Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Essar Oil (UK) Limited

Stanlow Manufacturing Complex
PO Box 3
Ellesmere Port
Cheshire
CH65 4HB

Variation application number

EPR/FP3139FN/V008

Permit number

EPR/FP3139FN

Stanlow Manufacturing Complex
Permit number EPR/FP3139FN

Introductory note

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

Under the Environmental Permitting (England & Wales) Regulations 2016 (schedule 5, part 1, paragraph 19) a variation may comprise a consolidated permit reflecting the variations and a notice specifying the variations included in that consolidated permit.

Schedule 1 of the notice specifies that all the conditions of the permit have been varied and schedule 2 comprises a consolidated permit which reflects the variations being made and contains all conditions relevant to this permit.

The requirements of the Industrial Emissions Directive (IED) 2010/75/EU are given force in England through the Environmental Permitting (England and Wales) Regulations 2016 (the EPR).

This Permit, for the operation of an oil refinery which includes large combustion plant (LCP), as defined by articles 28 and 29 of the Industrial Emissions Directive (IED), is varied by the Environment Agency to implement the special provisions for LCP given in the IED. The IED makes 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 Operator has chosen to operate this LCP under the ELV compliance route.

As well as implementing Chapter III of IED, the consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issued. It also modernises all conditions to reflect the conditions contained in our current generic permit template.

The variation notice uses updated LCP numbers in accordance with the most recent EIONET references. The LCP references have changed as follows:

- LCP 29 is changed to LCP 138;
- LCP 30 is changed to LCP 139;
- LCP 31 is changed to LCP 140;
- LCP 32 is changed to LCP 141;
- LCP 33 is changed to LCP 142; and
- LCP 34 is changed to LCP 143.

The rest of the installation is unchanged and continues to be operated as follows:

Stanlow Manufacturing Complex is situated south of the Mersey estuary near Ellesmere Port and is operated by Essar Oil (UK) Limited. The installation processes crude oil in a refinery which includes a fluid catalytic cracker, alkylation unit, platformer and hydrodesulpherisation plant.

The refinery is integrated with adjoining chemicals plants described below and process waste is incinerated at the complex. Crude oil is received from a separate EPR installation at the Tranmere oil terminal on the Mersey and is transferred by pipeline to storage at the installation. Finished products are exported by pipeline then transported either by road tanker from the loading terminal or by water via the Manchester Ship Canal.

The site effluent is treated by a combination of physico-chemical and biological treatments on site and off site. Treated effluent is discharged to the River Gowy, Manchester Ship Canal or the Ellesmere Port Waste Water Treatment Works dependant on composition.

Main environmental issues at the site are the airborne emissions of sulphur dioxide, oxides of nitrogen, particulates and volatile organic compounds, the efficiency of energy use and the prevention, and reduction, of contamination of water.

The Mersey Estuary is within 10km of the site and identified as a Special Protection Area (SPA) and Ramsar site.

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.

Status log of the permit		
Description	**Date**	**Comments**
Application NP3237LS (EPR/NP3237LS/A001)	Duly Made 20/09/06	
Additional Information Received		25/01/07
Additional Information Received		01/03/07
Additional Information Received		02/05/07
Additional Information Received		07/07/07
Additional Information Received		08/08/07
Additional Information Received		11/09/07
Additional Information Received		30/11/07
Permit determined NP3237LS (EPR/NP3237LS)	21/12/07	
Application EPR/NP3237LS/V002	Received 22/12/08	
Variation EPR/NP3237LS/V002 issued	23/12/08	
Application EPR/FP3139FN/T001 (full transfer of permit EPR/NP3237LS)	Duly made 27/07/2011	
Additional information relating to technical and financial capability plus specific asset management	28/07/11	
Transfer determined EPR/FP3139FN/T001	01/08/11	
Application EPR/FP3139FN/V002	24/11/11	Application to vary and reduce the flow and monitoring frequency for outlet W3 (N38) in Table S4.2
Variation determined EPR/FP3139FN/V002	27/01/12	Varied permit issued.
Application EPR/FP3139FN/V003 (variation)	Duly made 21/11/11	Application to vary and update the permit to modern conditions.
Variation determined EPR/FP3139FN/V003	22/03/12	Varied permit issued.
Variation EPR/FP3139FN/V004 issued.	28/12/12	Environment Agency led variation.
Variation determined EPR/FP3139FN/V005	31/03/14	Varied and consolidated permit issued in modern condition format.
Variation determined EPR/FP3139FN/V006	08/04/14	Varied and consolidated permit issued in modern condition format.

Status log of the permit		
Description	**Date**	**Comments**
Regulation 60 Notice sent to the Operator	05/08/15	Issue of a Notice under Regulation 60(1) of the EPR. Environment Agency 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.
Regulation 60 Notice response	30/09/15	Response received from the Operator. Methodology for assigning periods of start up and shutdown provided in Notes section for each LCP of the response.
Additional information received	01/10/15 15/10/15 04/11/15 26/11/15 15/12/15 06/10/16 04/11/16 16/12/16 13/01/17	Response to request for further information: Corrected data for LCP143 (SHOP) Worked example for LCP emission limit value calculation Response to the additional questions Additional information Additional information including LCP140 (HPBH) rating IED LCP Response Letter including fuels & LCP140 (HPBH) operations and fuel mix LCP140 (HPBH) Representative emission limit value demonstration LCP140 (HPBH) improvements commitment Annual LCP140 (HPBH) NOx emission limit
Part surrender application EPR/FP3139FN/S007	Duly made 06/05/16	Application to surrender land and amend permitted area.
Part surrender determined EPR/FP3139FN/S007 PAS/Billing ref: LP3139DA	13/09/16	Part surrender complete.
Variation determined EPR/FP3139FN/V008 (PAS Billing ref: JP3530RD)	03/03/17	Varied and consolidated permit issued in modern condition format. Variation effective from 03/03/2017

End of introductory note

Notice of variation and consolidation

The Environmental Permitting (England and Wales) Regulations 2016

The Environment Agency in exercise of its powers under regulation 20 of the Environmental Permitting (England and Wales) Regulations 2016 varies and consolidates

Permit number

EPR/FP3139FN

Issued to

Essar Oil (UK) Limited ("the operator")

whose registered office is

5th Floor
The Administration Building
Stanlow Manufacturing Complex
Ellesmere Port
Cheshire
CH65 4HB

company registration number **07071400**

to operate an Installation at

Stanlow Manufacturing Complex
PO Box 3
Ellesmere Port
Cheshire
CH65 4HB

to the extent set out in the schedules.

The notice shall take effect from 01/01/2016

Name	Date
Martin Jenkins, Principal Permitting Team Leader	**03/03/2017**

Authorised on behalf of the Environment Agency

Schedule 1

All conditions have been varied by the consolidated permit as a result of an Environment Agency initiated variation.

Schedule 2 – consolidated permit

Consolidated permit issued as a separate document.

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/FP3139FN

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/FP3139FN/V008 authorising,

Essar Oil (UK) Limited ("the operator"),

whose registered office is

5th Floor
The Administration Building
Stanlow Manufacturing Complex
Ellesmere Port
Cheshire
CH65 4HB

company registration number **07071400**

to operate an installation at

Stanlow Manufacturing Complex
PO Box 3
Ellesmere Port
Cheshire
CH65 4HB

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

Name	Date
Martin Jenkins, Principal Permitting Team Leader	**03/03/2017**

Authorised on behalf of the Environment Agency

Conditions

1. Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

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

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

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

1.2 Energy efficiency

1.2.1 The operator shall:

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

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

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

1.3 Efficient use of raw materials

1.3.1 The operator shall:

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

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

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

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

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

1.4.1 The operator shall take appropriate measures to ensure that:

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

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

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

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

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").

2.1.2 Waste authorised by this permit in condition 2.3.6 shall be clearly distinguished from any other waste on the site.

2.1.3 Hazardous waste shall not be mixed, either with a different category of hazardous waste or with other waste, substances or materials, unless it is authorised by schedule 1 table S1.1 and appropriate measures are taken.

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green, excluding the land shown edged red, on the site plan at schedule 7 to this permit.

2.3 Operating techniques

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

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

2.3.2 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 For the following activities referenced in schedule 1, table S1.1: LCP 139 stand by liquid fuel may be used for periods of up to 240 hours per calendar year in accordance with section 6 of 'IED Chapter III Protocol for Multi-fuel Firing Refinery Combustion Plants granted a Permit prior to 7th January 2013'. Version 5 or any later version unless otherwise agreed in writing by the Environment Agency ('the MFF Protocol').

2.3.4 For the following activities referenced in schedule 1, table S1.1: LCP 138, LCP 139, LCP 140, LCP 141, LCP 142 and LCP 143 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.

2.3.5 The following activities referenced in schedule 1, table S1.1: LCP 138 and LCP 141 (HVI only) shall not take place until the operator has submitted a report in writing to the Environment Agency demonstrating compliance with the requirements of this Permit and has obtained written approval from the Environment Agency.

2.3.6 For the following activity referenced in schedule 1, table S1.1: "incineration of hazardous waste". Waste shall only be accepted if:

(a) it is of a type and quantity listed in schedule 2 table(s) S2.2 and S2.3; and

(b) it conforms to the description in the documentation supplied by the producer and holder.

2.3.7 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.

2.3.8 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.

2.3.9 For the following activity referenced in schedule 1, table S1.1: “incineration of hazardous waste”: The operator shall burn only those hazardous wastes where the throughputs, calorific values and pollutant compositions are within the ranges specified in table S2.3 of schedule 2.

2.3.10 For the following activity referenced in schedule 1, table S1.1: “incineration of hazardous waste”: Waste shall not be charged, or shall cease to be charged, if:

(a) the combustion chamber temperature is below, or falls below, 850^{o}C for non-hazardous waste or hazardous waste where the content of halogenated organic substances (as chlorine) does not exceed 1%,; or

(b) any continuous emission limit value in schedule 3 table S3.1(a) is exceeded; or

(c) any continuous emission limit value in schedule 3 table S3.1 is exceeded, other than under abnormal operating conditions; or

(d) monitoring results required to demonstrate compliance with any continuous emission limit value in schedule 3 table S3.1 are unavailable other than under abnormal operating conditions.

2.3.11 For the following activity referenced in schedule 1, table S1.1: “incineration of hazardous waste”: The operator shall have at least one auxiliary burner in each line at start up or shut down or whenever the operating temperature falls below that specified in condition 2.3.10, as long as incompletely burned waste is present in the combustion chamber. Unless the temperature specified in condition 2.3.10 is maintained in the combustion chamber, such burner(s) may be fed only with fuels which result in emissions no higher than those arising from the use of gas oil, liquefied gas or natural gas.

2.3.12 For the following activity referenced in schedule 1, table S1.1: “incineration of hazardous waste”. The operator shall record the beginning and end of each period of “abnormal operation”.

2.3.13 For the following activity referenced in schedule 1, table S1.1: “incineration of hazardous waste”: During a period of “abnormal operation”, the operator shall restore normal operation of the failed equipment or replace the failed equipment as rapidly as possible.

2.3.14 For the following activity referenced in schedule 1, table S1.1: “incineration of hazardous waste”: Where, during “abnormal operation”, on an incineration line, any of the following situations arise, waste shall cease to be charged on that line until normal operation can be restored:

(a) continuous measurement shows that an emission exceeds any emission limit value in schedule 3 table S3.1 due to disturbances or failures of the abatement systems, or continuous emission monitor(s) are out of service, as the case may be, for a total of 4 hours uninterrupted duration;

(b) the cumulative duration of “ abnormal operation” periods over 1 calendar year has reached 60 hours;

(c) continuous measurement shows that an emission exceeds any emission limit value in schedule 3 table S3.1 (a) due to disturbances or failures of the abatement systems;

(d) continuous emission monitors or alternative techniques to demonstrate compliance with the emission limit value(s) for particulates, TOC and / or CO in schedule 3 table S3.1(a), as detailed in the application or as agreed in writing with the Environment Agency, are unavailable.

2.3.15 For the following activity referenced in schedule 1, table S1.1: “incineration of hazardous waste”. The operator shall interpret the end of the period of “abnormal operation” as the earliest of the following:

(a) when the failed equipment is repaired and brought back into normal operation;

(b) when the operator initiates a shutdown of the waste combustion activity, as described in the application or as agreed in writing with the Environment Agency;

(c) when a period of four hours has elapsed from the start of the “abnormal operation”;

(d) when, in any calendar year, an aggregated period of 60 hours “abnormal operation” has been reached .

2.3.16 For the following activity referenced in schedule 1, table S1.1: “incineration of hazardous waste” Bottom ash and APC residues shall not be mixed.

2.4 Improvement programme

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

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

2.5 Pre-operational conditions

2.5.1 The 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, S3.2 and S3.3.

3.1.2 The limits given in schedule 3 shall not be exceeded.

3.1.3 Where a substance is specified in schedule 3 tables S3.2 or S3.3 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 Total annual emissions from the emission point(s) set out in tables schedule 3 S3.1, S3.2 and S3.3 of a substance listed in schedule 3 table S3.4 shall not exceed the relevant limit in table S3.4.

3.1.5 Wastes produced at the site shall, as a minimum, be sampled and analysed in accordance with schedule 3 table S 3.6 Additional samples shall be taken and tested and appropriate action taken, whenever:

(a) disposal or recovery routes change; or

(b) it is suspected that the nature or composition of the waste has changed such that the route currently selected may no longer be appropriate.

