

Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Venator Materials UK Limited

Greatham Works
Tees Road
Hartlepool
TS25 2DD

Variation application number

EPR/TP3532PK/V010

Permit number

EPR/TP3532PK

Greatham Works

Permit number EPR/TP3532PK

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 the conditions that have been varied and schedule 2 comprises a consolidated permit which reflects the variations being made. All the conditions of the permit have been varied and are subject to the right of appeal.

Greatham Works is a regulated installation manufacturing titanium dioxide pigment and titanium tetrachloride. The activities permitted at the installation, according to the descriptions in Schedule 1 of the Environmental Permitting Regulations, are listed below:

- Section 4.2 Part A(1)(a)(v)(a) Producing inorganic chemicals;
- Section 5.4 Part A(1)(a)(ii) Disposal of non-hazardous waste in a facility with a capacity exceeding 50 tonnes per day by physico-chemical treatment;
- Section 1.1 Part A(1)(a) Burning any fuel in an appliance with a rated input of 50 megawatts or more.

Prior to this variation, high pressure steam for process supply was raised on site using four boilers emitting through a common stack (existing LCP 354, emission point A250). Since 01/01/2016, LCP 354 has operated under the interim compliance route set by the Transitional National Plan (TNP) for Large Combustion Plants (LCP) according to Chapter III of the Industrial Emissions Directive (IED).

This variation permits the replacement of the existing LCP354 with a new, more modern and energy efficient boiler plant (LCP 671) that provides the same service of the existing plant being replaced.

LCP 671 consists of four new fire tube boilers with a total capacity of 108 tph of steam at 255-275°C and 24barg. LCP 671 has total net rated thermal input of 81.6 MW and is fired on natural gas. Flue gases are emitted through a common stack with 40m height (emission point A251).

The existing LCP 354 will be decommissioned after LCP671 is commissioned and started-up, however LCP 354 is retained in the permit to allow its operation until the end of the TNP on 30/06/2020, whilst the new LCP 671 is commissioned. LCP 354 and LCP 671 are not permitted to operate simultaneously, other than for the testing and commissioning activities of LCP 671.

No other changes to the operations of the chemical works are permitted by this variation; the rest of the installation is unchanged and continues to be operated as follows:

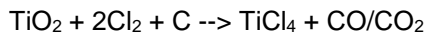
Purpose of original Permit

The installation is located on Tees Road, Hartlepool, Cleveland, TS25 2DD. The centre of the main site is at National Grid Reference 4516 5266 and occupies an area of about 23 hectares.

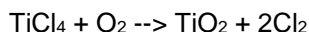
The site currently produces titanium dioxide pigment at up to 150,000 tonnes/year, and in addition up to 12,000 tonnes/year of the intermediate titanium tetrachloride can be produced for export.

The process produces high purity titanium dioxide and titanium tetrachloride from titanium dioxide ores. The chemistry of the process is a chlorination reaction followed by an oxidation reaction as follows:

Chlorination:



Oxidation:



ICON 1 and ICON 2 are the chlorination and oxidation plants, with TiO₂ product finishing taking place at the Wet Treatment and Packing plant.

Raw Materials

Ores are delivered to site by tipper wagons which discharge into a reception hopper fitted with a dust hood. The ore is then moved by belt conveyors, screw conveyors, and a bucket elevator into storage silos which vent directly to atmosphere and bunkers which have filtered vents. Releases of dust are minimised during the movement of the ore by means of local extraction fans, which discharge to atmosphere via dust filters, at points where the ore changes direction.

Coke is handled in a similar manner to the ores. However, although powdered coke can be offloaded from tipper wagons, it is more usually pneumatically discharged from tankers directly into process bunkers. The coke silo has a filtered vent designed to handle the conveying air.

Chlorine is delivered to the site in road tankers and unloaded by air padding into bulk storage tanks. The chlorine storage tanks are protected from overpressure by bursting discs which vent to an expansion tank which in turn vents to a caustic scrubbing system.

Chlorination

In the chlorination stage, titanium oxide ores are converted to pure titanium tetrachloride. This is achieved by reacting the ores with chlorine in the chlorination reactor, then cooling the resulting gas to precipitate various metal chloride impurities, further scrubbing of the gas with liquid titanium tetrachloride and condensing the titanium tetrachloride out of the product stream. The condensed product can contain some impurities and these are removed by distillation to give a pure titanium tetrachloride product. The "tail gas" which remains after the titanium tetrachloride has been condensed is principally nitrogen, carbon dioxide, carbon monoxide, carbonyl sulphide, hydrogen sulphide and small amounts of hydrogen chloride, titanium tetrachloride and silicon tetrachloride. The tail gas is monitored continuously for chlorine on both plants and, if chlorine is detected, the plant is shut down to minimise the release of chlorine. Chlorine releases are further minimised by feeding caustic soda into the scrubber circulating liquor.

On each of the ICON plants a thermal oxidiser and an alkaline scrubber have been constructed for the abatement of releases to air of carbon monoxide, carbonyl sulphide, hydrogen sulphide and sulphur dioxide. In fault conditions the tail gas may contain chlorine.

The metal chloride impurities are neutralised with either lime or chalk and filtered in a filter press. Solids from the filter press are landfilled and the filtrate is discharged into the site liquid effluent lagoons.

Oxidation

In the oxidation stage oxygen and vaporised titanium tetrachloride are fed into an electric plasma arc reactor. The reactor product, a mixture of chlorine, oxygen and nitrogen gases with titanium dioxide powder feeds directly from the reactor into the cooling and separation section. Cooling takes place in water-cooled pipes which are scoured with sand to prevent product build-up occurring. The cooled product is fed to a filter which separates the product and sand from the tail gas which is recycled to the chlorination section. Product from the filter is discharged into a conveyor which is purged with either nitrogen or air in order to disentrain chlorine from the raw product into the filter exit gas.

The raw product is mixed with water to form a slurry before passing to a classifier where the sand is separated for disposal at an appropriate licensed waste disposal site. Any residual chlorine is either carried forward to wet treatment or routed to a caustic soda scrubbing column before discharge to atmosphere.

The slurry is then fed to the Wet Treatment Stage for conversion into the finished product.

Wet Treatment and Packing

In the wet treatment process the raw titanium dioxide is initially milled with electrofused zirconia/silica beads and then classified using rotary screens and hydrocyclones. The classified slurry is then mixed with various additives which give the surface properties required by customer specifications.

During this process some residual chlorine is released and vented via a dedicated ventilation system. The slurry is then passed to a vacuum filter where it is washed and re-slurried before being re-filtered on a segmental disc vacuum filter. The dewatered filter cake is then spray-dried in a natural gas/LPG direct-fired drier which exhausts to atmosphere via a bag filter. Each spray drier exhaust is fitted with a particulate monitor. Dried product is then fed to fluid energy mills which use superheated steam to impart the milling energy. The milled pigment product discharges from the vortex of the mill to storage bunkers and the steam exhausts via a filter to an energy recovery system. Each fluid energy mill is fitted with a particulate monitor.

