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Wales

## **Permit with introductory note**

The Environmental Permitting (England & Wales) Regulations 2016

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Valero Energy Ltd

Pembroke Refinery  
Pembroke  
Pembrokeshire  
SA71 5SJ

Permit number

EPR/YP3930EX

# Pembroke Refinery

## Permit number EPR/YP3930EX

### Introductory note

#### **This introductory note does not form a part of the permit**

The main features of the installation are as follows.

Location: The site is located on the south shore of the Milford Haven estuary approximately 7 km west of Pembroke, Pembrokeshire. The site is centred at NGR 190800 203000. The installation extends to around 500 acres. A natural north-south watershed divides the application site into two areas, one draining into Angle Bay to the west and the other into Martin's Haven to the East. Milford Haven estuary has been designated a Special Area of Conservation.

Operator: The site is a single-operator installation operated by Valero Energy Limited

Key activities: The purpose of the site is to process crude oil into its component parts to produce fuels for sale into various markets. The processing of crude oil involves a series of inter-linked processes, as follows:

- *De-salter:* this unit removes water and water-soluble salts from the crude oil prior to it being transferred to the crude distillation unit (CDU). The crude is water washed and additives are used to break any oil/water emulsion that could potentially form. The separation of the oil and water phases is carried out by means of an electrical field. This ensures that the maximum amount of water and salts are removed from the crude oil. The salt water is then sent to the site's effluent treatment plant. The water used within the desalter is often recirculated process water from other parts of the site.
- *Crude distillation unit (CDU):* The CDU functions to separate crude oil by distillation into the generic fractions of naphtha, kerosene, light diesel, heavy diesel, LPG and fuel gas. The unit comprises several separate distillation columns. There are a series of heat exchangers within the unit which enables heat energy to be recycled e.g. heat energy released by condensing distillates is used to pre-heat incoming crude oil stream. Around 45% of the crude oil feed to the CDU remains un-distilled and this bottom product passes on to the vacuum distillation unit (VDU) for further processing. A significant amount of sour water is produced within the CDU (via stripping steam operations). Sour water is high in impurities such as H<sub>2</sub>S and NH<sub>3</sub>. The sour water is stripped with steam to remove these impurities. The H<sub>2</sub>S and NH<sub>3</sub> removed are burnt in the crude charge heater.
- *Vacuum distillation unit (VDU):* The main purpose of the VDU is to re-distil the bottom product from the CDU into suitable feedstock for the Fluidised Catalytic Cracking Unit (FCCU). The distillation is carried out under partial vacuum conditions. Three overhead products are produced - diesel product, light vac gas oil, heavy vac gas oil leaving a heavy bottom product referred to as vac residue. The vacuum gas oils are passed to the FCCU and the diesel product is passed to the hydrotreater while the vac residue passes to the visbreaker unit for further processing. The VDU has an associated Sour water stripper unit which removes sour gas from the VDU water effluent stream. The sour gas removed is used as fuel within the VDU.

- *Visbreaker unit (VBU):* The VBU uses a process of thermal cracking to break down the complex compounds which make up the heavy feed of vacuum residue into lighter oil in the diesel range, products in the LPG and naphtha ranges and a heavy residual oil. This residual oil is blended with similar oils from other process units to produce a fuel oil suitable for industrial processes. This fuel is also used as refinery fuel oil (RFO). The diesel produced on the VBU is sent to one of the hydrotreaters, the naphtha is sent to the Unifiner, the LPG is sent to one of the Merox units and any gas produced is added to the refinery fuel gas (RFG) system.
- *Hydrotreaters:* There are 2 hydrotreaters on site. Both units reduce the sulphur content of diesel by passing the diesel through a catalyst bed in the presence of hydrogen. The sulphur is removed as H<sub>2</sub>S which is then absorbed into a solution of diethanolamine which will be processed within the amine and sulphur recovery units.
- *Unifiner:* The Unifiner unit removes any impurities such as metals, sulphur, nitrogen and water from naphtha before feeding the heavier fractions to the platformer unit. The process occurs in the presence of excess hydrogen over a nickel-molybdenum catalyst and produces hydrogen, LPG and a naphtha stream. The naphtha is subsequently separated into light and heavy naphtha fractions. Hydrogen is sent to the hydrotreater, LPG is sent to the CDU, the light naphtha is sent to the isomerisation unit while the heavy naphtha is sent to the Platformer unit.
- *Merox units:* The Merox unit converts the mercaptans in kerosene to disulphides. This reduces the odour and corrosive nature of the kerosene.
- *Platformer unit:* The Platformer unit comprises the Catalytic Reformer unit (CRU) and the Continuous Catalytic Regeneration Unit (CCR). The CRU comprises a 3-stage high temperature process using a platinum catalyst which produces aromatic hydrocarbons from paraffin's and naphthalene's in heavy naphtha which has been hydrotreated in the Unifiner to remove sulphur, nitrogen and unsaturated compounds. This conversion produces a high-octane stream known as platformate while benzene, LPG and hydrogen are produced as by-products. The platinum catalyst is continuously regenerated in the directly linked CCR.
- *Hydrogen Recovery Unit (HRU):* This unit uses pressure swing absorption to recover hydrogen from RFG.
- *Isomerisation unit (ISOM):* The ISOM unit converts C5 and C6 straight chain hydrocarbons into their isomers in the presence of hydrogen and a platinum catalyst. The catalyst is activated by means of a chlorocarbon and thus the off-gases are acidic. These are neutralised in a caustic scrubber before they are sent to the LPGRU. The isomerised hydrocarbon is used in gasoline blending.
- *Fluid Catalytic Cracking Unit (FCCU):* The FCCU unit breaks down the heavy complex and long chain hydrocarbons from the CDU and VDU to produce lighter oils and gases that can be used as LPG or gasoline for blending. The main feedstock is vacuum gas oil although this may be supplemented by higher fractions from the CRU or VDU bottoms. The unit has a 3-stage cyclone system to abate emissions of particulate (catalyst) to air. The catalyst is thermally treated to remove any hydrocarbon/carbon deposited on its surface during the process before being recycled to the cracking unit.