3.2 Emissions of substances not controlled by emission limits

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

3.2.2 The operator shall:

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

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

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

3.2.4 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

3.3 Odour

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

3.3.2 The operator shall:

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

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

3.4 Noise and vibration

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

3.4.2 The operator shall:

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

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

3.5 Monitoring

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

(a) point source emissions specified in tables S3.1, S3.2 and S3.3;

(b) process monitoring specified in table S3.5;

(c) residue quality in table S3.6

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

3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate) unless otherwise agreed in writing by the Environment Agency. Newly installed CEMs, or CEMs replacing existing CEMs, shall have MCERTS certification and have an MCERTS certified range which is not greater than 1.5 times the daily emission limit value (ELV) specified in schedule 3 table S3.1. The CEM shall also be able to measure instantaneous values over the ranges which are to be expected during all operating conditions. If it is necessary to use more than one range setting of the CEM to achieve this requirement, the CEM shall be verified for monitoring supplementary, higher ranges.

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, S3.2 and S3.3 unless otherwise agreed in writing by the Environment Agency.

3.5.5 Where Continuous Emission Monitors are installed to comply with the monitoring requirements for the incineration of waste. in schedule 3 table S3.1; the Continuous Emission Monitors shall be used such that;

(a) the values of the 95% confidence intervals of a single measured result at the daily emission limit value shall not exceed the following percentages:

- Carbon monoxide 10%
- Sulphur dioxide 20%
- Oxides of nitrogen (NO & NO2 expressed as NO2) 20%
- Dust 30%
- Total organic carbon (TOC) 30%
- Hydrogen chloride 40%

(b) valid half-hourly average values shall be determined within the effective operating time (excluding the start-up and shut-down periods) from the measured values after having subtracted the value of the confidence intervals in condition 3.5.5 (a);

(c) where it is necessary to calibrate or maintain the monitor and this means that data are not available for a complete half-hour period, the half-hourly average shall in any case be considered valid if measurements are available for a minimum of 20 minutes during the half-hour period. The number of half-hourly averages so validated shall not exceed 5 per day;

(d) daily average values shall be determined as the average of all the valid half-hourly average values within a calendar day. The daily average value shall be considered valid if no more than five half-hourly average values in any day have been determined not to be valid;

(e) no more than ten daily average values per year shall be determined not to be valid.

3.6 Monitoring for the purposes of Chapter III 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 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 the Environment Agency 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 the Environment Agency 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 the Environment Agency.

3.6.6 Where required by a condition of this permit to check the measurement equipment the operator shall submit a report to the Environment Agency 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, table S3.1; the Continuous Emission Monitors shall be used such that:

- for the continuous measurement systems fitted to the LCP release points defined in Table S3.1 the validated hourly, monthly and daily averages shall be determined from the measured valid hourly average values after having subtracted the value of the 95% confidence interval;
- the 95% confidence interval for nitrogen oxides and sulphur dioxide of a single measured result shall be taken to be 20%;
- the 95% confidence interval for dust releases of a single measured result shall be taken to be 30%;
- the 95% confidence interval for carbon monoxide releases of a single measured result shall be taken to be 10%;
- 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 (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
- 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 the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) off-site environmental effects; and

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

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

4.2 Reporting

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

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to the Environment Agency by 31 January (or other date agreed in writing by the Environment Agency) each year. The report(s) shall include as a minimum:

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

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

(c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.5 of that schedule;

(d) the total annual emissions from, and total amount of energy input to each Large Combustion Plant in accordance with the requirements of Chapter III of the IED set out in schedule 4 table S4.4 using the forms specified in table S4.5 of that schedule; and

(e) the functioning and monitoring of the incineration plant in a format agreed with the Environment Agency. The report shall, as a minimum requirement give an account of the running of the process and the emissions into air and water compared with the emission standards in the IED.

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

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

(b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.5 ; and

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

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

4.2.5 Within 1 month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter, if during that quarter the total amount accepted exceeds 100 tonnes of non-hazardous waste or 10 tonnes of hazardous waste.

4.3 Notifications

4.3.1 The Operator shall

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

(i) inform the Environment Agency,

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

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

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

(i) inform the Environment Agency, and

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

(c) 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, 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) any incident which has led to a period of abnormal operation of the incineration plant.

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

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

Where the operator is a registered company:

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

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

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

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

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

In any other case:

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

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

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

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

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

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

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

4.3.7 Where the operator has entered into a climate change agreement with the Government, the Environment Agency 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 the Environment Agency 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 "without delay", in which case it may be provided by telephone.

Schedule 1 - Operations

Table S1.1 activities		
Activity listed in Schedule 1 of the EP Regulations	**Description of specified activity**	**Limits of specified activity**
S1.1 A1 (a)	Burning any fuel in an appliance with a rated thermal input of 50MW or more in: HP Boiler House Boiler and MP Boiler House Boiler	**LCP 140**: Receipt of natural gas, fuel oil and storage of fuel oil. Natural gas, fuel oil and refinery fuel gas supply systems to combustion units and any associated activities necessary to maintain the operation of the plant and fuel supplies through to the discharge of exhaust gases from the stacks, ash removal from the combustion process and the export of steam to the steam systems, including: HP 21-26 6 x 104 MWth boilers (combined capacity limited by software interlock to <500MW from 1st January 2016 in accordance with EA Regulatory Guidance Note 2 and subject to provisions set out in Section 4 of the MFF Protocol MPBH 2 x 28 MWth boilers
S1.2 A1 (d)	Refining mineral oil (Cracking)	From feed to oil refining unit to use, intermediate or product storage, or export including each of the following units: i. Catalytic Cracking Unit no 2 ii. Capacity 11000 Tpd including process heaters: iii. Gas Separation Unit iv. Hydrogen Fluoride Alkylation (Butamer and SHU) v. Ethyl benzene production including process heater: F6800 9.45 MWth vi. Low Sulphur Mogas Units (CD Hydro and HD Select) including process heater: F4001 7.0 MWth
S1.2 A1 (d)	Refining mineral oil (Secondary Processes)	From receipt of feed, through blending (where necessary) to feed, intermediate and product storages including: i. Iso-Pentane Unit ii. Kerosene Merox Treater No.2 iii. **LCP 142**: Platformer No.3 and Hydrotreater No.3 including process heaters: F9301 16.8 MWth F9401 30.4 MWth F9402 42.4 MWth F9403 28.8 MWth F9404 16.8 MWth iv. Hydrotreater No. 2 including process heater: F501 17.4 MWth v. **LCP 141**: Aromatics production including process heaters: F5901A 63.1 MWth F5901B 63.1 MWth vi. **LCP 141**: Hydrodesulphurisation unit 2 including process heater: F6301 18.3 MWth

Table S1.1 activities		
Activity listed in Schedule 1 of the EP Regulations	**Description of specified activity**	**Limits of specified activity**
		vii. **LCP 141**: HVI lubricating oil including process heaters F4101 44.5 MWth F4102 5.6 MWth F4901A 44.5 MWth F4901B 44.5 MWth
S1.2 A1 (e)	The loading, unloading or other handling of, the storage of, or the physical, chemical or thermal treatment of crude oil (Oil movements)	From receipt of feed, through blending (where necessary) to feed, intermediate and product storages including: liquified petroleum gases, white oils, gas oils/ black oils, crude oil/ slops.
S1.2 A1 (d)	Refining mineral oil (Distillation)	From receipt of crude to operation of crude distillation units including: i. **LCP 138**: Crude Distiller Unit 3 (throughout 8000 te/d) and High Vacuum Unit 3 (throughout 4500 te/d) including process heaters F301 33.2 MWth F301U 37.6 MWth F302 27.9 MWth ii. **LCP 139**: Crude Distiller Unit 4 (throughout 24000te/d) including process heaters: F201A 58.9 MWth F201B 58.9 MWth F201C 49.0 MWth F202 53.3 MWth F650 2.4 MWth
S4.1 Part A (1) (a) (i)	Producing organic chemicals such as hydrocarbons (linear or cyclic, saturated or unsaturated, aliphatic or aromatic)	**LCP 143**: Higher Olefins SHOP: from receipt of raw materials to the manufacture, storage and despatch of finished product. (including the cleaning of the process plant, operation of abatement systems and the storage and handling of waste arising from the process) including process heaters F9460 1.5 MWth F9401 1.5 MWth F9801 64 MWth Production capacity 395 kT/a
S4.1 Part A (1) (a) (ii)	Producing organic chemicals such as organic compounds containing oxygen, such as alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins	Alcohols (Neodol and Linevol) including Syngas Production: from receipt of raw materials to the manufacture, storage and despatch of finished product. (including the cleaning of the process plant, operation of abatement systems and the storage and handling of waste arising from the process) including process heaters F2102 26 MWth F2101 A,B 2.3 MWth F3901 5.2 MWth F4701 5.2 MWth Production capacity: Linevol: 48 kT/a Neodol: 93 kT/a

Table S1.1 activities		
Activity listed in Schedule 1 of the EP Regulations	**Description of specified activity**	**Limits of specified activity**
S4.1 Part A (1) (a) (ii)	Producing organic chemicals such as organic compounds containing oxygen, such as alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins	Epoxy Resins: from receipt of raw materials to the manufacture, storage and despatch of finished product. (including the cleaning of the process plant, operation of abatement systems and the storage and handling of waste arising from the process) Production capacity 15 kT/a
S4.1 Part A (1) (a) (iii)	Producing organic chemicals such as organic compounds containing sulphur., such as sulphides, mercaptans, sulphonic acids, sulphonates, sulphates and sulphones and sulphur heterocyclics	Sulfolane production: from receipt of raw materials to the manufacture, storage and despatch of finished product. (including the cleaning of the process plant, operation of abatement systems and the storage and handling of waste arising from the process) Production capacity 6 kT/a
S4.2 A1 (a) (v)	Sulphur recovery and production	Amine recovery unit , amine systems, sour water stripper units and sulphur recovery unit plants including: (i) Unit 5300 (100t/d design feed rate for sour gas) (ii) Unit 5500 (100t/d design feed rate for sour gas) (iii) Claus Off gas Treating Unit
S5.1 A1 (a)	The incineration of hazardous waste in an incineration plant with a capacity exceeding 10 tonnes per day	From receipt and preparation of wastes for incineration to export of ashes and APC residues. The incinerator is permit to burn 50 000 tonnes/year of hazardous and non-hazardous waste. Energy is recovered from the burning of the waste.
S5.3 A1 (a) (ii)	Spent Caustic Neutralisation Unit: Disposal of hazardous waste (other than by incineration or landfill) in a facility with a capacity of more than 10 tonnes per day.	From collection and treatment of spent caustic from Merox and Gas plant to discharge at PDAF, CDU4 furnaces and HDS2 unit.
S5.3 A1 (a) (i)	NDAF: Biological treatment of waste waters and storage of sludge >50t/day	From collection and treatment of process effluent including : Receipt of ballast water received from ships in MSC berths, surface waters from north site and effluent from No1 and No2 Gate road car terminals and subsequent physical and biological treatment to the discharge point to controlled waters.
S5.3 A1 (a) (i)	SDAF: Biological treatment of waste waters and storage of sludge >50t/day	From collection and treatment of process effluent including: Surface waters from storages West and East of Gowy, the distillation department and non process effluents arising from HF Alkylation unit and subsequent physical and biological treatment to the discharge point to controlled waters.
S5.3 A1 (a) (ii)	Unit 78: Physico-chemical treatment of waste waters and storage of sludge >50t/day	From collection and treatment of process effluent including: Process effluents arising from chemicals units located at north and south sites and effluent by pipeline from Argent Energy (UK) Limited (EPR/LP3233DK) is subject to pH correction and physical treatment prior to discharge point to sewer.
S5.3 A1 (a) (ii)	PDAF: Physico-chemical treatment of waste waters and storage of sludge >50t/day	From collection and treatment of process effluent including: Process effluents from refinery operation and subsequent treatment to joint discharge point with surface waters from refinery operations (N38) to controlled waters.

Table S1.1 activities		
Activity listed in Schedule 1 of the EP Regulations	**Description of specified activity**	**Limits of specified activity**
S5.3 A1 (a) (ii)	Storage (Maintenance): Disposal of hazardous waste (other than by incineration or landfill) in a facility with a capacity of more than 10 tonnes per day.	The desludging together with the dewatering and/or de-oiling of hazardous sludge including; tank/vessel bottoms, oil water separators and interceptors. Recovered oil to be directed to existing tankage. Recovered water to be discharged via an effluent emission point listed in Sched 3 Table S3.2
S5.4 A1 (a) (ii)	Effluent (Maintenance): Physico-chemical treatment of non-hazardous waste >50t/day	The desludging and dewatering of non-hazardous sludge from the demineralisation plant (CT2) and component parts of the effluent management system (including settlement ponds, grit chambers and channels). Recovered water to be discharged via an effluent emission point listed in Sched 3 Table S3.2
Directly Associated Activity		
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 consisting Flares 1 to 4 on South Site
Flaring of gases	Burning of hydrocarbon gases at flare	SHOP flare headers, knock-out pots and flare stacks and any ancillary equipment
Nitrogen generation	Onsite generation by third party	From the production facility piped to the respective plants.
Cooling water system	Closed circuit natural draft cooling tower	Cooling Tower 1 serves Resins, Sulfolane, Alcohols, Instrument Air compressors and sour water stripper
Cooling water system	Once through cooling tower	CT2 serves HVI Luboil, Crude Distillers, Feed Preparation Units, Merox Treater 2 and HP Boiler house.
Cooling water system	Closed circuit natural draft cooling towers	CT5 serves Platformers, Aromatics, Hydrodesulphuriser 2, Catalytic Cracking Units and Gas Separation Units
Cooling water system	Closed circuit natural draft cooling towers	CT7, 8 and 9 serves SHOP, HF alkylation unit, HPBH and Distillation PU.
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.
Demineralised water unit	HPBH demineralised water plant	From the production of demineralised water to process water use in the High Pressure Boiler House.