All filtrates and washings from wet treatment are settled to enable solids to be recycled and liquids are then passed to final settlement lagoons before discharge to controlled waters.

Pigment product is packed in bags, Intermediate Bulk Containers (IBCs) and bulk wagons. During packing operations the product powder is conveyed using air and this vents to atmosphere via filters.

Titanium tetrachloride product is despatched in drums and road tankers which vent to atmosphere via scrubbing systems.

Chlorine Recovery

On the ICON plants the off-gas from the oxidation stage is recycled directly to chlorination.

Vent Cleaning

Chlorine contamination of gaseous effluent streams and relief vents is removed by a caustic soda scrubbed packed column. Spent sodium hypochlorite from the scrubber is either sold as a by-product or catalytically decomposed to sodium chloride and oxygen which vents directly to atmosphere. The sodium chloride solution is discharged into the liquid effluent system.

The point source releases to air are primarily off-gas from the chlorination reaction in the ICON (**I**ntegrated **C**lorination and **O**xidation) plants (carbon dioxide, carbon monoxide, sulphur dioxide, carbonyl sulphide), steam from the milling operation in the Finishing plant, combustion products (carbon dioxide, oxides of sulphur and nitrogen) from the boiler plant and other process heating duties. Exhaust streams from operations handling powdery or granular material are passed through fabric filters to minimise particulate releases to atmosphere.

There is one main outfall, which discharges all the site liquid effluent. Discharge only takes place on the ebb tide in order to ensure dispersion into a substantial volume of seaward flowing water. The site effluent is predominantly inorganic and before discharge all site wastewater is neutralised and precipitated solids removed by filtration or settling. This reduces the concentration of any potentially harmful metal species to levels so low they have no significant environmental effect.

The site generates a large volume of non-hazardous process waste. The great majority of the non-hazardous process waste consists of metal hydroxides and oxides, which originate from the impurities in the titanium dioxide ores processed. It is taken to a suitably licensed site for disposal.

The site operates and maintains an Environmental Management System (EMS) certified to ISO 14001. The schedules specify the changes made to the permit.

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 TP3532PK (EPR/TP3532PK/A001)	05/08/05	Application for an environmental permit.
Additional information requested	13/01/06	Information on coke trials and waste heat boilers requested.
Additional information requested	28/01/06	Additional information on filters.
Extension requested	06/02/06	Query over cross reference on pg30 (heading B2.1, section 329) should be B2.2.19 and not B2.2.16.
Additional information received	06/02/06	Addendum relating to coke trials and waste heat boilers.
Additional information received	13/03/06	E-mail received explaining that stack A31 had been disconnected from the plant and that stacks A224 and A225 were operational. A224 is an intermittent vent, not necessarily in operation every month.
Additional information received	20/03/06	Addendum 2 relating to new bauxite vents A226 and A227 – IPC Variation CA 3394 24/03/06 refers.
Additional information received	15/05/06	Email requesting response to comments on ASR.
Permit EPR/TP3532PK granted	16/06/06	Permit granted to Tioxide Europe Limited.
Variation EPR/TP3532PK/V002 (LP3634ML) issued	16/04/07	Corrections and clarification.
Variation application EPR/TP3532PK/V003 (GP3034UA)	27/04/07	An increase in site capacity to 150,000 tonne/year of TiO ₂ pigment plus 12,000 tonne/year of titanium tetrachloride for export.
Variation EPR/TP3532PK/V003 issued	15/10/07	Varied permit issued.
Variation EPR/TP3532PK/V004 (EP3939XQ) issued	17/12/07	To implement the requirements of the NERP as set out in the LCPD.
Variation application EPR/TP3532PK/V005	Duly made 07/04/10	To change the max sulphur content of the coke and to amend monitoring methods.
Variation EPR/TP3532PK/V005 issued	09/09/10	Varied and consolidated permit issued
Variation application EPR/TP3532PK/V006	07/12/12	Change of company registered address to; Titanium House, Stockton-on-Tees.
Variation EPR/TP3532PK/V006 issued	12/12/12	Varied permit issued to Tioxide Europe Limited.
Environment Agency variation EPR/TP3532PK/V007 issued	17/12/13	Environment Agency variation to implement the changes introduced by IED.
Regulation 60 Notice sent to the Operator	31/10/14	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	23/03/15	Response received from the Operator.
Additional information received	15/06/15	Response to request for further information (RFI) dated 13/05/15.

Variation determined EPR/TP3532PK/V008 (Billing ref: BP3738AE)	17/12/15	Varied and consolidated permit issued. Variation effective from 01/01/16. Consolidation based on EPR/TP3532PK/V005, not been fully updated to modern conditions
Notified of change of Company Name	28/01/19	Name changed to Venator Materials UK Limited
Variation issued EPR/TP3532PK/V009	01/02/19	Varied permit issued to Venator Materials UK Limited
Application EPR/TP3532PK/V010 (variation and consolidation)	Duly made 29/07/19	Application to replace the existing boiler plant (LCP 354) with a new boiler plant (LCP 671). Application to vary and update the permit to modern conditions.
Additional information received	16/08/19	Additional information on the assumptions for the Energy Efficiency Directive Article 14 Cost Benefit Analysis.
Additional information received	11/09/19	Additional information on the proposed MSUL / MSDL criteria for LCP 671.
Response to Schedule 5 Notice dated 21/08/19 received	30/09/19	Additional information on compliance with LCP BAT conclusions 10, 11, 13, 14. Updated air dispersion model.
Variation determined EPR/TP3532PK (Billing ref: FP3309PB)	10/12/19	Varied permit issued.

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

Permit number

EPR/TP3532PK

Issued to

Venator Materials UK Limited (“the operator”)

whose registered office is

**Titanium House
Hazard Drive
Wynyard Park
Stockton On Tees
TS22 5FD**

company registration number 00832447

to operate a regulated facility at

**Greatham Works
Tees Road
Hartlepool
TS25 2DD**

to the extent set out in the schedules.

The notice shall take effect from 10/12/2019

Name	Date
Simon Hunt	10/12/2019

Authorised on behalf of the Environment Agency

Schedule 1

All conditions have been varied by the consolidated permit as a result of the application made by the operator.

Schedule 2 – consolidated permit

Consolidated permit issued as a separate document.

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/TP3532PK

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/TP3532PK/V010 authorising,

Venator Materials UK Limited (“the operator”),

whose registered office is

**Titanium House
Hazard Drive
Wynyard Park
Stockton On Tees
TS22 5FD**

company registration number 00832447

to operate an installation at

**Greatham Works
Tees Road
Hartlepool
TS25 2DD**

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

Name	Date
Simon Hunt	10/12/2019

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) take appropriate measures to ensure the efficiency of energy generation at the permitted installation is maximised;
- (c) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and
- (d) take any further appropriate measures identified by a review.