- *Ultra-low sulphur gasoline unit (ULSG):* The ULSG reduces the sulphur content of naphtha streams from the FCCU. Naphtha feeds are processed in 2 catalytic distillation columns and a fixed catalyst bed along with hydrogen to form ultra-low sulphur naphtha and H<sub>2</sub>S. The ultra-low sulphur naphtha is routed to storage through a caustic prewash and the naphtha Mercox unit. H<sub>2</sub>S is absorbed into the amine stream and transported back to the amine recovery unit for processing.
- *Alkylation unit:* This unit combines short-chain alkenes from the FCCU with iso-butane from the Butamer unit to form C7 and C8 branched hydrocarbons known as alkylate. The reaction is catalysed by Hydrofluoric acid.
- *Butamer unit:* The Butamer unit is used to increase the iso-butane content of the butane stream feedstock for the alkylation unit. The reaction section is a fixed bed catalytic process for the conversion of n-Butane to iso-Butane.
- *Amine recovery and sulphur recovery units (ARU and SRU):* The ARU and SRU work in combination to convert acid gas (H<sub>2</sub>S/SO<sub>2</sub>) from refinery gas streams into elemental sulphur which is sold as a feedstock into the chemical industry. Acid gas from the various refinery processes is absorbed into diethanolamine at source. The diethanolamine is then transferred to the ARU where the acid gas is removed under vacuum. The acid gas is then transferred to the SRU where the acid gas is converted to elemental sulphur in the presence of an alumina catalyst and steam in a 3-stage Claus convertor and Superclaus (as per IC24 in original IPPC permit QP3033LW).
- *Waste water treatment facility (WWTP):* All process water, surface water and ballast water at the site is treated in the on-site WWTP. The WWTP consists of equalisation basins to ensure that the feed to the WWTP is consistent, API to remove oil and suspended solids from the feed, DAF unit to further remove oil and suspended solids and a biological treatment plant. After treatment, the water is discharged into the Milford Haven waterway.
- *Cogeneration Plant:* The cogeneration plant will produce up to 49.9 megawatts of electrical output (MWe) from the combustion of natural gas in a combustion turbine generator (CTG) to provide electricity to the refinery. Superheated steam will be generated via a heat recovery steam generator (HRSG) and will supplement the refineries steam demand. The plant will be connected to the refinery's steam infrastructure as well as the natural gas and electrical distribution systems. There is a de-mineralisation plant associated with the cogeneration plant to provide a flow of softened and filtered water to allow on-line and off-line washing of the CTG. Neutralised regeneration fluid from the unit to the existing waste water drain line.

The schedules specify the changes made to the permit.

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

<b>Status log of the permit</b>		
<b>Detail</b>	<b>Date</b>	<b>Comments</b>
Application QP3033LW	Duly made 21/09/2006	
Additional Information Received Certificate of Incorporation Details on combustion units	18/08/06 24/01/07	Confirmation of site boundary.

**Status log of the permit**

<b>Detail</b>	<b>Date</b>	<b>Comments</b>
Site plan	24/02/07	
Response to Schedule 4 notice issued 08/12/06	02/02/07 09/02/07 20/03/07 12/04/07	
Response to Schedule 4 notice issued 02/04/07	01/05/07	
Response to Schedule 4 notice issue 02/05/07	25/05/07	
Response to Schedule 4 notice issued 04/01/07	15/06/07	
Historical data on emission to water	19/06/07	
Annual VOC emissions	16/07/07	
Historical data on emissions to air	16/07/07	
Historical data on carbon monoxide releases to air	17/09/07	
Sulphur dioxide emissions from sulphur recovery unit	21/09/07 25/09/07	
Letter justifying request for higher annual mass limit	04/10/07	
e-mail detailing methods used for monitoring emissions to water	15/10/07 16/10/07	
e-mail detailing SO2 releases from SRU and % efficiency	17/10/07 01/11/07	
e-mail detailing effluent temperature		
e-mail on volumetric flows of A9/A10 flue		
e-mail on H2S concentration in Refinery fuel gas		
Permit determined	20/12/2007	Permit issued
Variation application ERR/QP3033LW/V002	Duly made 13/08/10	
Variation issued ERR/QP3033LW/V002	11/09/10	
Notified of change of company name and registered office address	26/08/11	
Variation issued EPR/QP3033LW/V003	21/09/11	
Variation application EPR/QP3033LW/V004	06/01/12	
Variation issued EPR/QP3033LW/V004	05/04/12	
Variation determined EPR/QP3033LW/V005	26/03/13	
Transfer application EPR/YP3930EX/T001 (full transfer of permit EPR/QP3033LW)	Duly made 18/09/13	
Transfer determined EPR/YP3930EX	01/01/14	Permit transferred to Valero Energy Limited company No 8566216 as of 01/01/14, from Valero Energy Limited company No 145197
Regulation 60 Notice sent to the Operator	08/10/15	Issue of a Notice under Regulation 60(1) of the EPR. Natural Resources

<b>Status log of the permit</b>		
<b>Detail</b>	<b>Date</b>	<b>Comments</b>
		Wales initiated review and variation to vary the permit.
Regulation 60 Notice response	06/11/15	Response received from the Operator.
<b>Job Aid – PP-HES-JBA-0004</b>	15/12/15	Supporting documentation
Regulation 60 Notice response	06/11/15	Response received from the Operator.
Variation determined EPR/YP3930EX/V002	23/12/15	Varied permit issued.
Variation determined EPR/YP3930EX/V003	09/12/16	NRW led variation to add hazardous waste storage to the permit.
Variation EPR/YP3930EX/V004	03/03/17	Administrative variation to change registered address.
Variation EPR/YP3930EX/V005	Duly Made 31/05/17	
Schedule 5 notice issued	05/06/17	Notice issued requesting additional information relating to the noise assessment
Additional Information Received	19/06/17	Additional information relating to the noise assessment
Additional Information Received	12/07/17	Additional Information relating to the noise assessment
Additional Information Received	20/07/17	Additional Information relating to the noise assessment
Schedule 5 notice issued	02/08/17	Notice issued requesting additional information relating to the noise assessment
Additional Information Received	08/08/17	Additional information relating to the noise assessment
Variation determined EPR/YP3930EX/V005	xx/xx/xx	Consolidated and varied permit issued.

<b>Other Part A installation permits relating to this installation</b>		
<b>Operator</b>	<b>Permit number</b>	<b>Date of issue</b>
Valero Energy Limited	Waste Management licence EPR/YB3997TZ/T001	01/01/2014

End of introductory note

# Permit

The Environmental Permitting (England and Wales) Regulations 2016

The Natural Resources Body for Wales (“Natural Resources Wales”) authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2016

Permit number

**EPR/YP3930EX**

issued to

**Valero Energy Ltd**

whose registered office is

**Fifth Floor  
100 Wood Street  
London  
EC2V 7EX**

company registration number **8566216**

to operate a regulated facility at

**Pembroke Refinery  
Pembroke  
Pembrokeshire  
SA71 5SJ**

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

Signed

Date

	xx/xx/xx
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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) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and
- (c) take any further appropriate measures identified by a review.

### 1.3 Efficient use of raw materials

1.3.1 For the following activities referenced in schedule 1, table S1.1 (A1 to A18.) The operator shall:

- (a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;
- (b) maintain records of raw materials and water used in the activities;
- (c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and
- (d) take any further appropriate measures identified by a review.