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application	The response to section 2.1 and 2.2 in the Application not including: That part of KMT2 operation involving the use of R1101	21/08/06
Receipt of additional information to the application	Responses to informal request for clarification on a number of sections on the application	19/01/07

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Receipt of additional information to the application	Responses to informal request for clarification on a number of sections on the application	02/03/07
Receipt of additional information to the application	Responses to informal request for clarification on improvement programme with respect to reduction in sulphur dioxide emissions	02/08/07; 23/08/07
Receipt of additional information to the application	Responses to informal request for clarification on improvement programme with respect to reduction in emissions of oxides of nitrogen and particulates.	31/08/07
Receipt of additional information to the application	Summary of key aspects of the additional information supplied during the determination period	30/11/07
Application EPR/NP3237LS/V002	All parts	22/12/08
Application EPR/FP3139FN/T001 (full transfer of permit EPR/NP3237LS)	All parts	27/07/2011
Additional information	Information relating to technical and financial capability plus specific asset management	28/07/11
Application EPR/FP3139FN/V002	All parts - application to vary and reduce the flow and monitoring frequency for outlet W3 (N38) in Table S4.2	24/11/11
Application EPR/FP3139FN/V003 (variation)	All parts	21/11/11
Variation EPR/FP3139FN/V004	Environment Agency led variation.	28/12/12
Variation determined EPR/FP3139FN/V005	Environment Agency led variation.	26/03/14
Receipt of additional information	Procedures for compliance with storm overflow conditions	Emails received on 24/03/14 and 25/03/14
Response to regulation 60(1) Notice – request for information dated 05/08/15	Compliance route and operating techniques identified in response to questions 1 (ELV and monitoring requirements) and 2c (LCP configuration, layout, fuel options available and flue configuration), 2d (methodology for assessing which ELVs apply in accordance with Articles 40(2) and 40(3) of IED), 2e (methodology for assessing compliance with relevant ELVs for NOx, SO2 and dust by reference to parts 3 and 4 of Annex V of Chapter III of IED) and 2f (methodology for assigning periods of start up and shutdown).	Received 30/09/15
Receipt of additional information to the regulation 60(1) Notice.	Compliance route(s) and operating techniques identified in to questions 1 (ELV and monitoring requirements) and 2c (LCP configuration, layout, fuel options available and flue configuration), 2d (methodology for assessing which ELVs apply in accordance with Articles 40(2) and 40(3) of IED), 2e (methodology for assessing compliance with relevant ELVs for NOx, SO2 and dust by reference to parts 3 and 4 of Annex V of Chapter III of IED) and 2f (methodology for assigning periods of start up and shutdown) for LCP143 (SHOP).	Received 15/10/15

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Receipt of additional information to the regulation 60(1) Notice.	Confirmation of the rate limiting approach for LCP140 (HPBH)	Received 15/12/15
Receipt of additional information to the regulation 60(1) Notice.	Confirmation of the compliance route chosen approach for LCP138 (CD3), LCP139 (CDU-4), LCP141 (Secondary Processes), LCP142 (Platformer 3 & HDT3) and LCP143 (SHOP)	Received 06/10/16
Receipt of additional information to the regulation 60(1) Notice.	Confirmation of the compliance route chosen approach and representative ELV for LCP140 (HPBH)	Received 04/11/16
Minor operational change	By email - Changing in nitrogen generation & supply by third party	26/11/15
Minor operational change	By email – Receiving effluent by pipeline from Argent Energy (UK) Limited (EPR/LP3233DK) via Unit 78 before discharging to sewer.	29/11/16

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	A written procedure shall be submitted to the Agency detailing the measures to be used so that monitoring equipment, personnel and organisations employed for monitoring programme for emissions to air shall have either MCERTS certification or accreditation in accordance with condition 3.5.3. The notification requirements of condition 2.4.2 shall be deemed to have been complied with on submission of the procedure. The procedure shall be implemented by the operator from the date of approval in writing by the Agency	3 months from the date of issue of the Variation to implement the special provisions for LCP under Chapter III of IED
IC2	A written plan shall be submitted to the Agency for approval detailing the results of a survey of hard-standing, kerbing and secondary containment for raw material, intermediate, product and waste storage areas and the measures to comply with the requirements of sections 2.2.2. and 2.2.5 of TGN S1.02 and section 2.2.5 of TGN S 4.01, including but not limited to: kerbing at HVI lube plant and north site berths; materials of construction of acids and alkali storages at HVI lube oil and alcohols plants; basis of design for bunding for D17 gas oil area, EOG, WOG T site storage, NDAF and NO3 VRU ballast Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.4.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	To be delivered through IC34
IC3	A written plan shall be submitted to the Agency for approval detailing the results of review of the abatement measures (the effluent treatment plant) used to control emissions to the River Gowy, Thornton Brook and Manchester Ship Canal and the measures to comply with the requirements of sections 2.2.2 and the benchmark ELVs in section 3 of TGN S1.02. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency	Completed 17/07/15

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC4	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to cease burning of the remaining sour water stripper off-gases in combustion plant at the installation (i.e. from HDS2 sour water stripper, C6501) and to ensure that their sulphur content is recovered via the sulphur recovery unit. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 13/11/13
IC5	A written plan shall be submitted to the Agency for approval detailing the measures be taken to achieve flow proportional sampling of the process effluent release at W1, W2, W3 and N19. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 30/09/16
IC6	A written plan shall be submitted to the Agency for approval detailing the measures be taken to achieve a consistent particulate emission concentration from the FCCU regenerator of 20 mg/m3 (at 6% oxygen). Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 05/11/15
IC7	A written plan shall be submitted to the Agency for approval detailing the measures be taken to achieve continuous measurement of oxides of nitrogen in the emissions to air from the FCCU regenerator. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 13/11/13
IC8	A written report shall be submitted to the Agency for approval detailing the work to be undertaken to improve the identification of fugitive VOCs across all plant and pipework at the refinery installation. An interim report shall detail the effectiveness of the FLIR camera for this purpose. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 14/05/15

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC9	A written plan shall be submitted to the Agency for approval detailing the results of a review of work to be undertaken to achieve MCERTS accreditation for effluent flow on release points W1, W2 and W3. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.4.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/04/17
IC10	A written plan shall be submitted to the Agency for approval detailing the method to be used to obtain, update and validate oxides of nitrogen (NOx) emission factors for non-LCP units within the refinery installation. The plan shall demonstrate how the NOx factors will be used in the calculation of NOx emissions for non-LCP units. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.4.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/07/17
IC11	A written plan shall be submitted to the Agency for approval detailing the results of a review to minimising flaring from SHOP plant including, but not limited to the provision of a flare gas recovery system Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 14/05/15
IC12	A written plan shall be submitted to the Agency for approval detailing the measures be taken to ensure necessary monitoring and infrastructure is in place at the installation to allow the Operator to demonstrate compliance against an hourly bubble limit for sulphur dioxide from 1 January 2009. Where appropriate the plan shall contain dates for the implementation of individual measures, including but not limited to agreement on methodologies for REF-A-4 (secondary processes) and REF-A-6 (HPBH). The notification requirements of condition 2.4.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/06/17
IC13	The Operator shall review BAT for operation of the floating roof tanks. The Operator shall provide a report to the Agency summarising the findings. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency	Completed 14/05/15

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC14	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to minimise visible plume from combustion products. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 14/05/15
IC15	A written plan shall be submitted to the Agency for approval detailing the improved quantification and speciation of sulphur bearing compounds in the refinery fuel gas in order to identify sources and propose suitable treatment techniques. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 02/01/14
IC16	A written plan shall be submitted to the Agency for approval detailing the results of a review to identify options to ensure that the concentration of Class B Volatile Organic Compounds from Alcohols emission points ALC-A-3 and ALC-A-4 are continually as low as practicable through reliable operation of the ejector vacuum and condenser systems. The review shall have regard to the sector benchmarks in section 3 of the Environment Agency Sector Guidance Note IPPC S4.01. Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 14/05/15
IC17	A written plan shall be submitted to the Agency for approval detailing the results of a review to identify options to minimising emissions from VOC emissions from SHOP hotwell vessels. The review shall have regard to the sector benchmarks in section 3 of the Environment Agency Sector Guidance Note IPPC S4.01. Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 14/05/15
IC18	A written plan shall be submitted to the Agency for approval detailing the results of a review to identify options to reduce the emissions of class B volatile organic compounds in the emission from ERP-A-2. The review shall have regard to the sector benchmarks in section 3 of the Environment Agency Sector Guidance Note IPPC S4.01. Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 02/01/14

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC19	A written plan shall be submitted to the Agency for approval detailing the timescale to address the issues identified in the Application Site Report sections D2A and D2B with regard to potential for pollution Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.4.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	To be delivered through IC34
IC20	A written plan shall be submitted to the Agency for approval detailing the feasibility of routing aqueous effluents from the north site interceptors W4 and W9 to the North Dissolved Air Flotation unit. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 17/07/15
IC21	A written plan shall be submitted to the Agency for approval detailing the results of routine noise monitoring of the installation to BS4142:1997. Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 14/05/15
IC22	A written plan shall be submitted to the Agency for approval detailing the method to be used to obtain, update and validate sulphur balance and methodology for the sulphur recovery unit and refinery installation The plan shall demonstrate how the availability and utilization are used in the calculation of sulphur recovery. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 14/05/15
IC23	A written plan shall be submitted to the Agency for approval detailing the results of a review to scrubbing the exhaust of the platformer 3 regenerator, including but not limited to an environmental risk assessment for the failure of the scrubber. Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 14/05/15

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC24	A written plan shall be submitted to the Agency for approval detailing the work to be undertaken to monitor and measure COD in outfalls W1, W2 and W3 to replace BOD measurement by 31 October 2009. Where appropriate the plan shall contain dates for the implementation of individual measures including but not limited to agreement of limits. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 02/01/14
IC25	A written plan shall be submitted to the Agency for approval detailing the results of a review of progress against the improvement programme with respect to reduction in emissions of oxides of nitrogen and particulates submitted 31/08/07. The review will include any additional measures considered including but not limited to burner improvements on HPBH. Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 02/01/14
IC26	A written plan shall be submitted to the Agency for approval detailing the results of a review of progress against the improvement programme with respect to reduction in emissions of sulphur dioxide submitted 23/08/07. The review will include any additional measures considered including but not limited to the addition of deSOx additive to the FCCU. Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 02/01/14
IC27	A written report shall be submitted to the Agency for approval. The report shall contain a protocol for a monitoring programme to assess changes in acidification and eutrophication deposition and ecological effects at an appropriate Natura 2000 site. The protocol will include the selection of the Natura 2000 sites and a time scale for implementation of the programme. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the report. The protocol detailed in the report shall be implemented by the Operator from the date of approval by the Environment Agency.	Completed 22/12/2016
IC28	A written plan shall be submitted to the Agency for approval detailing the results of a review to identify options to reduce the concentration of isopropyl alcohol, 1,3 butadiene and sulphur dioxide in the emission from Sulpholane emission point, SUL-A-3. The review shall have regard to the sector benchmarks in section 3 of the Environment Agency Sector Guidance Note IPPC S4.01. Where appropriate, the plan shall contain the dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	Completed 23/06/08

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC29	The operator shall produce a report for the approval of the Environment Agency identifying the maximum extent to which SO_2 reduction can be achieved through fuel switching to natural gas and an implementation plan that will recompense for the temporary deviation from indicative BAT allowed in 2012 and 2013 in the shortest possible time. Once approved this plan shall be implemented.	Completed 12/12/12
IC30	A written report shall be submitted to the Environment Agency for approval undertaking an updated detailed Best Available Technique (BAT) assessment (particularly in regards to both energy efficiency and reducing SO_2 emissions) for the following techniques described by variation application EPR/ FP3139FN/ V003, taking account of the installation of natural gas to the installation: • increased energy efficiency via 'Liquid Coupled Air Preheater (LCAP) reinstatement', • increased energy efficiency via 'Furnace Finned Tubes' • 'Heat Integration Project' and in regards to further reductions of $SO_2$and NO_x emissions: • Developments on FCC DeSOx Additives for partial burn FCCU regenerators • 'FCCU Waste Gas Non-regenerative scrubber' and regenerative scrubber abatement of emissions from the CO Boiler • current and future opportunities to reduce the sulphur content of the crude feed to the refinery by the purchase of lower sulphur crudes. • Increase the use of natural gas on other combustion processes on the installation The report shall include proposals to implement suitable techniques with timescales. These proposals shall be implemented following approval by the Environment Agency.	Completed 06/09/13
IC31	A written report shall be submitted to the Environment Agency for approval, providing a summary of six months of monitoring data for emissions to air for all emission points on combustion processes where natural gas is used.	Completed 10/04/15
IC32	A written report shall be submitted to the Environment Agency for approval, providing a summary of six months of monitoring data following commencement of continuous monitoring of the CO Boiler exhaust stack (REF-A-11)	Completed 02/09/15