1.3 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”).

2.2 The site

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

2.3 Operating techniques

- 2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.
- 2.3.2 For the following activities referenced in schedule 1, table S1.1: LCP 354 and LCP 671. The activities shall be operated in accordance with the “Electricity Supply Industry IED Compliance Protocol for Utility Boilers and Gas Turbines” dated December 2015 or any later version unless otherwise agreed in writing by the Environment Agency.
- 2.3.3 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 or other documentation (“plan”) specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.
- 2.3.4 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.
- 2.3.5 For the following activities referenced in schedule 1, table S1.1: LCP 354 and LCP 671. The end of the start-up period and the start of the shutdown period shall conform to the specifications set out in Schedule 1, tables S1.2 and S1.4.
- 2.3.6 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.
- 2.3.7 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.

2.4 Improvement programme

- 2.4.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency.
- 2.4.2 Except in the case of an improvement which consists only of a submission to the Environment Agency, the operator shall notify the Environment Agency within 14 days of completion of each improvement.

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, S3.1a and S3.2.
- 3.1.2 The limits given in schedule 3 shall not be exceeded.
- 3.1.3 Total annual emissions from the emission point(s) set out in schedule 3 tables S3.1 of a substance listed in schedule 3 table S3.3 shall not exceed the relevant limit in table S3.3.
- 3.1.4 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

3.2 Emissions of substances not controlled by emission limits

- 3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.
- 3.2.2 The operator shall:
- (a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;
 - (b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.
- 3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Odour

- 3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.
- 3.3.2 The operator shall:
- (a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;
 - (b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.4 Noise and vibration

- 3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to
- 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, S3.1a and S3.2;
 - (b) process monitoring specified in table S3.4;
- 3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.
- 3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the Environment Agency.
- 3.5.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1, S3.1a and S3.2 unless otherwise agreed in writing by the Environment Agency.

3.6 Monitoring for Large Combustion Plant

- 3.6.1 All monitoring required by this permit shall be carried out in accordance with the provisions of Annex V of the Industrial Emissions Directive and the Large Combustion Plant Best Available Techniques Conclusions.
- 3.6.2 If the monitoring results for more than 10 days a year are invalidated within the meaning set out in condition 3.6.7, the operator shall:
- (a) within 28 days of becoming aware of this fact, review the causes of the invalidations and submit to 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 proposals.
- 3.6.3 Continuous measurement systems on emission points from the LCP shall be subject to quality control by means of parallel measurements with reference methods at least once every calendar year.
- 3.6.4 Unless otherwise agreed in writing by 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 and S3.1a; the Continuous Emission Monitors shall be used such that:
- (a) for the continuous measurement systems fitted to the LCP release points defined in table(s) S3.1 and S3.1a the validated hourly, monthly, yearly and daily averages shall be determined from the measured valid hourly average values after having subtracted the value of the 95% confidence interval;
 - (b) the 95% confidence interval for nitrogen oxides and sulphur dioxide of a single measured result shall be taken to be 20%;
 - (c) the 95% confidence interval for dust releases of a single measured result shall be taken to be 30%;
 - (d) the 95% confidence interval for carbon monoxide releases of a single measured result shall be taken to be 10%;
 - (e) an invalid hourly average means an hourly average period invalidated due to malfunction of, or maintenance work being carried out on, the continuous measurement system. However, to allow some discretion for zero and span gas checking, or cleaning (by flushing), an hourly average period will count as valid as long as data has been accumulated for at least two thirds of the period. Such discretionary periods are not to exceed more than 5 in any one 24-hour period unless agreed in writing. Where plant may be operating for less than the 24-hour period, such discretionary periods are not to exceed more than one quarter of the overall valid hourly average periods unless agreed in writing; and
 - (f) any day, in which more than three hourly average values are invalid shall be invalidated.

4 Information

4.1 Records

- 4.1.1 All records required to be made by this permit shall:
- (a) be legible;
 - (b) be made as soon as reasonably practicable;
 - (c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and
 - (d) be retained, unless otherwise agreed in writing by 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; and
 - (c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule.
- 4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:
- (a) in respect of the parameters and emission points specified in schedule 4 table S4.1;
 - (b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.4; and
 - (c) giving the information from such results and assessments as may be required by the forms specified in those tables.
- 4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.
- 4.2.5 The Operator shall review fugitive emissions, having regard to the application of Best Available Techniques, on an annual basis, or such other period as shall be agreed in writing by the Environment Agency, and a summary report on this review shall be sent to the Environment Agency detailing such releases and the measures taken to reduce them within 3 months of the end of such period.

4.3 Notifications

- 4.3.1 In the event:
- (a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—
 - (i) inform the Environment Agency,
 - (ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and
 - (iii) take the measures necessary to prevent further possible incidents or accidents;
 - (b) of a breach of any permit condition the operator must immediately—
 - (i) inform the Environment Agency, and
 - (ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;
 - (c) of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored;

- (d) of any malfunction or breakdown of abatement equipment resulting in simultaneous diversion of ICON 1 and ICON 2 waste gas streams from the abatement equipment to the respective process vents for 4 hours or more time, the operator shall notify the Environment Agency within 72 hours of the end of the dual divert period unless notification has already been made under (a) to (c) above.

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, or 4.3.1 (d) where the information relates to malfunction or breakdown of abatement equipment 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.

4.4 Interpretation

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

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made “immediately”, in which case it may be provided by telephone.

Schedule 1 – Operations

Table S1.1 activities			
Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
AR1	Section 4.2 Part A(1)(a)(v)(a) Producing inorganic chemicals such as: non-metals, metal oxides, metal carbonyls or other inorganic compounds such as calcium carbide, silicon, silicon carbide, titanium dioxide	Chlorination of titanium ore to produce $TiCl_4$. Oxidation of $TiCl_4$ to produce TiO_2 .	From handling of raw materials, receipt and storage, input to the process through, distillation, oxidation, classification, storage and packing.
AR2	Section 5.4 Part A(1)(a)(ii) Disposal of non-hazardous waste in a facility with a capacity exceeding 50 tonnes per day by physico-chemical treatment	Neutralisation of aqueous effluent, filtration, lagoon settling, collection of filtered solids prior to off-site disposal.	From collection of effluent and neutralisation in dedicated tanks to filtration and collection of solids.
AR3	Section 1.1 Part A(1) (a) Burning any fuel in an appliance with a rated input of 50 megawatts or more	LCP 354 Steam generation plant including four natural gas fired boilers (2, 4, 5 & 6), with a combined thermal input of 80 MW. Each capable of producing 23 tonne/hour of superheated steam at 250°C and 24 barg.	From feed water treatment, steam raising to release of combustion gases. Permitted to operate until the end of the TNP (30/06/2020) or completion of commissioning of LCP 671, whichever is sooner. Simultaneous operation of LCP 354 and LCP 671 is not permitted during normal operating conditions: refer to notes to Table S3.1.
		LCP 671 Steam generation plant including four natural gas fired boilers, with a combined thermal input of 81.6 MW. Each capable of producing 27 tonne/hour of superheated steam at 255-275°C and 24 barg.	From feed water treatment, steam raising to release of combustion gases. Simultaneous operation of LCP 354 and LCP 671 is not permitted during normal operating conditions: refer to notes to Table S3.1.