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

1.4.1 The operator shall take appropriate measures to ensure that:

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



- (b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and
- (c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.
- (i) 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 (a) For the following activities referenced in schedule 1, table S1.1 (A1 to A18.) 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.
- (b) 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.
- 2.3.2 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.
- 2.3.3 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.

- 2.3.4 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.
- 2.3.5 For the following activities: LCP371, LCP372, LCP373, LCP374, LCP375 and LCPxxxx, the end of the start-up period and the start of the shutdown period shall conform to the specifications set out in the Job Aid-PP-HES-JBA-0004.
- 2.3.6 For the following activities: LCP371, LCP372, LCP373, LCP374, LCP375 and LCPxxxx, the following conditions apply where there is a malfunction or breakdown of any abatement equipment:
- Unless otherwise agreed in writing by Natural Resources Wales:
- a) If a return to normal operations is not achieved within 24 hours, the operator shall reduce or close operations, or shall operate the activities using low polluting fuels;
  - b) The cumulative duration of breakdown in any 12-month period shall not exceed 120 hours; and
  - c) The cumulative duration of malfunction in any 12-month period shall not exceed 120 hours.

## **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 operations specified in Schedule 1 table S1.4 shall not commence until the measures specified in that table have been completed.

# **3 Emissions and monitoring**

## **3.1 Emissions to water, air or land**

- 3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1(a), S3.1(b), S3.1(c), S3.1(d), S3.1(e), S3.1(f) and S3.2;
- 3.1.2 The limits given in schedule 3 shall not be exceeded.
- 3.1.3 For the following activities referenced in schedule 1, table S1.1 (A1 to A18) where a substance is specified in schedule 3 table S3.2 but no limit is set for it, the concentration of such substance in emissions to water from the relevant emission point shall be no greater than the background concentration.
- 3.1.4 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.

- 3.1.5 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1(a), S3.1(b), S3.1(c), S3.1(d), S3.1(e), S3.1(f) and S3.2 unless otherwise specified in that schedule.
- 3.1.6 The operator shall, unless otherwise agreed in writing by Natural Resources Wales, undertake the monitoring specified in the following tables in schedule 4 to this permit:
- (a) point source emissions specified in tables S3.1(a), S3.1(b), S3.1(c), S3.1(d), S3.1(e), S3.1(f) and S3.2

## **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 S3.1(a), S3.1(b), S3.1(c), S3.1(d), S3.1(e), S3.1(f)
  - (b) surface water specified in table S3.2;
- 3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made based on 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) 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 S3.1(a), S3.1(b), S3.1(c), S3.1(d), S3.1(e), S3.1(f) and S3.2 unless otherwise agreed in writing by Natural Resources Wales.

## **3.6 Monitoring for the purposes of the Industrial Emissions Directive**

- 3.6.1 All LCP monitoring required by this permit shall be carried out in accordance with the provisions of Annex V of the Industrial Emissions Directive.
- 3.6.2 If the monitoring results for more than 10 days a year are invalidated within the meaning set out in schedule 3, 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 measures.
- 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 S3.1(a), S3.1(b), S3.1(c), S3.1(d) and S3.1(e); the Continuous Emissions Monitors shall be used such that:
- a) for the continuous measurement systems fitted to the LCP release points defined in tables S3.1(a), S3.1(b), S3.1(c), S3.1(d) and S3.1(e) the validated hourly, monthly and daily averages shall be determined from the measured valid hourly average values after having subtracted the value of 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) any 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 such data has been accumulated for at least two thirds of the period (40 minutes). 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, 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.

## 4.2 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 January (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;
- (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.

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.
  - (d) of any malfunction or breakdown of abatement equipment relating to condition 2.3.5, the operator shall notify Natural Resources Wales within 48 hours unless notification has already been made under (a) to (c) above.
- 4.3.2 Any information provided under condition 4.3.1 where the information relates to the breach of a limit 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:
- (a) any change in the operator's name or address; and
  - (b) any steps taken with a view to the dissolution of the operator.
- In any other case:
- (a) the death of any of the named operators (where the operator consists of more than one named individual);
  - (b) any change in the operator's name(s) or address(s); and
  - (c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.
- 4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:
- (a) 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 Ref.	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
A1	S1.1 A(1)(a) – Burning any fuel in an appliance with a thermal input of 50 megawatts.	Boiler plant	Refinery fuel oil storage and supply, boilers and abatement plant including: <ul style="list-style-type: none"> <li>(i) 1 x 63.9 MW(th) boiler [designated B1]</li> <li>(ii) 2 x 63.8 MW(th) boilers [B2, B3]</li> <li>(iii) 1 x 78.9 MW(th) boiler [B4]</li> <li>(iv) 3 x 62.7 MW(th) boiler [B5, B6, B7]</li> <li>(v) 1 x 24.9 MW(th) boiler [B8]</li> <li>(vi) 1 x 74 MW(th) boiler [B9]</li> <li>(vii) 1 x 137 MW(th) natural gas fired cogeneration plant. From receipt of fuel to emissions of combustion products</li> </ul>
A2	S1.2 A(1)(d) – Refining mineral oils	Refining mineral oil – primary operations	From feed to oil refining unit to use, intermediate or product storage, or export including each of the following units: <ul style="list-style-type: none"> <li>(i) Vacuum distillation unit (typical throughput capacity – 640 m<sup>3</sup>/hr) and 2 x 47.5MW(th) heaters [H1, H2]</li> <li>(ii) Visbreaker unit (typical throughput capacity - 170 m<sup>3</sup>/hr) and 32.3MW(th) heater [H3]</li> <li>(iii) Fluidised catalytic cracker (typical throughput capacity - 625 m<sup>3</sup>/hr) and 31.1MW (th) heater [H4] and 318 MW (th) Regenerator [H5].</li> <li>(iv) Kerosene Merox unit (typical throughput capacity - 223 m<sup>3</sup>/hr)</li> <li>(v) Hydro treater HTU-1 (typical throughput capacity - 275m<sup>3</sup>/hr) and 3 heaters (16.9MW(th) [H6], 14.2MW(th) [H7]and 6.5(th) [H8])</li> <li>(vi) Hydro treater HTU-2 (typical throughput capacity - 220m<sup>3</sup>/hr) and 2 heaters (10.5MW(th) [H9] and 4.2MW(th) [H10])</li> <li>(vii) Isomerisation unit (typical throughput capacity – 110m<sup>3</sup>/hr)</li> <li>(viii) LPG recovery unit (typical throughput capacity – 69,277 sm<sup>3</sup>/hr)</li> <li>(ix) Unifiner unit (typical throughput capacity - 340m<sup>3</sup>/hr) and 3 heaters (11MW(th) [H11], 9.6MW(th) [H12] and 7.3MW(th) [H13])</li> <li>(x) Hydrogen recovery unit (typical throughput capacity - 18,645 sm<sup>3</sup>/hr)</li> <li>(xi) Platformer unit (typical throughput capacity - 255m<sup>3</sup>/hr) and 4 heaters (37.4MW(th) [H14], 30.4MW(th) [H15], 18.1MW(th) [H16] and 15.3MW(th) [H17])</li> <li>(xii) FCC Merox unit (typical throughput capacity - 220m<sup>3</sup>/hr)</li> <li>(xiii) Alkylation unit (typical throughput 250m<sup>3</sup>/hr production of alkylate) and 2 heaters (28.8MW (th) [H18], and 22.1MW (th) [H19].</li> <li>(xiv) Butamer unit (typical throughput capacity - 135m<sup>3</sup>/hr) and 1.75MW (th) heater [H20].</li> </ul>