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC33	The Operator shall undertake a review of the existing screening measures at the intakes and outfalls which provide and discharge water to and from the Installation. The review shall be undertaken with reference to the Eels (England and Wales) Regulations 2009 (SI 2009/3344) and the Environment Agency ''Safe Passage for Eel'' Regulatory Position Statement version 1 dated July 2012. The Operator shall submit details of the arrangement suitable to meet the requirements for the safe passage of eels [of the Eels (England and Wales) Regulations 2009 (SI 2009/3344)] by either:- • Providing a written proposal for the installation of an eel screen. • Providing a written proposal to the modification of existing screening arrangements. • Providing a written response with an explanation and description of how the existing screening arrangements can be regarded to meet the requirements for the safe passage of eels [of SI 2009/3344] either without change or with mitigation measures. • Providing a written response setting out a case for an exemption In all cases, the proposal shall be submitted in writing for the approval of the Environment Agency. Where appropriate, each proposal shall contain an assessment of alternative options considered including impacts on other fish species and an explanation of why the proposed option has been chosen. Where installation of eel screen; modification of existing arrangements; or mitigation measures are proposed, the submission shall contain relevant timescales for installation in accordance with the Safe Passage of Eel Regulatory Position Statement version 1 dated July 2012. The proposals shall be implemented in accordance with the Environment Agency's written approval.	Completed 10/04/15
IC34	The Operator shall prepare and submit a desk top study in line with Stages 1–7 set out within the European Commission Guidance concerning baseline reports dated 5th May 2014 (Ref: 2014/C 136/03) and the Environment Agency's H5 guidance to the Environment Agency for review and shall include but not be limited to the following: • An assessment to determine whether there is a possibility of soil and / or groundwater contamination from relevant hazardous substances (RHS) used, stored or released from site; • A review of existing soil and groundwater measurements to determine whether an appropriate baseline can be established for RHS in the locations that they will be used, stored or released, having regard to the possibility of soil and/or groundwater contamination; • Proposals to undertake site investigation works should additional soil and groundwater measurements be required to enable an baseline to be established for RHS in the locations that they will be used, stored or released, having regard to the possibility of soil and/or groundwater contamination; and • An assessment to demonstrate that the requirements of improvement conditions IC2 and IC19 have been addressed.	Date to be confirmed by Environment Agency by 31/03/17
IC35	The Operator shall undertake any relevant intrusive works identified within IC34 to enable an adequate baseline to be established for relevant hazardous substances (RHS) in the locations that they will be used, stored or released, having regard to the possibility of soil and/or groundwater contamination in line with the requirements set out within Stage 7 of European Commission Guidance concerning baseline reports dated 5th May 2014 (Ref: 2014/C 136/03) and the Environment Agency's H5 guidance; and Prepare and submit a baseline report to the Environment Agency in line with the requirements set out within Stage 8 of the European Commission Guidance concerning baseline reports dated 5th May 2014 (Ref: 2014/C 136/03) and the Environment Agency's H5 guidance.	31/12/17

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC36	The Operator shall submit an updated site condition report to the Environment Agency for review. The Report shall include, but not be limited to, the following: • The baseline report required by IC35 above; • Baseline reference data for any 'other polluting substances'; and • A soil and groundwater monitoring plan, to demonstrate proposed compliance with permit condition 3.2.4 in respect of periodic monitoring of relevant hazardous substances (RHS) in soil and groundwater and proposed monitoring for 'any other polluting substances'. Further information in respect of setting baseline reference data for any other polluting substances is detailed within the Environment Agency's H5 guidance.	30/06/18
IC37	The operator shall submit, to the Environment Agency, a written technical report in relation to the high pressure boiler house (HPBH) which addresses the following: 1. identify the operating envelope of the HPBH, including fuel mixes and maximum and minimum firing rates. 2. Associated with this operating envelope, the operator shall quantify the emissions of oxides of nitrogen from the HPBH (LCP 138, emission point REF-A 4). 3. identify changes in operating philosophy, improvements to existing oxides of nitrogen reduction technology and/or further reduction techniques. This should include an assessment of the level of reduction in nitrogen oxide releases which will be achieved through application of these modifications. 4. a project plan, including timescales, for implementation of the improvements identified in 3 above The plan presented in 4 above shall be implemented by the operator, following approval by the Environment Agency.	30/06/17
IC38	The Operator shall undertake an impact assessment in accordance with the methodology in the Environment Agency H1 screening tool for all determinands listed in Schedule 3 Table S3.2 for emissions points to water W1, W2, W3 and W4. Based on the outcomes of the H1 screening and IC5, the Operator shall propose a revised Table S3.2, including applicable emission limit values, a monitoring schedule, and a revised Table S3.4 annual limit for oil in water (total). These shall be submitted in writing to the Environment Agency for approval.	31/03/2017

Table S1.4 Pre-operational measures for future development		
Reference	**Operation**	**Pre-operational measures**
POC1	Using natural gas as a fuel	At least 3 months prior to commencement of using natural gas, the operator shall submit a report for approval by the Environment Agency describing in detail the techniques to be used to operate the parts of the installation which are to use natural gas and any consequent changes to the techniques listed in Schedule 1 Table 1.2 and other relevant techniques previously agreed in writing with the Environment Agency. Once approved by the Environment Agency these techniques and equipment are to be implemented. **Completed 26/06/12**
POC2	Using natural gas as a fuel	At least 3 months prior to commencement of using natural gas , the operator shall submit a report for approval by the Environment Agency comprising an updated assessment of environmental impact as previously undertaken for the original PPC application to reflect the changes in emissions as a result of the new operating techniques described in pre-operational condition POC1 above. **Completed 24/04/13**

Table S1.4 Pre-operational measures for future development		
Reference	**Operation**	**Pre-operational measures**
POC3	Operation of Crude Distillation Unit 3 (LCP138)	At least 3 months prior to commencement of start-up of Crude Distillation Unit 3 the operator shall submit a report for approval by the Environment Agency describing in detail any changes in operating techniques and fuels used, when compared to the techniques and fuels described in the '*reference relevant documents in the operating techniques table*'. The operator shall also submit a periodic monitoring plan for approval which will be implemented within one month of stable unit operation
POC4	Operation of HVI unit (LCP141 - HVI part only)	At least 3 months prior to commencement of start-up of HVI, the operator shall submit a report for approval by the Environment Agency describing in detail any changes in operating techniques and fuels used, when compared to the techniques and fuels described in the '*reference relevant documents in the operating techniques table*'. The operator shall also submit a monitoring plan for continuous monitoring across the LCP; for approval, which will be implemented from the start-up of the HVI operation.

Schedule 2 - Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	**Specification**
Flushing Oil	Maximum 1.5% sulphur
Gas Oil (MP Boilers, etc)	< 0.1% sulphur content
For release points: REF-A-5 (LCP142: Platformer 3 and HDT3), REF-A-6 (LCP141: HDS2 and Aromatics ONLY)	No liquid fuel shall be fired
For release point: REF-A-2 (LCP139: CDU-4)	Back up liquid firing is allowed for 240 hours per calendar year as described in section 6 of the MFF Protocol

Table S2.2 Permitted waste types and quantities for receipt of ballast water	
Maximum quantity	**N/A**
Waste code	**Description**
16 07 08*	Waste containing oil (ballast water)

Table S2.3 Permitted waste types and quantities for Energy Recovery Plant	
Maximum quantity	Total hazardous and non hazardous waste throughput shall not exceed 50,000 tonnes per year
Waste code	**Description**
01	**WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS**
01 05	**drilling muds and other drilling wastes**
01 05 05	oil-containing drilling muds and wastes
05	**WASTES FROM PETROLEUM REFINING,NATURAL GAS PURIFICATION AND PYROLYTIC TREATMENT OF COAL**
05 01	**Wastes from petroleum refining**
05 01 02*	wastes from petroleum refining
05 01 03*	desalter sludges
05 01 04*	acid alkyl sludges
05 01 05*	oil spills
05 01 06*	oily sludges from maintenance operations of the plant or equipment
05 01 08*	other tars
05 01 09*	Sludges from on-site effluent treatment containing dangerous substances
05 01 10	sludges from on-site effluent treatment other than those mentioned in 05 01 09
05 01 11*	wastes from cleaning of fuels with bases
05 01 13	oil containing acids
05 01 14	Wastes from cooling columns

Table S2.3 Permitted waste types and quantities for Energy Recovery Plant	
Maximum quantity	Total hazardous and non hazardous waste throughput shall not exceed 50,000 tonnes per year
Waste code	**Description**
05 01 15*	spent filter clays
05 01 16	sulphur-containing wastes from petroleum desulphurisation
05 01 17	Bitumen
05 01 99	wastes not otherwise specified
05 07	Wastes from Natural Gas Purification and transportation
05 07 99	wastes not otherwise specified
06	**WASTES FROM INORGANIC CHEMICAL PROCESSES**
06 02	**wastes from the MFSU of bases**
06 02 01*	Calcium Hydroxide
06 02 03*	ammonium hydroxide
06 02 04*	sodium and potassium hydroxide
06 06	**wastes from the MFSU of sulphur chemicals, sulphur chemical processes and desulphurisation processes**
06 06 02*	wastes containing dangerous sulphides
06 06 03	wastes containing sulphides other than those mentioned in 06 06 02
06 09	**wastes from the MSFU of phosphorous chemicals and phosphorous chemical processes**
06 09 03*	calcium-based reaction wastes containing or contaminated with dangerous substances
06 09 04	calcium-based reaction wastes other than those mentioned in 06 09 03
06 13	**wastes from inorganic chemical processes not otherwise specified**
06 13 02*	spent activated carbon (except 06 07 02)
07	**WASTES FROM ORGANIC CHEMICAL PROCESSES**
07 01	**wastes from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals**
07 01 01*	aqueous washing liquids and mother liquors
07 01 04*	other organic solvents, washing liquids and mother liquors
07 01 08*	other still bottoms and reaction residues
07 01 10*	other filter cakes and spent absorbents
07 01 11*	sludges from on-site effluent treatment containing dangerous substances
07 01 12	sludges from on-site effluent treatment other than those mentioned in 07 01 11
07 01 99	wastes not otherwise specified
07 07	**wastes from the MFSU of fine chemicals and chemical products not otherwise specified**
07 07 01*	aqueous washing liquids and mother liquors
07 07 04*	other organic solvents, washing liquids and mother liquors
07 07 08*	other still bottoms and reaction residues

Table S2.3 Permitted waste types and quantities for Energy Recovery Plant	
Maximum quantity	Total hazardous and non hazardous waste throughput shall not exceed 50,000 tonnes per year
Waste code	**Description**
07 07 10*	other filter cakes and spent absorbents
07 07 11*	sludges from on-site effluent treatment containing dangerous substances
07 07 12	sludges from on-site effluent treatment other than those mentioned in 07 07 11
07 07 08	other still bottoms and reaction residues
07 07 99	wastes not otherwise specified
10	**WASTES FROM THERMAL PROCESSES**
10 01	
10 01 01	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
10 01 04*	Oily fly ash and boiler dust
10 01 23	aqueous sludges from boiler cleansing other than those mentioned in 10 01 22
12	**WASTES FROM SHAPING AND PHYSICAL AND MECHANICAL SURFACE TREATMENT OF METALS AND PLASTICS**
12 01	**wastes from shaping and physical and mechanical surface treatment of metals and plastics**
12 01 02	ferrous metal dust and particles
12 01 16*	waste blasting material containing dangerous substances
13	**OIL WASTES AND WASTES OF LIQUID FUELS (except edible oils, and those in chapters 05, 12 and 19)**
13 03	**Waste insulating and heat transmission oils**
13 03 07*	mineral-based non-chlorinated insulating and heat transmission oils
13 05	**oil/water separator contents**
13 05 02*	sludges from oil/water separators
13 05 03*	interceptor sludges
13 05 06*	oil from oil/water separators
13 05 07*	oily water from oil/water separators
13 07	**wastes of liquid fuels**
13 07 01*	fuel oil and diesel
13 07 02*	Petrol
13 08	**Oil wastes not otherwise specified**
13 08 01*	Desalter sludges or emulsions
13 08 02*	Other emulsions
14	**WASTE ORGANIC SOLVENTS, REFRIGERANTS AND PROPELLANTS**
14 06	**waste organic solvents, refrigerants and foam/aerosol propellants**
14 06 03*	other solvents and solvent mixtures

Table S2.3 Permitted waste types and quantities for Energy Recovery Plant	
Maximum quantity	Total hazardous and non hazardous waste throughput shall not exceed 50,000 tonnes per year
Waste code	**Description**
15	**WASTE PACKAGING;ABSORBANTS, WIPING CLOTHS,FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHRWISE SPECIFIED**
15 01	**Packaging(including separately collected municipal packaging waste**
15 01 10*	packaging containing residues of or contaminated by dangerous substances
15 02	**Absorbants, filter materials, wiping cloths and protective clothing**
15 02 02*	absorbants, filter materials including oil filters not specified) wiping cloths and protective clothing contaminated with dangerous substances
16	**WASTE NOT OTHERWISE SPECIFIED IN THE LIST**
16 03	**off-specification batches and unused products**
16 03 03*	inorganic wastes containing dangerous substances
16 03 04	inorganic wastes other than those mentioned in 16 03 03
16 03 05*	organic wastes containing dangerous substances
16 08	**spent catalysts**
16 08 02*	spent catalyst containing dangerous transition metals or dangerous transition metal compounds
16 08 04	spent catalysts contaminated with dangerous substances
16 08 07*	spent fluid catalytic cracking catalyst
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE**
19 01	**wastes from incineration or pyrolysis of waste**
19 01 11*	Bottom ash and slag containing dangerous substances
19 01 13*	Fly ash containing dangerous substances
19 08	**wastes from waste water treatment plants not otherwise specified**
19 08 02	Waste from de-sanding
19 08 05	sludges from treatment of Urban waste water
19 08 06*	saturated or spent ion exchange resins
19 08 07*	solutions and sludges from regeneration of ion exchangers
19 09	**wastes from the preparation of water intended for human consumption or water for industrial use**
19 09 04	spent activated carbon
19 09 05	saturated or spent ion exchange resins
20	**MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS**
20 01	**separately collected fractions (except 15 01)**
20 01 01	Paper and Cardboard
20 01 02	Glass

Table S2.3 Permitted waste types and quantities for Energy Recovery Plant	
Maximum quantity	Total hazardous and non hazardous waste throughput shall not exceed 50,000 tonnes per year
Waste code	**Description**
20 01 13*	Solvents
20 01 38	Wood other than that mentioned in 20 01 37
20 03	**other municipal wastes**
20 03 01	mixed municipal waste
20 03 03	Street cleaning residues

Schedule 3 – Emissions and monitoring

Locations of key emissions to air detailed as figure 2.2.1 (823161) in the application and key emissions to water detailed as figure 2.2 (figure 823160).