Table S1.1 activities			
Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
	Directly Associated Activity		
AR4	Reverse osmosis plant	Reverse osmosis plant operated by Anglian Water Services supplying up to 250 m ³ /hr of treated water.	From feedwater input to discharge of effluent to site treatment plant.

Table S1.2 Operating techniques		
Description	Parts	Date Received
Application EPR/TP3532PK/A001	The response to questions B2.1 and B2.2 of the Application Form given in pages/section B2.3 and B2.4 of the application	5/08/05
Additional information	Requested information on coke trials and Waste Heat boilers	02/02/06, 06/02/06
Additional information	Information provided on new and non-operational stacks	13/03/06
Additional information	New bauxite vents A226 and A227	20/03/06
Additional information	Requested information on ASR	19/05/06
Application for variation EPR/TP3532PK/V003	Amendments to sections B2.1 and B2.2 in the original Application as given in sections C2.1 and C2.2 in this Application for variation.	27/04/07
Application for variation EPR/TP3532PK/V005	Information provided on the installation of the auxiliary pipeline system given in Section 1, subsection 040/042/043 of the original PPC Application and in Section 2 Attachment 1 – Non-technical summary of this variation Application.	August 2005 March 2010
Response to Regulation 60(1) Notice – request for information dated 31/10/14	Compliance route and operating techniques identified in response to questions: 362 (TNP compliance route for NO _x) 365 (net rated thermal input) 366 (start-up and shut-down load)	23/03/15
Application for variation EPR/TP3532PK/V010	The responses to the questions of section 6 of the Application Form Part C2 and sections 3, 4 and 5 of the Application Form Part C3, including the following: - Supporting Information - Part C2 - Environmental Risk Assessment - Supporting Information - Part C3 - BAT Assessment (against the Commission Implementing Decision (EU) 2017/1442 of 31 July 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for large combustion plants) - Document titled 'Uses of steam at Greatham – 24.07.19' - Document titled 'GM/00592 Greatham Replacement Boilers Environmental Permit Variation - Commissioning Plan'.	Duly made 29/07/19
Variation EPR/TP3532PK/V010 Additional information	Response to request for additional information on the proposed MSUL / MSDL criteria for LCP 671.	Received 11/09/19

Table S1.2 Operating techniques		
Description	Parts	Date Received
Variation EPR/TP3532PK/V010 Response to Schedule 5 Notice dated 21/08/19	Document titled 'Response to Schedule 5 Notice dated 21/08/19' including additional information on other than normal operating conditions, compliance with LCP BAT conclusions 10, 11, 13 and 14 and updated air dispersion modelling report titled 'Air quality assessment'.	Received 30/09/19

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC 1	The Operator shall review containment measures for the prevention or minimisation of liquid releases from all process, storage and waste areas, including sub-surface structures and bulk storage taking into account Agency Guidance Notes IPPC S4.03, May 2004. On completion of the review a summary report shall be submitted in writing to the Agency, including a timetable for implementation of any identified improvements.	Complete (Variation EPR/TP3532PK/V005)
IC 2	The Operator shall review the usage of water on-site with the objective of further reducing the quantity of water utilised in the process and process washings. On completion of the review a summary report shall be submitted in writing to the Agency, including a timetable for implementation of any improvements identified.	Complete (Variation EPR/TP3532PK/V005)
IC 3	<p>The Operator shall undertake a review of monitoring procedures having regard to Environment Agency Technical Guidance Notes M1, M2 and M18, the monitoring standards listed in Tables 2.2.2 and 2.2.5, and MCERTS certification/accreditation as specified in conditions 2.10.7. On completion of the review the Operator shall submit a summary report in writing to the Agency, setting out the monitoring methods used for both sampling and analysis. The report shall as a minimum consider</p> <p>The validation of current methods against standards as specified in Tables 2.2.2 and 2.2.5 of this Permit, and a timetable to implement any improvements identified to meet the standards as specified in Tables 2.2.2 and 2.2.5 of this Permit. or</p> <p>Proposals for any alternative monitoring where that specified in Tables 2.2.2 and 2.2.5 cannot be achieved;</p> <p>The MCERTS certification/accreditation status of equipment, and /or the monitoring organisation as appropriate for the methods used for sampling and analysis.</p> <p>A timetable for achieving the MCERTS standard or an equivalent acceptable to the Agency, for any elements that are not currently MCERTS.</p>	Complete (Variation EPR/TP3532PK/V005)
IC 4	The Operator shall develop a written Site Closure Plan with regard to the requirements set out in Section 2.11 of the Agency Guidance Notes IPPC S4.03, May 2004.	Complete (Variation EPR/TP3532PK/V005)
IC 5	The Operator shall review the use of the HCFC refrigeration systems and develop a planned programme to replace existing equipment with non-HCFC refrigerants with a completion time scale and submit this review to the Agency.	Complete (Variation EPR/TP3532PK/V005)

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC 6	The Operator shall submit a plan which details how the availability of the thermal oxidisers and associated abatement equipment for ICON 1&2 will be improved to achieve a minimum of 90% availability. (The percentage availability is to be calculated for periods when waste gas is on line to the thermal oxidiser). The plan shall be accompanied by a review and feasibility study detailing the options available for improving thermal oxidiser reliability and reducing the probability of exceedances of the short term carbon monoxide and carbonyl sulphide environmental quality standard action level.	Complete (Variation EPR/TP3532PK/V005)
IC 7	Prior to commencing the site trials detailed in the Application for Variation CA3394 the Operator shall submit a written report to the Agency. The report shall detail the expected programme for the trials including anticipated start and finish dates and proposals for aborting trials in the event of the COCOS thermal oxidiser units not being available. The report shall also detail the criteria which will be used to judge the success or otherwise of the trials. These criteria shall as a minimum cover the following areas: i) impact of higher sulphur coke on gaseous emissions ii) impact of higher sulphur coke on aqueous emissions iii) impact of higher sulphur coke on quantity and composition of solid waste streams iv) environmental impact of releases v) efficiency and impact on overall Titanium Dioxide production process	Complete (Variation EPR/TP3532PK/V005)
IC 8	a) The Operator shall update the Environment Agency on plans to carry out the site coke trials as previously detailed in IC7 response submitted on 23 June 2006. b) Following completion of these site trials the Operator shall submit a written report to the Agency describing the trials. As a minimum the report shall: i) detail and summarise all monitoring of solid, aqueous and gaseous waste streams undertaken during the trials ii) detail and summarise all monitoring of ore and coke feed stocks undertaken during the trial iii) detail the sulphur mass balance for the process iv) detail the impact of the trials on the overall efficiency of the Titanium Dioxide production process v) review the environmental impact of using higher sulphur coke	Complete (Variation EPR/TP3532PK/V005)
IC9	a) A written plan shall be sent to the Agency for approval to undertake off-site ambient monitoring for carbon monoxide during periods when waste gases are released to atmosphere from the Divert stack(s). The proposal shall take in to account the Environment Agency's Technical Guidance Notes M8 and M9 and shall include proposed dates for this monitoring. b) The plan shall be implemented by the Operator from the date of written approval by the Agency. A written report of the findings from the monitoring shall be submitted to the Agency.	Complete (Variation EPR/TP3532PK/V005)
IC10	For LCPD LCP 80 (now LCP 354 under IED). Annual emissions of dust, sulphur dioxide and oxides of nitrogen including energy usage for the year 01/01/2015 to 31/12/2015 shall be submitted to the Environment Agency using form AAE1 via the NERP Registry. If	Complete (Variation EPR/TP3532PK/V010)