			(xv) Ultra-low sulphur gasoline (ULSG) unit (nominal throughput capacity – 328 m <sup>3</sup> /hr) and 33.4MW (th) heater [H24].
A3	S1.2 A(1)(d) – Refining mineral oils	Refining mineral oil – secondary operations – oil movements and blending	From receipt of feed, through blending (where necessary) to feed, intermediate and product storage including: liquefied petroleum gases, white oils, gas oils/ black oils, Crude oil/ slops. Road and ship loading and associated vapour recovery units.
A4	S1.2 A(1)(e) – The loading, unloading, handling or storage of, or the physical, chemical or thermal treatment of –  (i) Crude oil  (ii) Stabilised crude petroleum	Handling and processing crude oil	From receipt of crude to operation of crude distillation unit including:  (i) jetty operations  (ii) Crude distillation unit (typical throughput capacity 13,360,300 m <sup>3</sup> /year) and 3 crude heaters (48.6MW(th) [H21], 52.7MW(th) [H22] and 58.5MW(th) [H23])  Crude storage (storage capacity – 538,625 m <sup>3</sup> )
A5	S4.2 A(1)(a)(v) – Producing inorganic chemicals such as – non-metals, metal oxides, metal carbonyls, or other inorganic compounds.	Sulphur recovery and production	Removal of sulphur from aqueous waste stream by use of:  (i) amine recovery unit (nominal throughput capacity – 185 m <sup>3</sup> /hr/train; 2 trains)  (ii) FCCU sour water stripper (nominal throughput capacity – 32 m <sup>3</sup> /hr)  (iii) CDU waste water stripper (nominal throughput capacity – 30 m <sup>3</sup> /hr)  (iv) VDU waste water stripper (nominal throughput capacity – 55 m <sup>3</sup> /hr)  (v) SRU 1 (nominal throughput capacity - 80 tonnes of sulphur/day).  (vi) SRU 2 (nominal throughput capacity - 80 tonnes of sulphur/day).  (vii) tail-gas incinerator  (viii) Sulphur storage prior to export (storage capacity – 2pits of 1,400 tonnes each)
A6	S5.3 A1 (a)	Disposal of hazardous waste (other than by incineration or landfill) in a facility with a capacity of more than 10 tonnes per day.	From receipt of ballast water, through treatment (oil recovery operations) to disposal of treated water and solid waste.
A7	S5.4A(1)(a)(i)	Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by biological treatment	Removal of oil and other chemicals from process water by action of aerobic bacteria within bio-cell.
A8	S5.4 A(1)(ii)	Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by physico - chemical treatment.	From formation of waste water stream, discharge into site drainage systems to discharge of effluents to Milford Haven waterway including interceptors, DAF units and clarifiers.

A9	S1.2 Part B (a) – Blending odorant for use with natural gas or liquefied petroleum gas	Odorising LPG (or natural gas)	From feed to unit to discharge for storage or export
A10	S1.2 Part B (b) – The storage of petroleum in stationary storage tanks at a terminal, or the loading or unloading at a terminal of petrol or from road tankers, rail tankers or inland waterway vessels.	Loading petrol into road tankers	Loading of petrol into road tankers
<b>Directly Associated Activities</b>			
A11	Flaring of gases	Burning of sour and sweet gases at flares.	Hydrocarbon gas recovery compressor, flare headers, knock-out pots and flare stacks and any ancillary equipment.
A12	Cooling water systems	Systems used for cooling.	All cooling water systems including storage, pipelines and equipment, to discharge to ETP.
A13	Lagoons	The holding or temporary storage of water, effluents or oil-based liquids for settling (sedimentation) or other purposes	The feed point to the lagoon(s), the lagoon(s) and its drainage point.
A14	Oxygen or nitrogen generation	Air separation unit	Air separation plant to pipeline(s) delivering nitrogen to process plants
A15	Surface water drainage	Collection and handling of surface waters within installation	Handling and storage of site drainage until discharge to the site waste water treatment system or to discharge off-site.
A16	Water treatment	All water treatment activities	From receipt of raw materials to dispatch to effluents to sewer or site waste water treatment system.
A17	Storage of Hazardous Waste	<b>R13:</b> Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	The waste shall only be stored within designated area(s) agreed in advance in writing with Natural Resources Wales. This activity is only permitted for storage of liquid oil based hazardous wastes. All waste European Waste Classification Codes to be accepted at the site must be agreed in writing in advance. Any agreement is time limited for a period of 28 days, after which a new agreement must be sought if further waste is to be accepted.
A18	Demineralisation Plant	De-mineralising a small flow of softened and filtered water to allow on-line and off-line washing of the CTG and HRSG.	From receipt of softened and filtered water to the delivery at the CTG and HRSG.  Neutralised regeneration fluid from the unit to the existing waste water drain line.

**Table S1.2 Operating techniques**

Description	Parts	Date Received
Application	PCC Application for Pembroke Refinery PPC Supplementary Technical Report: Volume 1 PCC Application for Pembroke Refinery PPC Supplementary Technical Report: Section 2.1 and 2.2 Controls: Volume 2 Application Site Report (Desk Study): Volume 3 of the PPC Application.	21/08/06
Response to Schedule 4 Notice dated 04/01/07	Response to questions 5, 12, 14, 16, 17, 18, 21, 22, 28 and 29.	15/06/07
Variation Application EPR/QP3033LW/V004	Document entitled "Technical proposal Natural Gas Pipeline" dated 23 November 2011	06/01/12
Variation Application EPR/YP3930EX/V002	Supporting documentation: Job Aid – PP-HES-JBA-0004	15/12/15
Response to Regulation 60 Notice	Document entitled "Review of Refinery operations against the Refining of Mineral Oil and Gas" BAT Conclusions	27/05/16
Application	Permit Variation supporting information – Cogen/Permit/Supp/A01	09/05/17
Application	Noise and Vibration impact assessment – Cogen/DNS/Noise/A01	12/06/17
Application	Air Quality Impact Assessment – Cogen/DNS/AQIA/B01	21/06/17
Additional Information	Information received via Schedule 5 notice – noise assessment	08/08/17