Table S3.1 Point source emissions to air – emission limits and monitoring requirements

Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
REF-A-1 Crude Distillation Unit 3 (Grid ref. 343788, 374800)	**LCP 138**: CDU-3 furnaces: F301, F301U, F302 Flexible Multi-fuel firing (RFG & non-commercial liquid fuels) <100MWth	Sulphur dioxide	1000 mg/m^3 **Note 1**	-	At least every 6 months	BS EN 14791 or TGN M21
		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	300 - 450 mg/m^3 **Note 1**	-	At least every 6 months	BS EN 14792 or TGN M21
		Dust	5 - 50 mg/m^3 **Note 1**	-	At least every 6 months	BS EN 13284-1
		Carbon monoxide	-	-	At least every 6 months	BS EN 15058
		Oxygen	-	-	Periodic As appropriate to reference	BS EN 14789
		Water vapour	-	-	Periodic As appropriate to reference	BS EN 14790
REF-A-2 Crude Distillation Unit 4 (Grid ref. 343930, 373910)	**LCP 139**: CDU-4 furnaces: F201 A, B, C, F202 Gas fired with back-up non-commercial liquid fuels	Sulphur dioxide	1000 mg/m^3	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3	Daily mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-2 Crude Distillation Unit 4 (Grid ref. 343930, 373910)	**LCP 139**: CDU-4 furnaces: F201 A, B, C, F202	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	300mg/m^3 **Note 2**	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			330 mg/m^3 **Note 2**	Daily mean of validated hourly averages	Continuous	BS EN 14181
			600 mg/m^3 **Note 2**	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Dust	5 mg/m^3 **Note 2**	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			5.5 mg/m^3 **Note 2**	Daily mean of validated hourly averages	Continuous	BS EN 14181
			10 mg/m^3 **Note 2**	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Sulphur dioxide (back-up non-commercial liquid fuel firing)	1000 mg/m^3 **Note 3**	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3 **Note 3**	Daily mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3 **Note 3**	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-2 Crude Distillation Unit 4 (Grid ref. 343930, 373910)	**LCP 139**: CDU-4 furnaces: F201 A, B, C, F202	Oxides of nitrogen (NO and NO_2 expressed as NO_2) (back-up non-commercial liquid fuel firing only)	450 mg/m^3 **Note 3**	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			495 mg/m^3 **Note 3**	Daily mean of validated hourly averages	Continuous	BS EN 14181
			900 mg/m^3 **Note 3**	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Dust (back-up non-commercial liquid fuel firing only)	50 mg/m^3 **Note 3**	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			55 mg/m^3 **Note 3**	Daily mean of validated hourly averages	Continuous	BS EN 14181
			100 mg/m^3 **Note 3**	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Carbon monoxide	-	-	Continuous	BS EN 14181
		Oxygen	-	-	Continuous as appropriate to reference	BS EN 14181
		Water vapour	-	-	Continuous as appropriate to reference	BS EN 14181
		Stack gas temperature	-	-	Continuous as appropriate to reference	Traceable to national standards
		Stack gas pressure	-	-	Continuous as appropriate to reference	Traceable to national standards

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-3 CD4 Molecular Sieve Start Up Heater (Grid ref. 343800, 374800)	F-650	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	No limits set			
		Oxides of sulphur	Subject to refinery bubble	As monitoring method	By calculation as agreed with Agency	By calculation as agreed with Agency
		Dust	No limits set	-	-	-
REF-A-4 HP Boilers (Grid Ref. 344200, 375180) **Note 5**	**LCP 140**: HP21-HP26 (3 flues in a common stack, 2 boiler per flue) Multi-fuel firing (Natural gas, RFG & non-commercial liquid fuels)	Sulphur dioxide	1000 mg/m^3	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3	Daily mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	411 mg/m^3 **Note 4**	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			452 mg/m^3 **Note 4**	Daily mean of validated hourly averages	Continuous	BS EN 14181
			822 mg/m^3 **Note 4**	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Dust	37 mg/m^3 **Note 4**	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			41 mg/m^3 **Note 4**	Daily mean of validated hourly averages	Continuous	BS EN 14181

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-4 HP Boilers (Grid Ref. 344200, 375180)	**LCP 140**: HP21-HP26 (3 flues in a common stack, 2 boiler per flue)	Dust	74 mg/m^3 **Note 4**	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Carbon monoxide	-	-	Continuous	BS EN 14181
		Oxygen	-	-	Continuous as appropriate to reference	BS EN 14181
		Water vapour	-	-	Continuous as appropriate to reference	BS EN 14181
		Stack gas temperature	-	-	Continuous as appropriate to reference	Traceable to national standards
		Stack gas pressure	-	-	Continuous as appropriate to reference	Traceable to national standards
REF-A-5 Platformer 3 and HDT3 (Grid Ref.343490, 375945)	**LCP 142**: PF3 (F9401-4) and HDT3 (F9301 RFG firing only	Sulphur dioxide	1000 mg/m^3	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3	Daily mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	300 mg/m^3	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			330 mg/m^3	Daily mean of validated hourly averages	Continuous	BS EN 14181

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-5 Platformer 3 and HDT3 (Grid Ref.343490, 375945)	**LCP 142**: PF3 (F9401-4) and HDT3 (F9301 RFG firing only		600 mg/m^3	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Dust	5 mg/m^3	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			5.5 mg/m^3	Daily mean of validated hourly averages	Continuous	BS EN 14181
			10 mg/m^3	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Carbon monoxide	-	-	Continuous	BS EN 14181
		Oxygen	-	-	Continuous as appropriate to reference	BS EN 14181
		Water vapour	-	-	Continuous as appropriate to reference	BS EN 14181
		Stack gas temperature	-	-	Continuous as appropriate to reference	Traceable to national standards
		Stack gas pressure	-	-	Continuous as appropriate to reference	Traceable to national standards
REF-A-6 Secondary Processes (Grid Ref. 343640, 375450)	**LCP 141**: Aromatics (F5901 A,B) and HDS2 (F6301) **ONLY** RFG firing only	Sulphur dioxide	1000 mg/m^3	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			1000 mg/m^3	Daily mean of validated hourly averages	Continuous	BS EN 14181

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-6 Secondary Processes (Grid Ref. 343640, 375450)	**LCP 141**: Aromatics (F5901 A,B) and HDS2 (F6301) **ONLY**		1000 mg/m^3	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	300 mg/m^3	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			330 mg/m^3	Daily mean of validated hourly averages	Continuous	BS EN 14181
			600 mg/m^3	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Dust	5 mg/m^3	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			5.5 mg/m^3	Daily mean of validated hourly averages	Continuous	BS EN 14181
			10 mg/m^3	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Carbon monoxide	-	-	Continuous	BS EN 14181
		Oxygen	-	-	Continuous as appropriate to reference	BS EN 14181
		Water vapour	-	-	Continuous as appropriate to reference	BS EN 14181
		Stack gas temperature	-	-	Continuous as appropriate to reference	Traceable to national standards

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
		Stack gas pressure	-	-	Continuous as appropriate to reference	Traceable to national standards
REF-A-6 Secondary Processes (Grid Ref. 343640, 375450)	**LCP 141**: HVI (F4101, F4102 and F4901 A,B) and Aromatics (F5901 A,B) and HDS2 (F6301) Multi-fuel firing (RFG & non-commercial liquid fuels)	Sulphur dioxide	Note 6	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			Note 6	Daily mean of validated hourly averages	Continuous	BS EN 14181
			Note 6	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
REF-A-6 Secondary Processes (Grid Ref. 343640, 375450)	**LCP 141**: HVI (F4101, F4102 and F4901 A,B) and Aromatics (F5901 A,B) and HDS2 (F6301)	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	Note 6	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			Note 6	Daily mean of validated hourly averages	Continuous	BS EN 14181
			Note 6	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Dust	Note 6	Calendar monthly mean of validated hourly averages	Continuous	BS EN 14181
			Note 6	Daily mean of validated hourly averages	Continuous	BS EN 14181
			Note 6	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Carbon monoxide	-	-	Continuous	BS EN 14181

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-6 Secondary Processes (Grid Ref. 343640, 375450)	**LCP 141**: HVI (F4101, F4102 and F4901 A,B) and Aromatics (F5901 A,B) and HDS2 (F6301)	Oxygen	-	-	Continuous as appropriate to reference	BS EN 14181
		Water vapour	-	-	Continuous as appropriate to reference	BS EN 14181
		Stack gas temperature	-	-	Continuous as appropriate to reference	Traceable to national standards
		Stack gas pressure	-	-	Continuous as appropriate to reference	Traceable to national standards
REF-A-7 HDT2 (Grid Ref. 343575, 375350)	HDT-2 (F501)	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	No limits set	-	-	-
		Oxides of sulphur	Subject to refinery bubble	As monitoring method	By calculation as agreed with Agency	By calculation as agreed with Agency
REF-A-8 HD Select (Grid Ref. 343825, 375140)	HD Select (F4001)	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	No limits set	-	-	-
		Oxides of sulphur	Subject to refinery bubble	As monitoring method	By calculation as agreed with Agency	By calculation as agreed with Agency
REF-A-9 Ethyl benzene unit (Grid Ref. 343500, 375290)	EBU (F6800)	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	No limits set	-	-	-
		Oxides of sulphur	Subject to refinery bubble	As monitoring method	By calculation as agreed with Agency	By calculation as agreed with Agency
REF-A-10 Sulphur Recovery Unit (Grid Ref. 344420, 375320)	Sulphur Recovery Unit	Oxides of sulphur	20,000 mg/m^3	As monitoring method	Continuous	BS EN 15267-3

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-11 CO Boiler Exhaust (Grid Ref. 343640, 375110)	CCU CO Boiler Exhaust (F2151)	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	400 mg/m^3	Calendar monthly mean	Continuous	BS EN 14181
		Oxides of sulphur	1510 mg/m^3	Calendar monthly mean	Continuous	BS EN 14181
		Dust	100 mg/Nm^3	Calendar monthly mean **Note 7**	Continuous	BS EN 14181
		Carbon monoxide	-	Calendar monthly mean	Continuous	BS EN 14181
REF-A-12 MP Boiler Plant (Grid Ref. 344260, 375125)	MP Boiler Plant (common stack for two vents)	Oxides of sulphur	See Table S2.1	-	-	By calculation as agreed with Agency
		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	200 mg/m^3	As monitoring method	Every two years post maintenance	BS EN 14792
		Carbon monoxide	150 mg/m^3	As monitoring method	Every two years post maintenance	BS EN 15058
		Dust	100 mg/m^3	As monitoring method	Every two years post maintenance	BS EN 13284-1
REF-A-14 Refinery flare (Grid Ref. 344155, 375360)	Refinery flare (4 flares in common structure)	Sour gas combustion products (sulphur dioxide)	Notification threshold: 0.47 T/h sulphur dioxide **Note 8**	As monitoring method	As required by flaring event	By calculation as agreed with Agency
ALC-A-1	Reformer F2102 (main fuel dry gas, standby RFG/ dry gas).	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	350 mg/m^3	As monitoring method	Monthly	By calculation as agreed with Agency
		Oxides of sulphur	35 mg/m^3	As monitoring method	Monthly	By calculation as agreed with Agency
ALC-A-2	Common furnaces (hot oil system) local to A32-S1 (main fuel dry gas, standby RFG/ dry gas).	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	350 mg/m3	As monitoring method	Monthly	By calculation as agreed with Agency
		Oxides of sulphur	35 mg/m^3	As monitoring method	Monthly	By calculation as agreed with Agency

