction given by National Grid ESO control room to providers of black start services, in the event of a partial or total electrical grid system shut down.

“calendar monthly mean” means the value across a calendar month of all validated hourly means.

“CEN” means Comité Européen de Normalisation.

“Daily average” means the average over a period of 24 hours of valid hourly averages obtained by continuous measurements.

“disposal” or “D” means any of the operations provided for in Annex I to Directive 2008/98/EC of the European Parliament and of the Council on waste.

“DLN” means dry, low NO_x burners.

“emissions to land” includes emissions to groundwater.

“Energy efficiency” the annual net plant energy efficiency means the value calculated from the operational data collected over the year.

“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.

“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.

“ESI IED Protocol” means Electricity Supply Industry IED Compliance Protocol for Utility Boilers and Gas Turbines revision 1 dated December 2015 (as amended) or any later version unless otherwise agreed in writing by Natural Resources Wales.

“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” means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions.

“large combustion plant” or “LCP” is a combustion plant or group of combustion plants discharging waste gases through a common windshield or stack, where the total thermal input is 50 MW or more, based on net calorific value. The calculation of thermal input, excludes individual combustion plants with a rated thermal input below 15MW.

“LCP Bref BAT Conclusions” means Commission implementing decision (EU) 2017/1442 of 31 July 2017 establishing best available techniques (BAT) conclusions under Directive 2010/75/EU of the European Parliament and the Council, for large combustion plant, published 17 August 2017.

“malfunction” has the meaning given in the ESI IED Compliance Protocol for Utility Boilers and Gas Turbines.

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

“medium combustion plant” or “MCP” means a combustion plant with a rated thermal input equal to or greater than 1 MW but less than 50 MW.

“Medium Combustion Plant Directive” or “MCPD” means Directive 2015/2193/EU of the European Parliament and of the Council on the limitation of emissions of certain pollutants into the air from medium combustion plants.

“MCR” means maximum continuous rating.

“MSDL” means minimum shut-down load as defined in Implementing Decision 2012/249/EU.

“MSUL” means minimum start-up load as defined in Implementing Decision 2012/249/EU.

“Natural gas” means naturally occurring methane with no more than 20% by volume of inert or other constituents.

“ncv” means net calorific value.

“Net electrical efficiency” means the ratio between the net electrical output (electricity produced minus the imported energy) and the fuel/feedstock energy input (as the fuel/feedstock lower heating value) at the combustion unit boundary over a given period of time.

“NRW” means Natural Resources Wales.

“operational hours” are whole hours commencing from the first unit ending start up and ending when the last unit commences shut down.

“quarter” means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

“SI” means site inspector.

“TNP Register” means the register maintained by the Environment Agency in accordance with regulation 4 of The Large Combustion Plant (Transitional National Plan) Regulations 2015.

“Waste code” means the six digit code referable to a type of waste in accordance with the List of Wastes (England) Regulations 2005, or List of Wastes (Wales) Regulations 2005, as appropriate, and in relation to hazardous waste, includes the asterisk.

“Waste Framework Directive” or “WFD” means Waste Framework Directive 2008/98/EC of the European Parliament and of the Council on waste.

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.