**Table S1.3 Improvement programme requirements**

Reference	Requirement	Date
IC33	<p>If residential property at 1 Pleasant View in Rhoscrowther is occupied at the start of operation, then following successful commissioning and establishment of routine steady operation, the operator shall undertake noise monitoring to confirm the conclusions of the application Noise and Vibration Impact Assessment report B01. This shall include:</p> <ul style="list-style-type: none"> <li>• A full noise monitoring survey and assessment meeting BS4142:2014 standard</li> <li>• Narrow band (FFT) measurements to identify and any tonal elements or low frequency noise</li> <li>• Reference to the World Health Organisation guidelines for community noise and night noise</li> </ul> <p>Upon completion of the work, a written report shall be submitted to Natural Resources Wales. The report shall refer to the predictions in the Noise and Vibration Impact Assessment report B01. If rating levels are expected to result in a significant impact in context at sensitive receptors, in an assessment in accordance with BS4142, then the report shall include an assessment of suitable abatement techniques, an estimate of the costs, the expected decibel reduction and a proposed timetable for their installation.</p>	Within 6 months of the completion of commissioning
IC34	The operator shall submit, for approval by Natural Resources Wales, a report setting out compliance with the appropriate BAT-AELs and Annex V of IED in relation to the cogeneration plant (A24).	Within 12 months of the completion of commissioning

**Table S1.4B Pre-operational measures for future development**

<b>Reference</b>	<b>Operation</b>	<b>Pre-operational measures</b>
1	Cogeneration Plant	<p>If residential property 1 Pleasant View in Rhoscrowther is occupied, within 1 month of permit issue, the Operator shall submit to Natural Resources Wales for approval, a written proposal for enhancing the background sound measurements included in the original permit application.</p> <p>The background sound measurements (<math>L_{A90,T}</math>) and residual sound noise level (including tonality), shall be measured over a time period that is sufficiently long enough to obtain a typical background sound level which is representative of the area in which the installation is located. A typical background sound level shall be obtained for all times when the installation will be operational, in accordance with BS4142:2014 but also include diurnal patterns and seasonal variations.</p>
2	Cogeneration Plant	<p>If residential property 1 Pleasant View in Rhoscrowther is occupied, following Natural Resources Wales approval of the written proposal provided in response to PO1 and at least 1 month prior to the commencement of significant noise producing construction activities, the Operator shall measure the background sound level (<math>L_{A90,T}</math>) and residual noise level (<math>L_{Aeq,T}</math>) (including tonality), in order to obtain a representative background sound level. The results of this exercise shall be submitted in the form of a written report for approval to Natural Resources Wales.</p>

## Schedule 2 - Waste types, raw materials and fuels

**Table S2.1 Raw materials and fuels**

Raw materials and fuel description	Specification
Crude oil	
Refinery fuel oil (RFO)	
Refinery fuel gas (RFG)	Less than 200 ppm sulphur (monthly average)
Refinery fuel (all fuels for LCP and other combustion plant)	Equivalent to 1% sulphur or less taking all fuels into account across all combustion plant
Natural Gas	Via Pipeline

**Table S2.1(a) Permitted waste types and quantities to be imported to site for treatment within effluent plant.**

Maximum Quantity	No limit set
Waste code	Description
16 07 08*	Ship ballast water containing oil/Wastes from ship transport tanks containing oil.

## Schedule 3 – Emissions and monitoring

**Table S3.1(a) Point source emissions to air – Steam Plant LCPS [ $>100$  MWth]**

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/A2 (stack 1 – 91.5m above ground level)	Sulphur dioxide	LCP371 and LCP373 boiler plant fired on 100% RFG	35 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
			38.5 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			70 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A3/A4 (stack 6 – 91.5m above ground level)	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP371 and LCP373 boiler plant fired on 100% RFG	300 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
			330 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			600 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A1/A2 and A3/A4	Dust	LCP371 and LCP373 boiler plant fired on 100% RFG	5 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
			5.5 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			10 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		

**Table S3.1(a) Point source emissions to air – Steam Plant LCPs [>100 MWth]**

<b>Emission point ref. &amp; location</b>	<b>Parameter</b>	<b>Source</b>	<b>Limit (including unit)- these limits do not apply during start up or shut down.</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
A1/A2 and A3/A4	Sulphur dioxide	LCP371 and LCP373 boiler plant fired on >0% and ≤50% RFO	1000 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(3) of IED	Calendar monthly mean	Continuous	BS EN 14181
			1100 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			2000 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A1/A2 and A3/A4	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP371 and LCP373 boiler plant fired on >0% and ≤50% RFO	300-450 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(2) of IED	Calendar monthly mean	Continuous	BS EN 14181
			330-495 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			600-900 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A1/A2 and A3/A4	Dust	LCP371 and LCP373 boiler plant fired on >0% and ≤50% RFO	5-50 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(2) of IED	Calendar monthly mean	Continuous	BS EN 14181
			5.5-55 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			10-100 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		



**Table S3.1(a) Point source emissions to air – Steam Plant LCPs [>100 MWth]**

<b>Emission point ref. &amp; location</b>	<b>Parameter</b>	<b>Source</b>	<b>Limit (including unit)- these limits do not apply during start up or shut down.</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
A1/A2 and A3/A4	Sulphur dioxide	LCP371 and LCP373 boiler plant fired on >50% and ≤100% RFO	1000 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(3) of IED	Calendar monthly mean	Continuous	BS EN 14181
			1100 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			2000 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A1/A2 and A3/A4	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP371 and LCP373 boiler plant fired on >50% and ≤100% RFO	450 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(2) of IED	Calendar monthly mean	Continuous	BS EN 14181
			495 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			900 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A1/A2 and A3/A4	Dust	LCP371 and LCP373 boiler plant fired on >50% and ≤100% RFO	50 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(2) of IED	Calendar monthly mean	Continuous	BS EN 14181
			55 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			100 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		

**Table S3.1(a) Point source emissions to air – Steam Plant LCPs [>100 MWth]**

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/A2 and A3/A4	Carbon monoxide	LCP371 and LCP373 boiler plant	-	-	Continuous	BS EN 14181
A24	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP***** Cogeneration Plant Stack <sup>(4)</sup>	50 mg/Nm <sup>3</sup>	Calendar monthly mean <sup>(1)(2)</sup>	Continuous	BS EN 14181
			100 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year <sup>(2)</sup>		
			35 mg/Nm <sup>3</sup>	Annual mean <sup>(1)(3)</sup>		
	50 mg/Nm <sup>3</sup>		Daily mean <sup>(1)(3)</sup>			
	Carbon Monoxide		110 mg/Nm <sup>3</sup>	Daily mean		
	200 mg/Nm <sup>3</sup>		95% of validated hourly averages within a calendar year <sup>(2)</sup>			
		100 mg/Nm <sup>3</sup>	Monthly mean <sup>(2)</sup>			