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
	the LPCD LCP was a NERP plant the final quarter submissions shall be provided on the RTA 1 form to the NERP Registry.	
IC11	The operator shall submit for approval to the Environment Agency a summary of the site Environmental Management System (EMS) updated to implement the changes related to the operations of the new LCP 671, including management of other than normal operating conditions (OTNOC), and make available for inspection all documents, procedures and operating instructions which form part of the EMS relevant to LCP 671.	Within four months from determination date of variation EPR/TP3532PK/V010
IC12	<p>The Operator shall submit a written report for approval by the Environment Agency on the commissioning of LCP 671 and confirm decommissioning of LCP 354. The report shall summarise the environmental performance of the LCP 671 as installed against the design parameters set out in the Application, including, but not limited to, confirmation of the following parameters, along with any relevant supporting information:</p> <ul style="list-style-type: none"> - Net Thermal Input and Net Total Fuel Utilisation of the plant based on performance tests carried out according to EN standards (or ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality); - Confirmation of Minimum Start-up Load and Minimum Shut-down Load points and criteria set out in the application. <p>The report shall also include a review of the performance of LCP 671 against the conditions of this permit and provide details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions.</p>	Within four months from completion of commissioning of LCP 671
IC13	<p>The operator shall review the technical and commercial viability of recovering waste heat from the operation of LCP 671, in line with the applicable requirements of Article 14 of the Energy Efficiency Directive. The assessment shall review and refine where possible the assumptions, analysis and conclusions of the cost benefit analysis submitted with application EPR/TP3532PK/V010 (document titled 'Technical Note: Venator Cost Benefit Analysis', received 29/07/19), taking in consideration any of the following factors:</p> <ul style="list-style-type: none"> (a) new potential waste heat users, including, where applicable, new plans for significant developments within relevant distance of the installation; (b) opportunities for more profitable arrangement for the sale of waste heat than what assumed at the time of the application; (c) changes to the Local Plan; (d) changes to the DECC UK CHP Development Map or similar; and (e) new financial or fiscal incentives for waste heat recovery. 	Within four years from determination date of variation EPR/TP3532PK/V010

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
	The results shall be reported in writing to the Environment Agency for review and approval, including where there has been no change to the original assessment in respect of the above factors.	

Table S1.4 Start-up and Shut-down thresholds		
Emission Point and Unit Reference	“Minimum Start-Up Load” When two of the criteria listed below for the LCP or unit have been met.	“Minimum Shut-Down Load” When two of the criteria listed below for the LCP or unit have been met
A250 LCP 354 Boilers	<ol style="list-style-type: none"> 1. 7 t/hr steam flow 2. >Steam pressure 21.5 barg 3. >Steam temperature 230°C 	<ol style="list-style-type: none"> 1. < 7 t/hr steam flow 2. < Steam pressure 21.5 barg 3. < Steam temperature 230°C
A251 LCP 671 Boilers	<p>When two of the criteria listed below for an individual boiler of LCP 671 have been met:</p> <ol style="list-style-type: none"> 1. Steam flow \geq 10 tph 2. Steam pressure \geq 23 barg 3. Steam temperature \geq 255 degC <p>[Note 1]</p>	<p>When two of the criteria listed below for an individual boiler of LCP 671 have been met:</p> <ol style="list-style-type: none"> 1. Steam flow < 10 tph 2. Steam pressure < 23 barg 3. Steam temperature < 255 degC <p>[Note 1]</p>
Notes <ol style="list-style-type: none"> 1. Minimum Start-Up Load (MSUL) and Minimum Shut-Down Load (MSDL) criteria listed for LCP 671 are to be confirmed after commissioning upon completion of improvement condition IC12. 		

Schedule 2 – Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	Specification
Natural rutile ore, Synthetic rutile ore & slag	Sulphur content in raw material Normal 0.7 % w/w (Note 1) Maximum 0.8% w/w
Coke	Normal operation and change over (Note 2) 4.0% w/w Abnormal operation (Note 2) 2.0 % w/w
<p>Notes:</p> <ol style="list-style-type: none"> 19 of the 20 most recent ore shipments are to be less than or equal to 0.7% w/w sulphur. The following definitions apply to this table: <i>“abnormal operation”</i> means when waste gas is on line to both divert stacks (release points A19 and A202) <i>“changeover”</i> means the operational time period when waste gas is first introduced to a second divert stack, such that waste gas is on line to both divert stacks at the same time, until such time that the coke feed day bunker is emptied of max 4.0%w/w sulphur coke, having not been replenished with this material <i>“normal operation”</i> means when waste gas on line to one or both COCOS scrubber stacks or one of the divert stacks (release point A19 or A202) 	

Schedule 3 – Emissions and monitoring

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply until 30 June 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A5 [NZ 5159 2647]	Coke Transfer Point Dust Filter Vent	No parameter set	No limit set	--	--	--
A11 [NZ 5159 2647]	Ore/Coke Unloading Dust Hood Filter Vent	No parameter set	No limit set	--	--	--
A13 [NZ 5159 2646]	Coke Silo Dust Filter Vent	No parameter set	No limit set	--	--	--
A19 [NZ 5144 2637]	ICON1 Divert Process Stack	Hydrogen chloride	10 mg/m ³	--	Annual	BS EN 1911
		Chlorine	5 mg/m ³	Daily average	Continuous ⁽⁴⁾	
		Chlorine	40 mg/m ³	Maximum	Continuous ⁽⁴⁾	
		Particulate	50 mg/m ³	--	Annual	BS EN 13284-1
A20 NZ 5153 2634]	ICON1 Rutile Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A21 [NZ 5153 2635]	ICON1 Ore Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A22 [NZ 5153 2636]	ICON1 Coke Day-Bunker Vent Filter	No parameter set	No limit set	--	--	--
A23 [NZ 5151 2636]	ICON1 Lime Silo Filter Vent	No parameter set	No limit set	--	--	--