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
SHO-A-1	SHOP Flare	Sour gas combustion products (sulphur dioxide)	No limit set	As monitoring method	As required by flaring event	By calculation as agreed with Agency
SHO-A-2	F9460	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	No limit set	As monitoring method	Monthly	By calculation as agreed with Agency
		Oxides of sulphur	No limit set	As monitoring method	Monthly	By calculation as agreed with Agency
SHO-A-3	F9401	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	No limit set	As monitoring method	Monthly	By calculation as agreed with Agency
		Oxides of sulphur	No limit set	As monitoring method	Monthly	By calculation as agreed with Agency
SHO-A-4	**LCP 143**: F9801 Flexible Multi-fuel firing (RFG & non-commercial liquid fuels) <100MWth	Sulphur dioxide	150 mg/m^3 **Note 9**	-	At least every 6 months	BS EN 14791
		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	300 - 450 mg/m^3 **Note 9**	-	At least every 6 months	BS EN 14792
		Dust	5 - 50 mg/m^3 **Note 9**	-	At least every 6 months	BS EN 13284-1
		Carbon monoxide	-	-	At least every 6 months	BS EN 15058
		Oxygen	-	-	Periodic As appropriate to reference	BS EN 14789
		Water vapour	-	-	Periodic As appropriate to reference	BS EN 14790

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
Note 1 Condition 2.3.5 and Pre-operational Condition to be fulfilled prior to CD3 operation following Section 6 III (a) of the MFF Protocol Note 2 Section 6 II of the MFF Protocol applies Note 3 These Emission Limit Values apply only when back up liquid fuels are used in accordance with condition 2.3.3 and Section 6 II of the MFF Protocol Note 4 Based on representative fuel split which shall be subject to annual review or if there are significant changes to the fuel split in accordance with Section 6 of the MFF Protocol Note 5 Capacity limited to <500MW by application of software interlock in accordance with RGN2 and guidance provided in Section 4 of the MFF Protocol Note 6 Condition 2.3.5 and Pre-operational Condition to be fulfilled prior to operation. Emission Limit Values to be set following Section 5 & 6 of the MFF Protocol Note 7 Excluding periods of soot blowing Note 8 Any Incident or event that results in an average of 0.47 t/hr of sulphur dioxide emitted from the flare for a period exceeding 72 hours shall be subject to a Notification to the Environment Agency. Note 9 Section 6 III (a) of the MFF Protocol applies						
ERP-A-1	Energy Recovery Plant	Dust	10 mg/m^3	Half hourly average	Continuous	BS EN 14181
		Dust	10 mg/m^3	Daily average	Continuous	BS EN 14181
		Total organic carbon (TOC)	10 mg/m^3	Half hourly average	Continuous	BS EN 14181
		Total organic carbon (TOC)	10 mg/m^3	Daily average	Continuous	BS EN 14181
		Hydrogen chloride	10 mg/m^3	Half hourly average	Continuous	BS EN 14181 (note 1)
		Hydrogen chloride	10 mg/m^3	Daily average	Continuous	BS EN 14181 (note 1)
		Hydrogen fluoride	2 mg/m^3	Half hourly average	Continuous	BS EN 14181
		Hydrogen fluoride	1 mg/m^3	Daily average	Continuous	BS EN 14181
		Carbon monoxide	150 mg/m^3	Half hourly average	Continuous	BS EN 14181
		Carbon monoxide	50 mg/m^3	Daily average	Continuous	BS EN 14181
		Sulphur dioxide	50 mg/m^3	Half hourly average	Continuous	BS EN 14181 (note 1)
		Sulphur dioxide	50 mg/m^3	Daily average	Continuous	BS EN 14181
		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	400 mg/m^3	Daily average	Continuous	BS EN 14181
		Cadmium and thallium and their compounds (total)	0.05 mg/m^3	Periodic over minimum 30 minute, maximum 8 hour period	Six monthly	BS EN 14385

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
		Mercury and its compounds	0.05 mg/m^3	Periodic over minimum 30 minute, maximum 8 hour period	Six monthly	BS EN 13211
		Antimony, arsenic, Lead, Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium and their compounds (total)	0.5 mg/m^3	Periodic over minimum 30 minute, maximum 8 hour period	Six monthly	BS EN 14385
		Dioxins / furans (I-TEQ)	0.1 ng/m^3	Periodic over minimum 6 hours, maximum 8 hour period	Six monthly	BS EN 1948 Parts 1, 2 and 3
ERP-A-2	Storage tanks cold water condenser	Class B VOC	50 tpa	Annual	Annual	BS EN 12619
Note 1. Oxides of sulphur and hydrogen chloride assume zero S and HCl in support gas. Stack concentrations corrected to account for residual H_2S and HCl in RFG.						

Table S3.1(a) Point source emissions to air during abnormal operation of incineration plant – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
ERP-A-1	Energy Recovery Plant	Dust	150 mg/m^3	Half hourly average	Continuous	BS EN 15267-3 during abatement plant failure or alternative surrogate as specified in the Application during failure of the continuous emission monitor
		Total organic carbon (TOC)	20 mg/m^3	Half hourly average	Continuous	
		Carbon monoxide	100 mg/m^3	Half hourly average	Continuous	

Table S3.1 (b) Point Source emissions to air – "refinery bubble"						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
REF-A-1; REF-A-2; REF-A-3; REF-A-4; REF-A-5; REF-A-6; REF-A- 7; REF-A-8; REF-A-9; REF-A-10; REF-A-11	SO_x	CDU-3; CDU-4; F-650; HP21-HP26; PF3; Sec proc; HDT2; HD Select; EBU; SRU; CO Boiler	1400 mg/m^3 (from 1/01/09)	Hourly	Continuous	To be agreed in response to completion of relevant improvement item, see table S1.3

Table S3.1(c) Point source emissions to air during normal operation for which there are no limits	
Emission point ref. & location	**Source**
Refinery Operations	
REF-A-13	VRU ship loading(intermittent)
Vents from Ethyl Benzene Unit	E6800 surplus gas vent
	Benzene sewer
Oil Movements	Stanlow Island White Oils Vent
HDS-2	V6327 vent
HVI (FEU)	C4306 vacuum system exhaust
HVI (MDU)	C4406 vacuum system exhaust
ODU (Sour water stripper, SWS)	T4009, T4010
Storage tanks	South site- white oils storage tanks as application table 2.1.5.1 (35 off)
Storage tanks	South site- black oils as application table 2.1.5.2 a &b (34 &25off)
Storage tanks	Hill site- crude oils and slops as application table 2.1.5.3 (11 off)
Storage tanks	North site- white oils as application table 2.1.5.4 (34 off)
Storage tanks	North site- black oils as application table 2.1.5.5 (15 off)
Storage tanks	North site- other materials as application table 2.1.5.5 (4 off)
Alcohols	
ALC-A-3	Linevol evaporators main ejector vent and other associated ejectors
ALC-A-4	Neodol main ejector vent and other associated ejectors
Syngas start-up and shutdown venting	Minor vents as application table 2.2.1.4
Linevol start-up and shutdown venting	Minor vents as application table 2.2.1.4
Neodol start-up and shutdown venting	Minor vents as application table 2.2.1.4

Table S3.1(c) Point source emissions to air during normal operation for which there are no limits	
Emission point ref. & location	**Source**
SHOP	
SHO-A-1	SHOP Flare
Vents from hotwell vessels	NaBH4 decomposition (Unit 93) common vacuum system
	C16 Distillation (C9310) vacuum system
	Heavy I/D Recycle Distillation Vacuum System
Catalyst Bed Systems Pressure Control Vent	Disprop (P) Catalyst Vent
	Purification (P) Catalyst Regeneration Vent
Resins	
Road tanker filling and drumming exhaust vent	Displacement from road tanker filling and drumming
Solvent condenser vent	Solvent weigh vessel

Table S3.1(d) Point source emissions to air during abnormal operation	
Emission point ref. & location	**Source**
REF-A-11 - CO Boiler Exhaust (see note)	CCU CO Boiler Exhaust (F2151)
ODU (amine recovery unit)	S-5801/ S-5802
Secondary processes (aromatics)	Knockout pot to flare
Secondary processes (HVI)	MDU inert gas system pressure control valve T4401
Oil movements	Pressure relief serving V4241-V4248, V4253- V4257
Oil movements	Ship loading purging and line depressurising
Energy Recovery Plant	Fuel gas knock out pot, V7701
Resins	Relief valves: Reactor R7551; Relief valves and bursting discs Weigh vessels V7551, V7552, V7568 , V7556
SHOP	C4 sphere. V9901 higher pressure relief valves
SHOP	Regeneration 1 and 2 systems relief valves
Alcohols (Linevol and Neodol)	Blowdown vessels V3311 and V4314 relief valves
Alcohols (Syngas)	Fuel gas and compressor relief valves
Note: In the event of an outage of the CO boiler, releases may be made to air via the by-pass system. In such an event, after 24 hours of operation without combustion via the boiler, the CO concentration of the stack gases will be reduced to a value not greater than 2% by volume. The CO concentrations shall be measured continuously in the regenerator flue gas. The Agency shall be informed of CO boiler outages of greater than 24 hours at the Reporting Address.	

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
W1	SDAF Effluent Treatment plant	Flow	350 m^3/h, 7500 m^3/d	Continuous	Daily	MCERTS performance requirements
		Temperature	30°C	Spot sample	Daily	
		pH	6-9	Spot sample	Weekly	ISO 10523
		Suspended solids	45 mg/l (80% not greater than 30 mg/l)	Spot sample	Weekly	BS EN 872
		COD	250 mg/l	For 95% of all measured values of periodic samples taken over one year	Weekly	UKAS accredited method UK1429
		Hydrocarbon oil	10 mg/ l	Spot sample	Weekly	UKAS accredited method UK1412
		Total N **Note 2**	5 mg/ l	Spot sample	Weekly	BS EN 12260
		Phenols **Note 2**	0.5 mg/ l	Spot sample	Weekly	UKAS accredited colormetric method UK 497
		Metals **Note 2**				
		As	40 ug/l	Spot sample	Quarterly	BS EN ISO 17294
		Cd	5 ug/l			
		Cr	5 ug/l			
		Cu	5 ug/l			
		Hg	0.5 ug/l			
		Pb	10 ug/l			
		Ni	10 ug/l			
		Zn	25 ug/l			
		Cyanide **Note 2**	20 ug/l	Spot sample	Monthly	BS6068-2.18
		Fluoride **Note 2**	10 mg/l	Spot sample	Monthly	BS EN ISO 10304-2
		Sulphide **Note 2**	1 mg/l	Spot sample	Monthly	Silver nitrate titration method (Sulphide in Waters and Effluents 1983 ISBN 0117517186)

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
W2	NDAF Effluent Treatment plant	Flow	170 m^3/h, 4100 m^3/d	Continuous	Daily	MCERTS performance requirements
		Temperature	30 °C	Spot sample	Daily	
		pH	6-9	Spot sample	Daily	ISO 10523:1994
		Suspended solids	45 mg/l (80% not greater than 30 mg/l)	Suspended solids	Weekly	BS EN 872
		COD	250 mg/l	For 95% of all measured values of periodic samples taken over one year	Weekly	UKAS accredited method UK1429
		Hydrocarbon oil	10 mg/ l	Spot sample	Weekly	UKAS accredited method UK1412
		Total N **Note 2**	20 mg/l	Spot sample	Weekly	BS EN 12260:2003
		Phenols **Note 2**	0.5 mg/l	Spot sample	Weekly	UKAS accredited colormetric method UK 497
		Metals **Note 2**				
		As	40 ug/l	Spot sample	Quarterly	BS EN ISO 17294-2
		Cd	5 ug/l			
		Hg	0.5 ug/l			
		Pb	10 ug/l			
		Ni	10 ug/l			
		Zn	25 ug/l			
		Cr	5 ug/l			
		Cu	50 ug/l			
		Cyanide **Note 2**	20 ug/l	Spot sample	Monthly	BS6068-2.18
		Sulphide **Note 2**	1 mg/l	Spot sample	Monthly	Silver nitrate titration method (Sulphide in Waters and Effluents 1983 ISBN 0117517186)
W3	PDAF and other systems as section B2.2	Flow	100,000 m^3/d	Continuous	Continuous	MCERTS performance requirements
		Temperature	32.5 °C	Spot sample	Daily	

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
		pH	6-9	Spot sample	Weekly	ISO 10523
		Suspended solids	45 mg/l (80% not greater than 30 mg/l) **Note 1**	Spot sample	Weekly	BS EN 872
		COD	250 mg/l **Note 1**	For 95% of all measured values of periodic samples taken over one year	Weekly	UKAS accredited method UK1429
		Hydrocarbon oil	10 mg/l **Note 1**	Spot sample	Weekly	UKAS accredited method UK1412
		Total N	20 mg/l **Note 1 & 2**	Spot sample	Weekly	BS EN 12260
		Phenols	0.5 mg/l **Note 1 & 2**	Spot sample	Weekly	UKAS accredited colormetric method - UK 497
		Metals **Note 1 & 2**				
		As	2 ug/l	Spot sample	Quarterly	BS EN ISO 17294-2
		Cd	2 ug/l			
		Hg	0.2 ug/l			
		Pb	2 ug/l			
		Ni	20 ug/l			
		Zn	20 ug/l			
		Cr	2 ug/l			
		Cu	2 ug/l			
		Cyanide **Note 1 & 2**	20 ug/l	Spot sample	Monthly	BS6068-2.18
		Sulphide **Note 1 & 2**	1 mg/l	Spot sample	Monthly	Silver nitrate titration method (Sulphide in Waters and Effluents 1983 ISBN 0117517186)
W4	North Site interceptors	Flow	No limit set	-	-	Surface water resulting from rainfall over area not exceeding 450,000m^2.
		pH	6-9	Spot sample	Daily	ISO 10523:1994