- (1) This may be achieved as part of the site's integrated emissions management plan for NO<sub>x</sub> emitters under BATc 57 of the adopted refineries BRef.
- (2) For single cycle gas turbines having an efficiency greater than 35 % – determined at ISO base load conditions – the emission limit value for NO<sub>x</sub> shall be  $50\eta/35$  where  $\eta$  is the gas turbine efficiency at ISO base load conditions expressed as a percentage.
- (3) For single cycle gas turbines having an efficiency greater than 39 % – determined at ISO base load conditions – the emission limit value for NO<sub>x</sub> shall be  $BAT-AEL\eta/39$  where  $\eta$  is the gas turbine efficiency at ISO base load conditions expressed as a percentage
- (4) Reference conditions for natural gas as per LCP BRef Conditions

**Table S3.1(b) Point source emissions to air – Black Oils Stack LCP [ $>100$  MWth]**

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
A7/A8/A9/ A10 (stack 8 – 158.5m above ground level) A7/A8 – crude distillation unit A9– vacuum distillation unit A10 - visbreaker unit	Sulphur dioxide	LCP375 fired heaters on 100% RFG	35 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
			38.5 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			70 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP375 (crude distillation unit) fired heaters on 100% RFG	300 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
			330mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			600 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Dust	LCP375 fired heaters on 100% RFG	5 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
			5.5 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			10 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Sulphur dioxide	LCP375	1000 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
			1100 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		

**Table S3.1(b) Point source emissions to air – Black Oils Stack LCP [>100 MWth]**

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
		fired heaters on any VDU off gas in combination with RFG	2000 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP375	300 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
		fired heaters on any VDU off gas in combination with RFG	330 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			600 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Dust	LCP375	5 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
		fired heaters on any VDU off gas in combination with RFG	5.5 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			10 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Sulphur dioxide	LCP375	1000 mg/Nm <sup>3</sup>	Calendar monthly mean	Continuous	BS EN 14181
		fired heaters on >0% and ≤50% RFO	Emission limit values calculated in accordance with Article 40(3) of IED			
			1100 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			2000 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		

**Table S3.1(b) Point source emissions to air – Black Oils Stack LCP [>100 MWth]**

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
A7/A8/A9/A10	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP375 fired heaters on >0% and ≤50% RFO	300-450 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(2) of IED	Calendar monthly mean	Continuous	BS EN 14181
			330-495 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			600-900 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Dust	LCP375 fired heaters on >0% and ≤50% RFO	5-50 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(2) of IED	Calendar monthly mean	Continuous	BS EN 14181
			5.5-55 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			10-100 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Sulphur dioxide	LCP375 fired heaters on >50% and ≤100% RFO	1000 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(3) of IED	Calendar monthly mean	Continuous	BS EN 14181
			1100 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			2000 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		

**Table S3.1(b) Point source emissions to air – Black Oils Stack LCP [>100 MWth]**

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
A7/A8/A9/A10	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP375 fired heaters on >50% and ≤100% RFO	450 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(2) of IED	Calendar monthly mean	Continuous	BS EN 14181
			495 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			900 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Dust	LCP375 fired heaters on >50% and ≤100% RFO	50 mg/Nm <sup>3</sup> Emission limit values calculated in accordance with Article 40(2) of IED	Calendar monthly mean	Continuous	BS EN 14181
			55 mg/Nm <sup>3</sup>	Daily mean of validated hourly averages		
			100 mg/Nm <sup>3</sup>	95% of validated hourly averages within a calendar year		
A7/A8/A9/A10	Carbon monoxide	LCP375	-	-	Continuous	BS EN 14181

**Table S3.1(c) Point source emissions to air – White Oils LCP [≥ 50 MWth <100 MWth]**

<b>Emission point ref. &amp; location</b>	<b>Parameter</b>	<b>Source</b>	<b>Limit (including unit)-these limits do not apply during start up or shut down.</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
A12 – platformer (stack 9 – 162m above ground level)	Sulphur dioxide	LCP372 fired heaters on 100% RFG	38.5 mg/Nm <sup>3</sup>		At least every 6 months	BS EN 14791
A12	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP372 fired heaters on 100% RFG	330 mg/Nm <sup>3</sup>		At least every 6 months	BS EN 14792
A12	Dust	LCP372 fired heaters on 100% RFG	5.5 mg/Nm <sup>3</sup>		At least every 6 months	BS EN 13284-1
A12	Carbon monoxide	LCP372 fired heaters on RFG	-	-	At least every 6 months	BS EN 15058

**Table S3.1(d) Point source emissions to air from C&O LCP  $\geq 50 < 100$  MWth**

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
A6 (stack 7 – 167.3m above ground level)	Sulphur dioxide	LCP374 heaters fired on 100% RFG	38.5 mg/Nm <sup>3</sup>	-	At least every 6 months	BS EN 14791
A6	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP374 – heaters fired on 100% RFG	330 mg/Nm <sup>3</sup>	-	At least every 6 months	BS EN 14792
A6	Dust	LCP374 heaters fired on 100% RFG	5.5 mg/Nm <sup>3</sup>	-	At least every 6 months	BS EN 13284-1
A6	Carbon monoxide	LCP374 heaters fired on 100% RFG	-	-	At least every 6 months	BS EN 15058

**Table S3.1(e) Point source emissions to air (not Chapter III) Not LCP**

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
A5a (stack 7 - 167.3 metres above ground level)	Sulphur Dioxide (SO <sub>2</sub> )	FCCU Catalyst Regenerator	4600mg/Nm <sup>3</sup>	Hourly mean	Continuous	BS EN 14181
	NO <sub>x</sub>		No limit set			
	Dust		No limit set			
	CO		No limit set			



**Table S3.1(e) Point source emissions to air (not Chapter III) Not LCP**

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
A6A (Stack 7 - 167.3 metres above ground level)	Sulphur Dioxide (SO <sub>2</sub> )	SRU	25,000mg/Nm <sup>3</sup>	Hourly mean	Continuous	BS EN 14181
	SO <sub>3</sub>		No limit set	Average over sampling period	6-monthly	
A11 (Stack 9 - 162 metres above ground level)	Sulphur dioxide (SO <sub>2</sub> )	Hydrotreater 1 and Unifier	No limit set	Average over sampling period	Annually	BS6069-4.4:1993
	Oxides of nitrogen (as NO <sub>2</sub> )		No limit set			ISO 10849: 1996
	Dust		No limit set			BS ISO 9096
	Carbon monoxide		No limit set			Average over sampling period
A13 (Stack 9 - 162 metres above ground level)	Sulphur dioxide	Hydrotreater 2	38.5mg/Nm <sup>3</sup>	Average over sampling period	6-monthly	BS EN 14181
	Oxides of nitrogen (as NO <sub>2</sub> )		330mg/Nm <sup>3</sup>			
	Dust		5.5mg/Nm <sup>3</sup>			
	Carbon monoxide		No limit set			
A14 (CCR vent)	Hydrogen chloride	Continuous Catalytic Regenerator (Platformer)	No limit set	Average over sampling period	6-monthly	US EPA Method 26
A15 (Acid flare)	Sulphur dioxide, nitrogen oxides, Carbon monoxide, dust	Flares	No monitoring required during normal operation			