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply until 30 June 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A24 [NZ 5151 2636]	ICON1 Chlorinator Start-Up Scrubbing System Stack	No parameter set	No limit set	--	--	--
A37 [NZ 5142 2634]	ICON1 Stage 1 O ₂ Heater Stack	No parameter set	No limit set	--	--	--
A39 [NZ 5142 2634]	ICON1 Stage 3 TiCl ₄ Furnace Stack	No parameter set	No limit set	--	--	--
A40 [NZ 5142 2634]	ICON1 Sand Silo Filter Vent	No parameter set	No limit set	--	--	--
A41 [NZ 5142 2634]	ICON1 Vent Cleaning Stack	No parameter set	No limit set	--	--	--
A43 [NZ 5142 2634]	ICON1 Hygiene Scrubber Vent	No parameter set	No limit set	--	--	--
A60 [NZ 5157 2651]	Strong Vent Cleaning Circulation Tank Vent	No parameter set	No limit set	--	--	--
A63 [NZ 5158 2650]	Decomposition Tank Vent	No parameter set	No limit set	--	--	--
A67 [NZ 5149 2662]	Stream 1 FEM Stack	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A68 [NZ 5149 2662]	Stream 2 FEM Stack	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply until 30 June 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A69 [NZ 5148 2661]	Stream 1 Spray Drier Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A70 [NZ 5148 2661]	Stream 2 Spray Drier Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A74 [NZ 5147 2664]	CSA Digester No.1 Vent	No parameter set	No limit set	--	--	--
A90 [NZ 5145 2665]	Coating Tanks Hygiene Vent	Chlorine	40 mg/m ³	maximum	Monthly	
A91 [NZ 5148 2664]	Bauxite Silo Filter	No parameter set	No limit set	--	--	--
A103 [NZ 5146 2648]	Bulk Silo Filter	No parameter set	No limit set	--	--	--
A104 [NZ 5146 2648]	Bulk Silo Filter	No parameter set	No limit set	--	--	--
A121 [NZ 5150 2663]	Stream 1 Transfer Bunker Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A122/1 ⁽²⁾ [NZ 5157 2638]	ICON 1 CO/COS Scrubber Stack	Hydrogen chloride	10 mg/m ³	-	Monthly	BS EN 1911
		Sulphur dioxide	50 mg/m ³	hourly average (99.5%ile)	Continuous	BS EN 15267-3
		Carbonyl sulphide	40 mg/m ³	-	Monthly	
		Chlorine	5 mg/m ³	daily average	Continuous ⁽⁴⁾	

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply until 30 June 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
		Chlorine	40 mg/m ³	maximum	Continuous ⁽⁴⁾	
		Carbon monoxide	100 mg/m ³	hourly average ⁽³⁾	Continuous	BS EN 15267-3
		Hydrogen sulphide	5 mg/m ³	-	Monthly	
		Particulate	50 mg/m ³	-	Monthly	BS EN 13284-1
A122/2 ⁽²⁾ [NZ 5157 2638]	ICON 2 CO/COS Scrubber Stack	Hydrogen chloride	10 mg/m ³	-	Monthly	BS EN 1911
		Sulphur dioxide	50 mg/m ³	hourly average (99.5%ile)	Continuous	BS EN 15267-3
		Carbonyl sulphide	40 mg/m ³	-	Monthly	
		Chlorine	5 mg/m ³	daily average	Continuous ⁽⁴⁾	
		Chlorine	40 mg/m ³	maximum	Continuous ⁽⁴⁾	
		Carbon monoxide	100 mg/m ³	hourly average ⁽³⁾	Continuous	BS EN 15267-3
		Hydrogen sulphide	5 mg/m ³	-	Monthly	
		Particulate	50 mg/m ³	-	Monthly	BS EN 13284-1
A123 [NZ 5150 2663]	Stream 2 Transfer Bunker Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A124 [NZ 5155 2642]	ICON 1 CO/COS Effluent treatment tank vent	No parameter set	No limit set	--	--	--
A125 [NZ 5142 2634]	ICON AICI3 Silo Filter Vent	No parameter set	No limit set	--	--	--

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply until 30 June 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A126 [NZ 5156 2639]	ICON 1 CO/COS Flame Trap Lute Pot Vent	No parameter set	No limit set	--	--	--
A202 [NZ 5152 2623]	ICON2 Divert Process Stack	Hydrogen chloride	10 mg/m ³	hourly average	Annual	BS EN 1911
		Chlorine	5 mg/m ³	Daily average	Continuous ⁽⁴⁾	
		Chlorine	40 mg/m ³	Maximum	Continuous ⁽⁴⁾	
		Particulate	50 mg/m ³	-	Annual	BS EN 13284-1
A203 [NZ 5146 2622]	ICON2 Oxidation Vent Cleaning Stack	No parameter set	No limit set	--	--	--
A204 [NZ 5146 2622]	ICON2 Oxidation Hygiene Scrubber Stack	No parameter set	No limit set	--	--	--
A205 [NZ 5147 2623]	ICON2 Stage 1 O ₂ Heater Stack	No parameter set	No limit set	--	--	--
A207 [NZ 5147 2623]	ICON2 Stage 3 TiCl ₄ Heater Stack	No parameter set	No limit set	--	--	--
A208 [NZ 5147 2622]	ICON2 Sand Silo Filter Vent	No parameter set	No limit set	--	--	--
A209 [NZ 5147 2622]	ICON2 AlCl ₃ Silo Filter Vent	No parameter set	No limit set	--	--	--
A211 [NZ 5155 2632]	ICON2 Chlorinator Dry Out Stack	No parameter set	No limit set	--	--	--

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply until 30 June 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A212 [NZ 5156 2630]	ICON2 Start-Up Scrubber Stack	No parameter set	No limit set	--	--	--
A213 [NZ 5155 2633]	ICON2 Coke Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A214 [NZ 5155 2633]	ICON2 Ore Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A215 [NZ 5155 2633]	ICON2 Ore Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A216 [NZ 5155 2631]	ICON2 Lime Silo Filter Vent	No parameter set	No limit set	--	--	--
A220 [NZ 5155 2631]	Tetra Tank Farm Stack	No parameter set	No limit set	--	--	--
A222 [NZ 5146 2664]	CSA Dissolver No. 2 Vent	No parameter set	No limit set	--	--	--
A223 [NZ 5158 2638]	ICON 2 CO/COS Flame Trap Lute Pot Vent	No parameter set	No limit set	--	--	--
A224 [NZ 5164 2652]	GEPT Stack	Hydrogen chloride	10 mg/m ³	-	Monthly	BS EN 1911
		Particulate	50 mg/m ³	-	Monthly	BS EN 13284-1
A225 [NZ 5158 2651]	Vent Cleaning Stack	Chlorine	5 mg/m ³	daily average	Continuous	
		Chlorine	40 mg/m ³	maximum	Continuous	
A226 [NZ 5147 2664]	Bauxite Delivery System No. 1 Vent	No parameter set	No limit set	--	--	--