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
		Suspended solids	45 mg/l	For 95% of all measured values of periodic samples taken over one year	Weekly	BS EN 872
		COD	250 mg/l	For 95% of all measured values of periodic samples taken over one year	Weekly	UKAS accredited method UK1429
		Hydrocarbon oil	10 mg/l	Spot sample	Weekly	UKAS accredited method UK1412
		Oil	None visible	-	Daily	-
W5	Cooling water intake screens flush	-	-		-	-
W6	Surface water run-off from former rail loading area	-	-	-	-	-
W7	Surface water ex LPG spheres	-	-	-	-	-
W8	Fire deluge water ex LPG spheres	-	-	-	-	-
W9	Surface water ex SHOP **Notes 3 & 4**	Flow	1000 m^3/d	Continuous	-	-
		Butanediol (BDL)	20 mg/l	Spot sample	Prior to discharge of S9002 to the River Gowy	UKAS accredited method UK1744
W10	Fire deluge water ex LPG storage area	-	No limit set	-	-	-
W12 **Note 5**	Storm overflow ex T1403/4	-	No limit set	-	-	-
W13 **Note 5**	Storm overflow ex T1405 A&B	-	No limit set	-	-	-
W14 **Note 5**	Storm overflow ex T1402 A&B	-	No limit set	-	-	-
W15 **Note 5**	Storm water overflow ex T7801,2	-	No limit set	-	-	-
W16	Surface water ex A track, car parks, old Phenol plant site	-	No limit set	-	-	-

Table S3.2 Point Source emissions to water (other than sewer) – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
Note 1: Comparison between influent and effluent concentrations Note 2: Emission limit value under review subject to completion of IC 38 Note 3: Compliance is defined as 95% of all results being 20 mg/l BDL with a maximum concentration of 40 mg/l without heavy rain. Note 4: • SHOP operations to sample S-9002 for BDL content using the plant lab when the basin high alarm activates - as per current procedure. • If sample result <20mg/l then discharge to R. Gowy. • If sample >20mg/l but <40mg/l then STL to authorise discharge to R. Gowy based if <5% of all results. If >5% of all results then instigate emergency procedures to pump S-9002 contents to Unit 78 via RM/Ashless pit or S-9741. • If sample >40mg/l then instigate emergency procedures to pump S-9002 contents to Unit 78 via RM/Ashless pit or S-9741 Note 5: Compliance with storm overflow procedures						

Table S3.3 Point source emissions to sewer, effluent treatment plant or other transfers off-site– emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (incl. Unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
S1	Unit 78, Chemicals (SHOP, Alcs, resins, Sulfolane, surface water ex Solvents, process effluent ex Argent Biodiesel Stanlow Plant (EPR/LP3233DK))	Subject to contractual agreement between United Utilities and operator October 2004.	-	-	As application	As application

Table S3.4 Annual Limits		
Parameter	**Medium**	**Limit (including unit)**
Sulphur dioxide (2012)	Air	11,000 tonnes
Sulphur dioxide (2013)	Air	8,800 tonnes
Sulphur dioxide (2014)	Air	8,400 tonnes
Sulphur dioxide (2015)	Air	7,800 tonnes
Sulphur dioxide (2016)	Air	7,400 tonnes
Sulphur dioxide (2017 onwards)	Air	7,400 tonnes
Oxides of nitrogen (2017 onwards) from emission point REF-A-4	Air	1,311 tonnes
Oil in water (total)	Water	3g / tonne Crude Oil Processed **Note 1 & 2**
Note 1: Comparison between influent and effluent concentrations Note 2: Emission limit value under review subject to completion of IC 38		

Table S3.5 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
REF-A-1 CDU-3	PM_{10}	Annual	Calculated from mass of measured particulates	Calculated as 5% of total PM by mass
REF-A-2 CDU-4	PM_{10}	Annual	Calculated from mass of measured particulates	Calculated as 5% of total PM by mass
REF-A-4 HPBH	PM_{10}	Annual	Calculated from mass of measured particulates	Calculated as 25% of total PM by mass
REF-A-6 Secondary processes	PM_{10}	Annual	Calculated from mass of measured particulates	Calculated as 5% of total PM by mass
RLFS sulphur monitoring	Heavy fuel oil surge vessel, V1802; Light fuel tank, T4027	As required by emission limit value calculation and hourly refinery bubble Periodic (i.e. by tank)	ISO method 8754 (1992), PrEN ISO 14596	
RFG sulphur monitoring	RFG fuel drums, V4808 and V4809	As required by emission limit value calculation and hourly refinery bubble	Composition ASTM D2-163-91(96)/ IP 264/72(01) in accordance with EN17025 sulphur	
Fugitive emissions of VOCs from operational plant at the installation, as described in Section 2.2.4 of their application.	VOCs	-	LDAR programme (to Tier 2 or higher with regard to the Institute of Petroleum [Energy Institute] protocol) for testing potential sources of fugitive emissions of VOCs	The operator shall complete repairs and/or carry out other actions to prevent, or where that is not possible, minimise continued emissions from those sources.

Table S3.6 Residue quality					
Emission point reference or source or description of point of measurement	**Parameter**	**Limit**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Bottom Ash	Total Organic Content (TOC) Loss On Ignition (LOI).	3% (TOC) or 5% (LOI) of the dry weight of the bottom ash	Quarterly	Environment Agency ash sampling protocol.	

Schedule 4 - Reporting

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Emissions to air – sulphur dioxide Parameters as required by condition 3.5.1.	REF-A-1, REF-A-2, REF-A-3, REF-A-4, REF-A-5, REF-A-6, REF-A-7, REF-A-8, REF-A-9, REF-A-10, REF-A-11 SHO-A-2, SHO-A-3, SHO-A-4, ALC-A-1. ALC-A-2	Quarterly	01/04/17
Emissions to air – sulphur dioxide Parameters as required by condition 3.5.1.	Refinery bubble as table S3.1 (b)	Quarterly	01/0417
Emissions to air – oxides of nitrogen Parameters as required by condition 3.5.1.	REF-A-1, REF-A-2, REF-A-3, REF-A-4, REF-A-5, REF-A-6, REF-A-7, REF-A-8, REF-A-9, REF-A-11 SHO-A-2, SHO-A-3, SHO-A-4, ALC-A-1. ALC-A-2	Quarterly	01/04/17
Emissions to air – dust Parameters as required by condition 3.5.1.	REF-A-11 REF-A-1, REF-A-2, REF-A-4, REF-A-5, REF-A-6, SHO-A-4	Quarterly	01/04/17
Emissions to air – carbon monoxide Parameters as required by condition 3.5.1.	REF-A-11 REF-A-1, REF-A-2, REF-A-4, REF-A-5, REF-A-6, SHO-A-4	Quarterly	01/04/17
Emissions to air – sour gas combustion products Parameters as required by condition 3.5.1.	REF-A-14, SHO-A-1	Quarterly	01/04/17
Emissions to air – sulphur dioxide Parameters as required by condition 3.5.1.	REF-A-12	Every two years (on maintenance turnaround)	01/01/08
Emissions to air – oxides of nitrogen Parameters as required by condition 3.5.1.	REF-A-12	Every two years (on maintenance turnaround)	01/01/08
Emissions to air – carbon monoxide Parameters as required by condition 3.5.1.	REF-A-12	Every two years (on maintenance turnaround)	01/01/08
Emissions to air – dust Parameters as required by condition 3.5.1.	REF-A-12	Every two years (on maintenance turnaround)	01/01/08
Emissions to air – dust Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – total organic carbon (TOC) Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – hydrogen chloride (HCl) Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – hydrogen fluoride (HF) Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – carbon monoxide Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – sulphur dioxide Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Emissions to air – oxides of nitrogen Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – cadmium and thallium and their compounds (total) Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – Mercury and its compounds Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium and their compounds Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to air – Dioxins / furans (I-TEQ) Parameters as required by condition 3.5.1.	ERP-A-1	Every 6 months	01/01/08
Emissions to water – Flow Parameters as required by condition 3.5.1	W1, W2, W3, W4	Quarterly	01/04/17
Emissions to water – Temperature Parameters as required by condition 3.5.1	W1, W2, W3	Quarterly	01/04/17
Emissions to water – pH Parameters as required by condition 3.5.1	W1, W2, W3, W4	Quarterly	01/04/17
Emissions to water – Suspended solids Parameters as required by condition 3.5.1	W1, W2, W3, W4	Quarterly	01/04/17
Emissions to water – COD Parameters as required by condition 3.5.1	W1, W2, W3, W4	Quarterly	01/04/17
Emissions to water – Hydrocarbon oil Parameters as required by condition 3.5.1	W1, W2, W3, W4	Quarterly	01/04/17
Emissions to water – Total N Parameters as required by condition 3.5.1	W1, W2, W3	Quarterly	01/04/17
Emissions to water – Phenols Parameters as required by condition 3.5.1	W1, W2, W3	Quarterly	01/04/17
Emissions to water – metals (As, Cd, Cr, Cu, Hg, Pb, Ni, Zn) Parameters as required by condition 3.5.1	W1, W2, W3	Quarterly	01/04/17
Emissions to water – cyanide Parameters as required by condition 3.5.1	W1, W2, W3	Quarterly	01/04/17
Emissions to water – fluoride Parameters as required by condition 3.5.1	W1	Quarterly	01/04/17
Emissions to water – Sulphide Parameters as required by condition 3.5.1	W1, W2, W3	Quarterly	01/04/17
LDAR	Installation wide	Annual	01/01/08
Sulphur monitoring for refinery liquid fuel system Parameters as required by condition 3.5.1	Heavy fuel oil surge vessel, V1802; Light fuel tank, T4027	Quarterly	01/04/17
Sulphur monitoring for refinery fuel gas Parameters as required by condition 3.5.1	RFG fuel drums, V4808 and V4809	Quarterly	01/04/17
Sulphur recovery unit Parameters as required by condition 3.5.1	SRU percentage recovery	Quarterly	01/04/17

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Sulphur Recovery Unit	Refinery sulphur balance and SRU availability	Quarterly	01/01/08
Emissions to air – Refinery Flare Sour gas and hydrogen sulphide	REF-A-14	Quarterly	01/04/17
Review of NOx factors	Emission points identified in response to IC10	Annual	01/04/17

Table S4.2 Annual production/treatment	
Parameter	**Units**
Hazardous waste incinerated	tonnes

Table S4.3 Performance parameters		
Parameter	**Frequency of assessment**	**Units**
Crude oil and other oil import (i.e. feedstocks)	Annually	tonnes
Water usage	Annually	Tonnes/ tonne feedstock
Energy usage (electrical)	Annually	MWh/ tonne feedstock
Energy usage (all fuels)	Annually	MJ/ tonne feedstock
Total release of oil to water per tonne of feedstock	Annually	g oil/ 1000 tonnes feedstock

Table S4.4 IED Chapter III Performance parameters		
Parameter	**Frequency of assessment**	**Units**
Annual fuel usage for each LCP	Annually	tJ
Total emission to air of NO_X for each LCP	Annually	Tonnes
Total emission to air of SO_2 for each LCP	Annually	Tonnes
Total emission to air of CO for each LCP	Annually	Tonnes
Total emission to air of dust for each LCP	Annually	Tonnes
Operating hours for each LCP	Annually	Hr

Table S4.5 Reporting forms or other form as agreed in writing by the Agency		
Media/parameter	**Reporting format**	**Date of form**
Air and Energy - LCP	Form IED AR1 – energy usage and emissions for the year (Table S4.4)	31/12/2016

Table S4.5 Reporting forms or other form as agreed in writing by the Agency		
Media/parameter	**Reporting format**	**Date of form**
Air – LCP	Form IED PM1 - discontinuous monitoring or other form as agreed in writing by the Agency	31/12/2016
Air – LCP	Form IED CON1 - continuous monitoring or other form as agreed in writing by the Agency	31/12/2016
Air – LCP	Form IEM CEM1 - continuous measurement systems invalidation log or other form as agreed in writing by the Agency	31/12/2016
Air – Sulphur Balance, SRU performance, Bubble & Annual Total	Form Air – 5 Refinery Sulphur Balance, SRU availability and efficiency, Refinery bubble and Annual SOx compliance or other form as agreed in writing by the Agency	01/01/08
Air – Fuels	Form Air – 6 Fuels used, sulphur contents, NOx factors and energy factors or other form as agreed in writing by the Agency	01/01/08
Air – Flares	Form Air – 7 Report of the sour gas and H_2S released from flaring. or other form as agreed in writing by the Agency	01/01/08
Air – ERP	Form Air – 8 Discontinuous monitoring on ERP or other form as agreed in writing by the Agency	31/12/2016
Air – CO, SO_2, NOx, Dust	Form Air – 9 Continuous monitoring on CO Boiler or other form as agreed in writing by the Agency	10/12/15
Air – SOx	Form Air – 10 Flaring report or other form as agreed in writing by the Agency	11/08/15
Water	Form Water – 1 or other form as agreed in writing by the Agency Flow, pH, temperature, Suspended solids, COD, Hydrocarbon Oil, Total Nitrogen and Phenols, Sulphide, Fluoride, Cyanide and Metals	31/12/2016
Water usage	Form Water usage1 or other form as agreed in writing by the Agency	01/01/08
Energy usage	Form Energy 1 or other form as agreed in writing by the Agency	01/01/08
Waste return	Form Waste 1 or other form as agreed in writing by the Agency	01/01/08
Other performance indicators: Table S3.5 Table S3.6 Table S4.2 Table S4.3	Form Performance 1 or other form as agreed in writing by the Agency	01/01/08

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/FP3139FN**
Name of operator	
Location of Facility	**Stanlow Manufacturing Complex** **PO Box 3** **Ellesmere Port** **Cheshire CH65 4HB**
Time and date of the detection	

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

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

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

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

Part B - to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

** authorised to sign on behalf of the operator*

Schedule 6 - Interpretation

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

"abnormal operation" means any technically unavoidable stoppages, disturbances, or failures of the abatement plant or the measurement devices [other than continuous emission monitors for releases to air of particulates, TOC and/or CO, during which the concentrations in the discharges into air and the purified waste water of the regulated substances may exceed the normal emission limit values.