**Table S3.1(e) Point source emissions to air (not Chapter III) Not LCP**

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 (Sour flare)	Sulphur dioxide, nitrogen oxides, carbon monoxide, dust	Flares				No monitoring required during normal operation
A17 (Sweet flare)	Sulphur dioxide, nitrogen oxides, carbon monoxide, dust	Flares				No monitoring required during normal operation
A18 (Benzene VRU)	VOC, benzene	Benzene ship loading VRU	No limit set	Average over sampling period	6-monthly (during loading)	BS EN13649
A19 (Stack 10 - 70 metres above ground level)	Sulphur dioxide	ULSG	No limit set	Average over sampling period	6-monthly	BS6069-4.4:1993
	Oxides of nitrogen (as NO <sub>2</sub> )					ISO 10849: 1996
	Dust					BS ISO 9096
	Carbon monoxide					ISO 12039
A20 (Road loading VRU)	VOC	Road tanker loading VRU	No limit set	Average over sampling period	6-monthly (during loading)	BS EN13649
Vents from oil storage tanks	VOC	Storage tanks	No monitoring required			
Floating roof tanks	VOC	Storage tanks	No monitoring required			
Process Relief valves	VOC, Sour gas	Refining process	No benzene to be vented No Class A VOC to be vented	No monitoring required		

**Table S3.1(e) Point source emissions to air (not Chapter III) Not LCP**

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
Sour flare, Sweet flare, Alky flare combined	Flares	SO <sub>2</sub>	3.1Te SO <sub>2</sub> /hour equivalent	During periods of flaring	-	-

**Table S3.1(f) Point source emissions to air – emission limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A1, A2, A3, A4, A5, A6, A7, A8, A9/A10, A11, A12, A13, A19	Sulphur dioxide	Site operations	Bubble 1910mg/Nm <sup>3</sup>	Hourly mean	Continuous	As agreed in response to IC7

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

Emission point ref. & location	Parameter	Source	Limit (incl. unit)	Reference Period	Monitoring frequency	Monitoring standard or method
W1 discharge to Milford Haven waterway	Flow	Effluent treatment plant	25,000m <sup>3</sup> /day	Weekly average of daily flow	Daily	
	Temperature		35°C	Daily average	Continuous	
	pH		6 –9	24-hour proportional sample	Daily	Test method 300
	Oil		17 mg/l			Test method 315
	Ammoniacal Nitrogen (as N)		20 mg/l			Test method 335
	COD		270 mg/l			Test method 316
	Phenols		3 mg/l			Test method 395
	Suspended solids		85 mg/l	24-hour proportional sample	Weekly average of daily samples	Test method 312
	Sulphides		1 mg/l			Test method 343

	Fluoride		15 mg/l			Test method 320
	Cyanide		250µg/l			Test method 309
	Iron		2.5mg/l	7-day composite sample	Quarterly	Test method 350
	Copper		80 µg/l			Atomic absorption spectrophotometry
	Zinc		560 µg/l			
	Nickel		85 µg/l			
	Arsenic		TBC			
	Chromium		TBC			
	Lead		TBC			
	Mercury and its compounds expressed as Mercury (Total Hg)		TBC			
	Cadmium and its compounds, expressed as cadmium (Total Cd)		TBC	No limit set		
W2 Pwllcrochan weir	Oil	Surface water run-off/failure of weir returning pumps	5 mg/l	Spot	3- hourly samples during emergency discharge	Test method 315
W3 West reservoir overflow.	Oil	Emergency discharge surface water lagoon	5mg/l	Spot	3-hourly samples during discharge	Test method 315

## Schedule 4 – Reporting

**Table S4.1 (a) Reporting of monitoring data - LCP**

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Oxides of nitrogen	A1, A2, A3, A4, A7, A8, A9, A10, A24	Every 3 months for continuous monitoring	1 January, 1 April, 1 July, 1 October
Oxides of nitrogen	A6, A12	Every 6 months for periodic monitoring	1 January, 1 July
Carbon monoxide	A1, A2, A3, A4, A7, A8, A9, A10, A24	Every 3 months for continuous monitoring	1 January, 1 April, 1 July, 1 October
Carbon monoxide	A6, A12	Every 6 months for periodic monitoring	1 January, 1 July
Sulphur dioxide	A1, A2, A3, A4, A7, A8, A9, A10	Every 3 months for continuous monitoring	1 January, 1 April, 1 July, 1 October
Sulphur dioxide	A6, A12	Every 6 months for periodic monitoring	1 January, 1 July
Dust	A1, A2, A3, A4, A7, A8, A9, A10	Every 3 months for continuous monitoring	1 January, 1 April, 1 July, 1 October
Dust	A6, A12	Every 6 months for periodic monitoring	1 January, 1 July

**Table S4.2 – Annual production/treatment**

Parameter	Units
Road and other transport fuels	Tonnes
Non-transport/heating fuels	Tonnes
Chemical/petrochemical feedstock	Tonnes
Bitumen/pet coke/other heavy-end products	Tonnes

**Table S4.3 – Performance parameters**

Parameter	Frequency	Units
Crude oil and other oil import (i.e. feedstock)	Annually	Tonnes
Water usage	Annually	Tonnes/tonne feedstock
Energy usage (electrical)	Annually	MWh/tonne feedstock
Energy usage (all fuels)	Annually	MJ/tonne feedstock
Total effluent flow to water	Annually	m <sup>3</sup> /tonne feedstock
Total release of oil to water per tonne of feedstock	Annually	g oil/tonne feedstock
Annual emissions and fuel usage of LCP	Annually	Tonnes
Calculation of NO <sub>x</sub> factors	Annually	Kg/Te fuel