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply until 30 June 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A227 [NZ 5146 2664]	Bauxite Delivery System No. 2 Vent	No parameter set	No limit set	--	--	--
A228 [NZ 5143 2660]	Free Flow Pigment Hopper Dust Extraction Vent	No parameter set	No limit set	--	--	--
A229 [NZ 5143 2660]	Free Flow Pigment PPM Dust Extraction Vent	No parameter set	No limit set	--	--	--
A235 [NZ 5158 2658]	Stream 3 Spin Flash Drier Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A238 [NZ 5156 2657]	Stream 3 Transfer Bunker Filter Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A246 [NZ 5157 2659]	Stream 3 FEM Stack	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A250 ⁽⁶⁾ [NZ 5151 2665]	LCP 354 Four natural gas fired boilers (2,3,5 & 6) with common boiler stack exhaust	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	400 mg/m ³	-	At least every 6 months	BS EN 14792
		Sulphur dioxide	35 mg/m ³	-	At least every 6 months	Alternative method TGN M21, or as otherwise agreed in writing with the Environment Agency

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

- emission limits and monitoring requirements shall apply until 30 June 2020

Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
		Dust	5 mg/m ³	-	At least every 6 months	Concentration by calculation, as agreed in writing with the Environment Agency
		Carbon Monoxide	110 mg/m ³	-	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
		Stack gas volume flow	-	-	-	BS EN 16911 & TGN M2
		As required by the Method Implementation Document for BS EN 15259	-	-	Pre-operation and when there is a significant operational change	BS EN 15259
A251 ⁽⁶⁾ [Point A1 on site plan in schedule 7]	LCP 671 Four natural gas fired boilers with common boiler stack exhaust	Stack gas volume flow	-	-	Indirect determination by calculation based on continuous measurement of fuel gas flow rate and periodic (at least annual) measurement of flue gas flow rate to the stack	BS EN 16911 & TGN M2

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

- emission limits and monitoring requirements shall apply until 30 June 2020

Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
		Oxygen	-	-	Continuous As appropriate to reference	BS EN 14181
		Water vapour	-	-	Continuous As appropriate to reference ⁽⁵⁾	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
		As required by the Method Implementation Document for BS EN 15259	-	-	Pre-operation and when there is a significant operational change	BS EN 15259
		Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	60 mg/m ³ Above MSUL/MSDL	Yearly average	Continuous	BS EN 14181
		Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	85 mg/m ³ Above MSUL/MSDL	Calendar monthly mean	Continuous	BS EN 14181
		Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	85 mg/m ³ Above MSUL/MSDL	Daily average	Continuous	BS EN 14181

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

- emission limits and monitoring requirements shall apply until 30 June 2020

Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
		Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	200 mg/m ³ Above MSUL/MSDL	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Carbon Monoxide	15 mg/m ³ Above MSUL/MSDL	Yearly average	Continuous	BS EN 14181
		Carbon Monoxide	100 mg/m ³ Above MSUL/MSDL	Calendar monthly mean	Continuous	BS EN 14181
		Carbon Monoxide	110 mg/m ³ Above MSUL/MSDL	Daily average	Continuous	BS EN 14181
		Carbon Monoxide	200 mg/m ³ Above MSUL/MSDL	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Dust	5 mg/m ³ Above MSUL/MSDL	Average over the sampling period	At least every 6 months	BS EN 13284-1 and MID
		Sulphur dioxide	35 mg/m ³ Above MSUL/MSDL	Average over the sampling period-	At least every 6 months	BS EN 14791

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

- emission limits and monitoring requirements shall apply until 30 June 2020

Emission point ref. & location	Source	Parameter	Limit (including unit) - these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
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Note 1: See Schedule 6 for reference conditions.

Note 2: Applicable only when waste gas is on line to the thermal oxidiser. In addition for carbon monoxide the limit is only applicable when titanium tetrachloride is on line to the oxidation continuous oxidation reactor.

Note 3: Excludes first 15 minutes after start up and last 5 minutes before shut down.

Note 4: Chlorine monitoring is carried out at the exit of the Tail Gas Scrubbing system and converted to a concentration at the stack using estimated flow rates for waste gases and other post-abatement gaseous inputs.

Note 5: Monitoring of water vapour in flue gas is not required if this parameter is not needed for referencing purposes because the flue gas sample is dried prior to analysis in the continuous emissions monitoring system.

Note 6: Simultaneous operation of LCP 354 and LCP 671 is not permitted during normal operating conditions. The only 'other than normal operating condition' during which LCP 354 and LCP 671 may operate at the same time, is during the commissioning of LCP 671, according to the plan outlined in the application document titled 'GM/00592 Greatham Replacement Boilers Environmental Permit Variation - Commissioning Plan' referred in Table S1.2.

Table S3.1a Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply from 01 July 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A5 [NZ 5159 2647]	Coke Transfer Point Dust Filter Vent	No parameter set	No limit set	--	--	--
A11 [NZ 5159 2647]	Ore/Coke Unloading Dust Hood Filter Vent	No parameter set	No limit set	--	--	--
A13 [NZ 5159 2646]	Coke Silo Dust Filter Vent	No parameter set	No limit set	--	--	--
A19 [NZ 5144 2637]	ICON1 Divert Process Stack	Hydrogen chloride	10 mg/m ³	--	Annual	BS EN 1911
		Chlorine	5 mg/m ³	Daily average	Continuous ⁽⁴⁾	
		Chlorine	40 mg/m ³	Maximum	Continuous ⁽⁴⁾	
		Particulate	50 mg/m ³	--	Annual	BS EN 13284-1
A20 NZ 5153 2634]	ICON1 Rutile Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A21 [NZ 5153 2635]	ICON1 Ore Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A22 [NZ 5153 2636]	ICON1 Coke Day-Bunker Vent Filter	No parameter set	No limit set	--	--	--
A23 [NZ 5151 2636]	ICON1 Lime Silo Filter Vent	No parameter set	No limit set	--	--	--
A24 [NZ 5151 2636]	ICON1 Chlorinator Start-Up Scrubbing System Stack	No parameter set	No limit set	--	--	--