"accident" means an accident that may result in pollution.

"annually" means once every year.

"APC residues" means air pollution control residues.

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

"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.

"back up fuel" means alternative liquid fuels that are used as back-up only to provide for exceptional periods as described in section 6 II of the "MFF Protocol"

"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.

"*bi-annual"* means twice per year with at least five months between tests;

"bottom ash" means ash from the kiln;

"BS EN 14181" will include the requirements of BS EN 15267-3 through QAL1. MCERTS certification for the appropriate ranges and determinands is a way of demonstrating of compliance with the requirements of BS EN 15267-3.

"calendar monthly mean" means the value across a calendar month of all hourly means.

"CEM" Continuous emission monitor

"CEN" means Commité Européen de Normalisation

"daily average" for releases of substances to air means the average of half-hourly averages over a calendar day during normal operation. Where any of abnormal operation, start up or shut down occur during the day in such a way that there are less than 43 half-hourly averages recorded during normal operation, no daily average shall be recorded for that day.

"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.

"*dioxin and furans*" means polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans.

"DLN" means dry, low NOx burners.

"DSD" means Dangerous Substances Directive.

"Duty of Care" shall have the meaning given to it in the Environmental Protection Act 1990

"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.

"ELV" means Emission Limit Value

"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 or background concentration limit**.**.

"FCCU" means fluidised catalytic cracking unit.

"fugitive emission" means an emission to air, water or land from the activities which is not controlled by an emission limit.

"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.

"hazardous property" has the meaning given in Schedule 3 of the Hazardous Waste (England and Wales) Regulations 2005 No.894 and the Hazardous Waste (Wales) Regulations 2005 No. 1806 (W.138). "Industrial Emissions Directive" means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 24 November 2010 on industrial emissions.

"incineration line" means all of the incineration equipment related to a common discharge to air location.

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

"invalid day" means any day in which more than three hourly average values are invalid.

"*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 (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.

"ISO" means International Standards Organisation.

"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 MWth or more, based on gross calorific value

"LDAR", means Leak Detection and Repair, a managed scheme and programme for testing potential sources of fugitive emissions, from operational plant at the installation, and repairing or carrying out other actions to prevent, or where that is not possible, minimise continued emissions from those sources. The LDAR programme at the installation shall be consistent with the requirements of the Institute of Petroleum (Energy Institute) Protocol.

'List of Wastes' means the list of wastes established by Commission Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, as amended from time to time

"LOI" means loss on ignition a technique used to determine the combustible material by heating the ash residue to a high temperature.

"MCERTS" means the Environment Agency's Monitoring Certification Scheme.

"mcr" means maximum continuous rating.

"MFF Protocol" means 'IED Chapter III Protocol for Multi-fuel Firing Refinery Combustion Plants granted a Permit prior to 7th January 2013'. Version 5 or any later version unless otherwise agreed in writing by the Environment Agency

"*Multi-fuel firing" or MFF* means the capability of burning more than one type of fuel.

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

"ncv" means net calorific value.

"notify without delay" and "notified without delay" means that a telephone call can be used, whereas all other reports and notifications must be supplied in writing, either electronically or on paper.

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

"PAH" means Poly-cyclic aromatic hydrocarbon, and comprises Anthanthrene, Benzo[a]anthracene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[b]naph(2,1-d)thiophene, Benzo[c]phenanthrene, Benzo[ghi]perylene, Benzo[a]pyrene, Cholanthrene, Chrysene, Cyclopenta[c,d]pyrene, Dibenzo[ah]anthracene, Dibenzo[a,i]pyrene Fluoranthene, Indo[1,2,3-cd]pyrene, Naphthalene

"PCB" means *Polychlorinated Biphenyl. Dioxin-like PCBs are the non-ortho and mono-ortho PCBs listed in the table below*

"quarterly" for reporting/sampling means after/during each 3 month period, January to March; April to June; July to September and October to December and, when sampling, with at least 2 months between each sampling date.

"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.

"Sector Guidance Note" means IPPC Sector Guidance Note on Gasification, Liquefaction and Refining Activities, IPPC S1.02.

"shut down", when applied to the incinerator, is any period where the plant is being returned to a non-operational state and there is no waste being burned.

"SRU" means sulphur recovery unit.

"start up", when applied to the incinerator, is any period where the plant has been non-operational, after igniting the auxiliary burner until waste has been fed to the incinerator in sufficient quantity to initiate steady-state conditions.

"TOC" means *Total Organic Carbon.* In respect of releases to air, this means the gaseous and vaporous organic substances, expressed as TOC. In respect of Bottom Ash, this means the total carbon content of all organic species present in the ash (excluding carbon in elemental form).

"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:

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

(b) in relation to emissions from gas turbine and compression ignition engine 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 15% dry for liquid and gaseous fuels; and/or

(c) 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.

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

(e) where hazardous wastes are burned in an incineration or co-incineration plant and the emissions of pollutants are reduced by gas treatment, standardisation of the gas with respect to oxygen content shall be carried out only if the oxygen concentration measured over the same period exceeds the relevant oxygen content defined in conditions [(a) – (c)] above. In other cases, the measured emissions shall be standardised only for moisture, pressure and temperature.

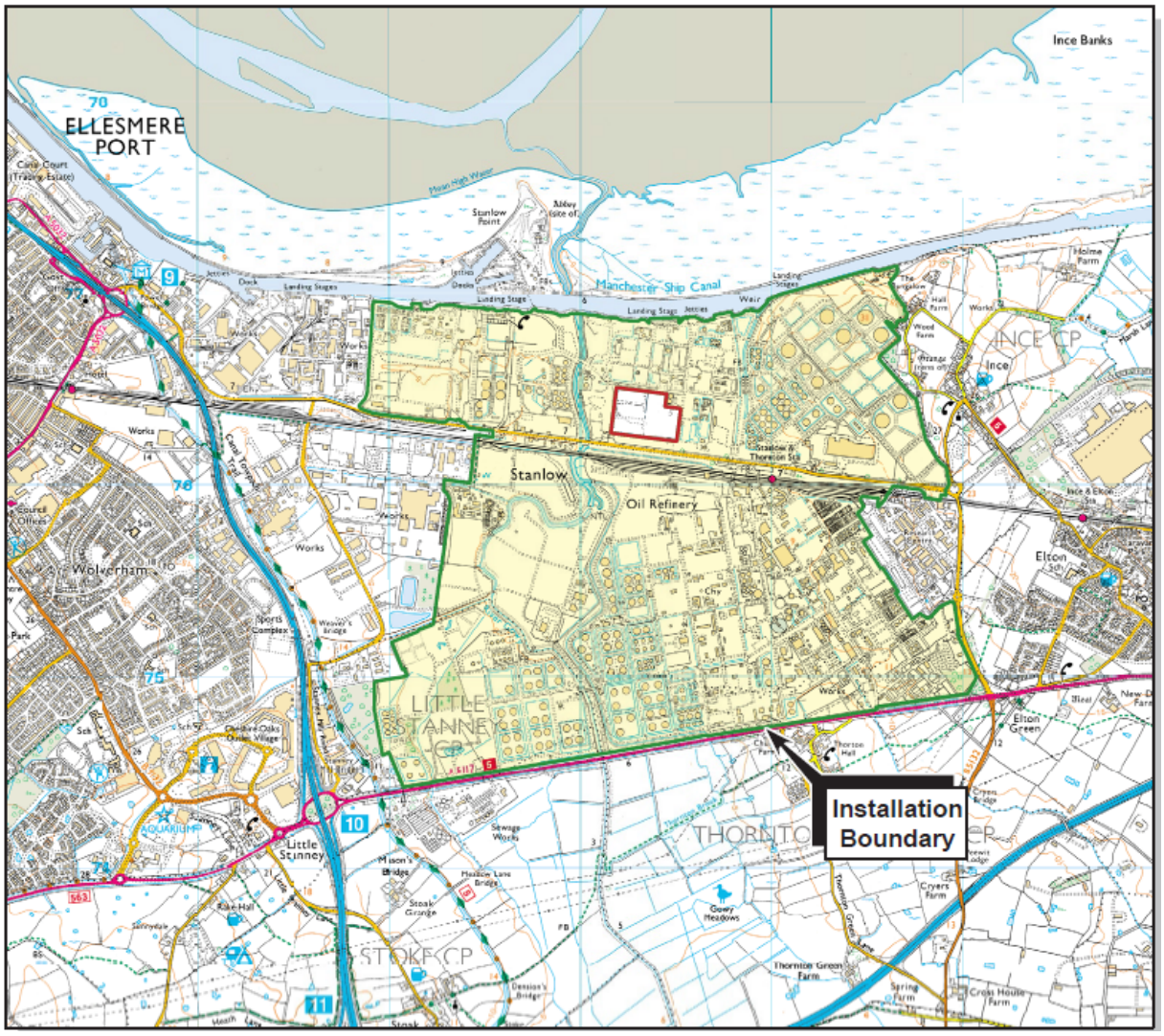
For dioxins/furans and dioxin-like PCBs the determination of the toxic equivalence concentration (I-TEQ, & WHO-TEQ for dioxins/furans, WHO-TEQ for dioxin-like PCBs) stated as a release limit and/ or reporting requirement, the mass concentrations of the following congeners have to be multiplied with their respective toxic equivalence factors before summing. When reporting on measurements of dioxins/furans and dioxin-like PCBs, the toxic equivalence concentrations should be reported as a range based on: all congeners less than the detection limit assumed to be zero as a minimum, and all congeners less than the detection limit assumed to be at the detection limit as a maximum.

TEF schemes for dioxins and furans				
Congener	***I-TEF(1990)***	***WHO-TEF (1997/8)***		
		Humans / Mammals	***Fish***	***Birds***
Dioxins				
2,3,7,8-TCDD	*1*	*1*	*1*	*1*
1,2,3,7,8-PeCDD	*0.5*	*1*	*1*	*1*
1,2,3,4,7,8-HxCDD	*0.1*	*0.1*	*0.5*	*0.05*
1,2,3,6,7,8-HxCDD	*0.1*	*0.1*	*0.01*	*0.01*
1,2,3,7,8,9-HxCDD	*0.1*	*0.1*	*0.01*	*0.1*
1,2,3,4,6,7,8-HpCDD	*0.01*	*0.01*	*0.001*	*<0.001*
OCDD	*0.001*	*0.0001*	*-*	*-*
Furans				
2,3,7,8-TCDF	*0.1*	*0.1*	*0.05*	*1*
1,2,3,7,8-PeCDF	*0.05*	*0.05*	*0.05*	*0.1*
2,3,4,7,8-PeCDF	*0.5*	*0.5*	*0.5*	*1*
1,2,3,4,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,7,8,9-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,6,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
2,3,4,6,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,4,6,7,8_HpCDF	*0.01*	*0.01*	*0.01*	*0.01*
1,2,3,4,7,8,9-HpCDF	*0.01*	*0.01*	*0.01*	*0.01*
OCDF	*0.001*	*0.0001*	*0.0001*	*0.0001*

TEF schemes for dioxin-like PCBs			
Congener	***WHO-TEF (1997/8)***		
	Humans / mammals	***Fish***	***Birds***
Non-ortho PCBs			
3,4,4',5-TCB (81)	*0.0001*	*0.0005*	*0.1*

TEF schemes for dioxin-like PCBs			
Congener	***WHO-TEF (1997/8)***		
	Humans / mammals	***Fish***	***Birds***
3,3',4,4'-TCB (77)	*0.0001*	*0.0001*	*0.05*
3,3',4,4',5 - PeCB (126)	*0.1*	*0.005*	*0.1*
3,3',4,4',5,5'-HxCB(169)	*0.01*	*0.00005*	*0.001*
Mono-ortho PCBs			
2,3,3',4,4'-PeCB (105)	*0.0001*	*<0.000005*	*0.0001*
2,3,4,4',5-PeCB (114)	*0.0005*	*<0.000005*	*0.0001*
2,3',4,4',5-PeCB (118)	*0.0001*	*<0.000005*	*0.00001*
2',3,4,4',5-PeCB (123)	*0.0001*	*<0.000005*	*0.00001*
2,3,3',4,4',5-HxCB (156)	*0.0005*	*<0.000005*	*0.0001*
2,3,3',4,4',5'-HxCB (157)	*0.0005*	*<0.000005*	*0.0001*
2,3',4,4',5,5'-HxCB (167)	*0.00001*	*<0.000005*	*0.00001*
2,3,3',4,4',5,5'-HpCB (189)	*0.0001*	*<0.000005*	*0.00001*

Schedule 7 - Site plan



END OF PERMIT