**Table S4.1 (b) Reporting of monitoring data – non-LCP**

<b>Parameter</b>	<b>Emission or monitoring point/reference</b>	<b>Reporting period</b>	<b>Period begins</b>
Emissions to air (spot sample) – SO <sub>2</sub> Parameters as required by condition 3.6.1.	A11, A13, A19	Every 12 months	1 January
Emissions to air (continuous) – SO <sub>2</sub> Parameters as required by condition 3.6.1.	A5, A6A	Every 3 months	1 January, 1 April, 1 July, 1 October
Emissions to air (hourly bubble) – SO <sub>2</sub> Parameters as required by condition 3.6.1.	Combined emissions from Stack 1, Stack 6, Stack 7, Stack 8, Stack 9, Stack 10	Every 3 months	1 January, 1 April, 1 July, 1 October
Emissions to air (spot sample) – SO <sub>3</sub> Parameters as required by condition 3.6.1.	A6A	Every 12 months	1 January
Emissions to air (spot sample) - NO <sub>x</sub> Parameters as required by condition 3.6.1.	A11, A13, A19	Every 12 months	1 January
Emissions to air (continuous) - NO <sub>x</sub> Parameters as required by condition 3.6.1.	A5	Every 3 months	1 January, 1 April, 1 July, 1 October
Emissions to air (spot sample) – Dust Parameters as required by condition 3.6.1.	A11, A13, A19	Every 12 months	1 January
Emissions to air (continuous) – Dust Parameters as required by condition 3.6.1.	A5	Every 3 months	1 January, 1 April, 1 July, 1 October
Emissions to air (spot sample) - CO Parameters as required by condition 3.6.1.	A11, A13, A19	Every 12 months	1 January
Emissions to air (spot sample) – HCl Parameters as required by condition 3.6.1.	A14	Every 12 months	1 January
Emissions to air (spot sample) - VOC Parameters as required by condition 3.6.1.	A18, A20	Every 12 months	1 January
Emissions to water – flow, temperature Parameters as required by condition 3.6.1	W1	Every 3 months for periodic monitoring	1 January, 1 April, 1 July, 1 October

**Table S4.1 (b) Reporting of monitoring data – non-LCP**

<b>Parameter</b>	<b>Emission or monitoring point/reference</b>	<b>Reporting period</b>	<b>Period begins</b>
Emissions to water – pH and Hydrocarbon Oil Index Parameters as required by condition 3.6.1	W1	Every 3 months for periodic monitoring	1 January, 1 April, 1 July, 1 October
Emissions to water – suspended solids Parameters as required by condition 3.6.1	W1	Every 3 months for periodic monitoring	1 January, 1 April, 1 July, 1 October
Emissions to water – Total Nitrogen (as N), COD and Phenols Parameters as required by condition 3.6.1	W1	Every 3 months for periodic monitoring	1 January, 1 April, 1 July, 1 October
Emissions to water – sulphide, fluoride, cyanide Parameters as required by condition 3.6.1	W1	Every 3 months for periodic monitoring	1 January, 1 April, 1 July, 1 October
Emissions to water – iron, nickel, copper, zinc, vanadium, arsenic, chromium and lead. Parameters as required by condition 3.6.1	W1	Every 3 months for periodic monitoring	1 January, 1 April, 1 July, 1 October
Emissions to cadmium, mercury Parameters as required by condition 3.6.1	W1	Every 3 months for periodic monitoring	1 January, 1 April, 1 July, 1 October

**Table S4.4 Reporting forms**

<b>Media/parameter</b>	<b>Reporting format</b>	<b>Starting Point</b>	<b>NRW recipient</b>	<b>Date of form</b>
Air & Energy	As agreed with NRW	01/01/16	SI	31/12/15
LCP	As agreed with NRW	01/01/16	SI	31/12/15
Air	As agreed with NRW	01/01/16	SI	31/12/15
CEMs	As agreed with NRW	01/01/16	SI	31/12/15
LCP	As agreed with NRW	01/01/16	SI	31/12/15
Air	As agreed with NRW	01/01/16	SI	31/12/15
Air	As agreed with NRW	01/01/16	SI	31/12/15
Water	As agreed with NRW	01/01/16	SI	31/12/15
Multi-fuel firing	As agreed with NRW	01/01/16	SI	31/12/15

# Schedule 5 - Notification

These pages outline the information that the operator must provide.

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

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

## Part A

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

<b>(a) Notification requirements for any activity that gives rise to an incident or accident which significantly affects or may significantly affect the environment</b>	
<b>To be notified immediately</b>	
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>(b) Notification requirements for the breach of a permit condition</b>	
<b>To be notified immediately</b>	
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	



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

(c) In the event 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:	
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.	

<b>Name*</b>	
<b>Post</b>	
<b>Signature</b>	
<b>Date</b>	

\* authorised to sign on behalf of the operator

### Part C - Malfunction or Breakdown of LCP abatement equipment

Permit Number	
Name of operator	
Location of Facility	
LCP Number	
Malfunction or breakdown	
Date of malfunction or breakdown	

<b>(a) Notification requirements for any malfunction and breakdown of abatement equipment as defined by the Industrial Emission Directive*.</b>	
<b>To be notified within 48 hours of abatement equipment malfunction and breakdown</b>	
Time at which malfunction or breakdown commenced	
Time at which malfunction or breakdown ceased	
Duration of the breakdown event in hours and minutes	
Reasons for malfunction or breakdown	
Where the abatement plant has failed, give the hourly average concentration of all measured pollutants.	
Cumulative breakdown operation in current year (at end of present event)	
Cumulative malfunction operation in current year (at end of present event)	
<b>Name**</b>	
<b>Post</b>	
<b>Signature **</b>	
<b>Date</b>	

\* See section 3.6 and Appendix E of ESI Compliance Protocol for guidance

\*\* authorised to sign on behalf of the operator

## Schedule 6 - Interpretation

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

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

“*authorised officer*” means any person authorised by 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.

“*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.

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

“*Combustion Technical Guidance Note*” means IPPC Sector Guidance Note Combustion Activities, version 2.03 dated 27<sup>th</sup> July 2005 published by Environment Agency.

“*disposal*”. 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.

“*dynamic emission limit value*” (DELV) means an emission limit that varies in accordance with Article 40 of the Industrial Emissions Directive.

“*emissions to land*” includes emissions to groundwater.

“*energy efficiency*” the ISO base load net plant efficiency means the performance value established by acceptance testing following improvements made to the plant that could affect the efficiency.

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

“*EP Regulations*” means The Environmental Permitting (England and Wales) Regulations SI 2010 No.675 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

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

“*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.

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

“*mcr*” means maximum continuous rating.

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

“*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

“*recovery*” means any of the operations provided for in Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

*“SI” means site inspector*

*“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.

*“year”* means calendar year ending 31 December.

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

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

1. 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, except in the case of coke oven under firing where the reference oxygen level is 5% dry and sinter plant emissions at 17%,
2. 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.
3. *“assessment year”* means any complete calendar year except that the first assessment year for the purposes of this permit shall run from 1 October 2006 until 31<sup>st</sup> December 2007
4. *“CEN”* means Comité Européen de Normalisation
5. *“central office”* means an address for reporting forms for the attention of Natural Resources Wales head office staff, which has been separately notified to the operator.
6. *“combustion technical guidance note”* means IPPC Sector Guidance Note Combustion Activities, version 2.03 dated 27th July 2005 published by The Environment Agency.
7. *“operational hours”* of an LCP is the time spent between start up and shut down of the LCP.

## Schedule 7 – Site Plan



END OF PERMIT