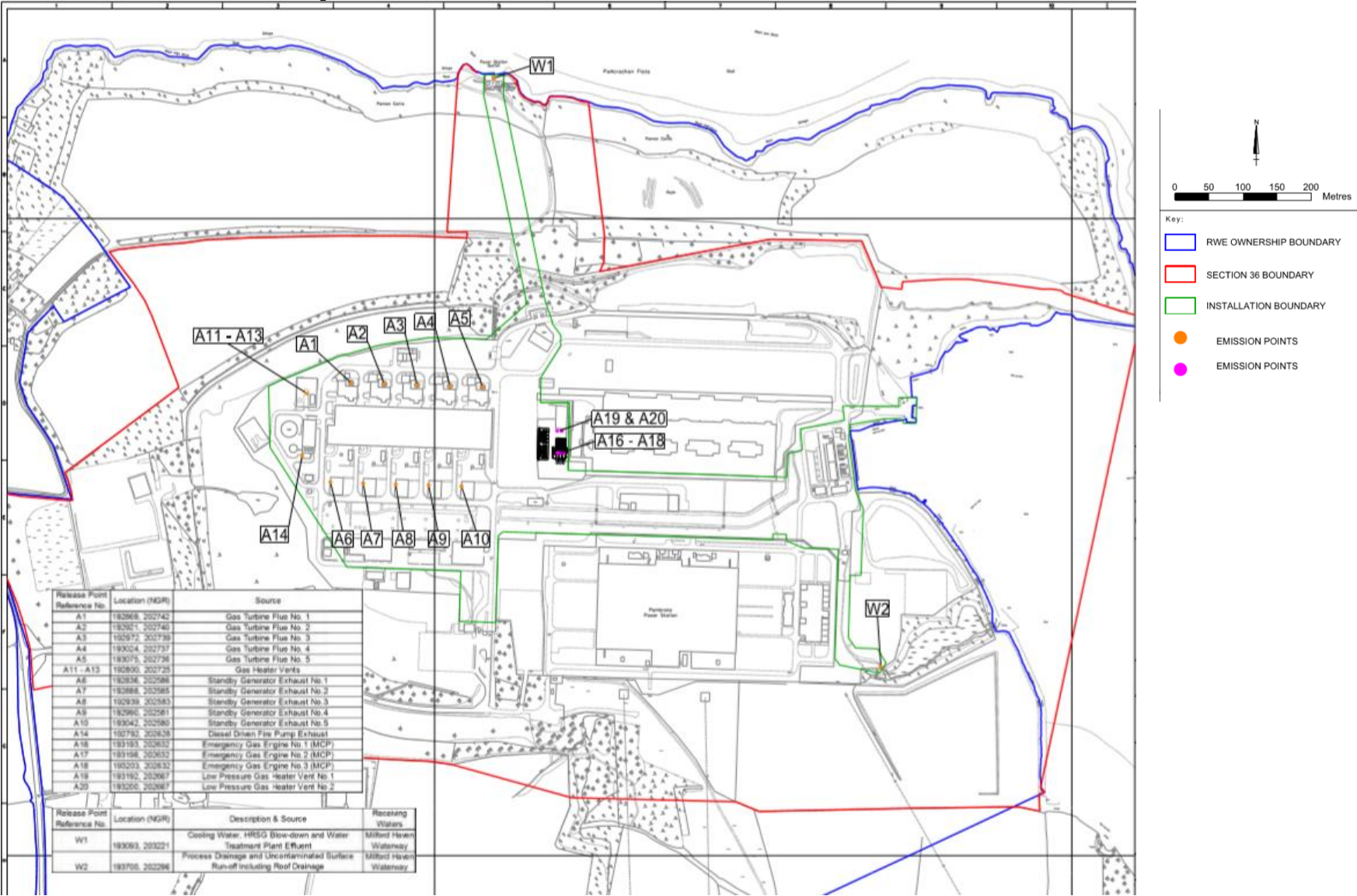
Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

- 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

- in relation to emissions from gas turbine or compression ignition engine combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3kPa and with an oxygen content of 15% dry for liquid and gaseous fuels; and/or
- in relation to emissions from combustion processes comprising a gas turbine with a waste heat boiler, the concentration in dry air at a temperature of 273K, at a pressure of 101.3kPa and with an oxygen content of 15% dry, unless the waste heat boiler is operating alone, in which case, with an oxygen content of 3% dry for liquid and gaseous fuels; and/or
- 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.

“year” means calendar year ending 31 December.

Schedule 7 – Site plan





Schedule 8 – Annex 1 of MCPD

1. Rated thermal input (MW) of the medium combustion plant.	7.6 MW thermal input (per MCP) 22.8 MW thermal input (aggregated, 3 MCP's)
2. Type of the medium combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	Other engine – Emergency back-up
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	100% Natural gas
4. Date of the start of the operation of the medium combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	-
5. Sector of activity of the medium combustion plant or the facility in which it is applied (NACE code).	D.35 Electricity, gas, steam and air conditioning supply
6. Expected number of annual operating hours of the medium combustion plant and average load in use.	500 hours maximum
7. Where the option of exemption under Article 6(3) or Article 6(8) is used, a declaration signed by the operator that the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs.	Yes
8. Name and registered office of the operator and, in the case of stationary medium combustion plants, the address where the plant is located.	Registered Office address: Windmill Hill Business Park, Whitehill Way, Swindon, Wiltshire, SN5 6PB MCP location: Pembroke Power Station, West Pennar, Pembroke, Pembrokeshire, SA71 5SS

END OF PERMIT