Table S3.1a Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply from 01 July 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A37 [NZ 5142 2634]	ICON1 Stage 1 O ₂ Heater Stack	No parameter set	No limit set	--	--	--
A39 [NZ 5142 2634]	ICON1 Stage 3 TiCl ₄ Furnace Stack	No parameter set	No limit set	--	--	--
A40 [NZ 5142 2634]	ICON1 Sand Silo Filter Vent	No parameter set	No limit set	--	--	--
A41 [NZ 5142 2634]	ICON1 Vent Cleaning Stack	No parameter set	No limit set	--	--	--
A43 [NZ 5142 2634]	ICON1 Hygiene Scrubber Vent	No parameter set	No limit set	--	--	--
A60 [NZ 5157 2651]	Strong Vent Cleaning Circulation Tank Vent	No parameter set	No limit set	--	--	--
A63 [NZ 5158 2650]	Decomposition Tank Vent	No parameter set	No limit set	--	--	--
A67 [NZ 5149 2662]	Stream 1 FEM Stack	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A68 [NZ 5149 2662]	Stream 2 FEM Stack	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A69 [NZ 5148 2661]	Stream 1 Spray Drier Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency

Table S3.1a Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply from 01 July 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A70 [NZ 5148 2661]	Stream 2 Spray Drier Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A74 [NZ 5147 2664]	CSA Digester No.1 Vent	No parameter set	No limit set	--	--	--
A90 [NZ 5145 2665]	Coating Tanks Hygiene Vent	Chlorine	40 mg/m ³	maximum	Monthly	
A91 [NZ 5148 2664]	Bauxite Silo Filter	No parameter set	No limit set	--	--	--
A103 [NZ 5146 2648]	Bulk Silo Filter	No parameter set	No limit set	--	--	--
A104 [NZ 5146 2648]	Bulk Silo Filter	No parameter set	No limit set	--	--	--
A121 [NZ 5150 2663]	Stream 1 Transfer Bunker Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A122/1 ⁽²⁾ [NZ 5157 2638]	ICON 1 CO/COS Scrubber Stack	Hydrogen chloride	10 mg/m ³	-	Monthly	BS EN 1911
		Sulphur dioxide	50 mg/m ³	hourly average (99.5%ile)	Continuous	BS EN 15267-3
		Carbonyl sulphide	40 mg/m ³	-	Monthly	
		Chlorine	5 mg/m ³	daily average	Continuous ⁽⁴⁾	
		Chlorine	40 mg/m ³	maximum	Continuous ⁽⁴⁾	
		Carbon monoxide	100 mg/m ³	hourly average ⁽³⁾	Continuous	BS EN 15267-3

Table S3.1a Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply from 01 July 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
		Hydrogen sulphide	5 mg/m ³	-	Monthly	
		Particulate	50 mg/m ³	-	Monthly	BS EN 13284-1
A122/2 ⁽²⁾ [NZ 5157 2638]	ICON 2 CO/COS Scrubber Stack	Hydrogen chloride	10 mg/m ³	-	Monthly	BS EN 1911
		Sulphur dioxide	50 mg/m ³	hourly average (99.5%ile)	Continuous	BS EN 15267-3
		Carbonyl sulphide	40 mg/m ³	-	Monthly	
		Chlorine	5 mg/m ³	daily average	Continuous ⁽⁴⁾	
		Chlorine	40 mg/m ³	maximum	Continuous ⁽⁴⁾	
		Carbon monoxide	100 mg/m ³	hourly average ⁽³⁾	Continuous	BS EN 15267-3
		Hydrogen sulphide	5 mg/m ³	-	Monthly	
		Particulate	50 mg/m ³	-	Monthly	BS EN 13284-1
A123 [NZ 5150 2663]	Stream 2 Transfer Bunker Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A124 [NZ 5155 2642]	ICON 1 CO/COS Effluent treatment tank vent	No parameter set	No limit set	--	--	--
A125 [NZ 5142 2634]	ICON AICI3 Silo Filter Vent	No parameter set	No limit set	--	--	--
A126 [NZ 5156 2639]	ICON 1 CO/COS Flame Trap Lute Pot Vent	No parameter set	No limit set	--	--	--
A202		Hydrogen chloride	10 mg/m ³	hourly average	Annual	BS EN 1911

Table S3.1a Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply from 01 July 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
[NZ 5152 2623]	ICON2 Divert Stack	Chlorine	5 mg/m ³	Daily average	Continuous ⁽⁴⁾	
		Chlorine	40 mg/m ³	Maximum	Continuous ⁽⁴⁾	
		Particulate	50 mg/m ³	-	Annual	BS EN 13284-1
A203 [NZ 5146 2622]	ICON2 Oxidation Vent Cleaning Stack	No parameter set	No limit set	--	--	--
A204 [NZ 5146 2622]	ICON2 Oxidation Hygiene Scrubber Stack	No parameter set	No limit set	--	--	--
A205 [NZ 5147 2623]	ICON2 Stage 1 O ₂ Heater Stack	No parameter set	No limit set	--	--	--
A207 [NZ 5147 2623]	ICON2 Stage 3 TiCl ₄ Heater Stack	No parameter set	No limit set	--	--	--
A208 [NZ 5147 2622]	ICON2 Sand Silo Filter Vent	No parameter set	No limit set	--	--	--
A209 [NZ 5147 2622]	ICON2 AlCl ₃ Silo Filter Vent	No parameter set	No limit set	--	--	--
A211 [NZ 5155 2632]	ICON2 Chlorinator Dry Out Stack	No parameter set	No limit set	--	--	--
A212 [NZ 5156 2630]	ICON2 Start-Up Scrubber Stack	No parameter set	No limit set	--	--	--
A213 [NZ 5155 2633]	ICON2 Coke Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--

Table S3.1a Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply from 01 July 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A214 [NZ 5155 2633]	ICON2 Ore Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A215 [NZ 5155 2633]	ICON2 Ore Day-Bunker Filter Vent	No parameter set	No limit set	--	--	--
A216 [NZ 5155 2631]	ICON2 Lime Silo Filter Vent	No parameter set	No limit set	--	--	--
A220 [NZ 5155 2631]	Tetra Tank Farm Stack	No parameter set	No limit set	--	--	--
A222 [NZ 5146 2664]	CSA Dissolver No. 2 Vent	No parameter set	No limit set	--	--	--
A223 [NZ 5158 2638]	ICON 2 CO/COS Flame Trap Lute Pot Vent	No parameter set	No limit set	--	--	--
A224 [NZ 5164 2652]	GEPT Stack	Hydrogen chloride	10 mg/m ³	-	Monthly	BS EN 1911
		Particulate	50 mg/m ³	-	Monthly	BS EN 13284-1
A225 [NZ 5158 2651]	Vent Cleaning Stack	Chlorine	5 mg/m ³	daily average	Continuous	
		Chlorine	40 mg/m ³	maximum	Continuous	
A226 [NZ 5147 2664]	Bauxite Delivery System No. 1 Vent	No parameter set	No limit set	--	--	--
A227 [NZ 5146 2664]	Bauxite Delivery System No. 2 Vent	No parameter set	No limit set	--	--	--
A228 [NZ 5143 2660]	Free Flow Pigment Hopper Dust Extraction Vent	No parameter set	No limit set	--	--	--

Table S3.1a Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply from 01 July 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
A229 [NZ 5143 2660]	Free Flow Pigment PPM Dust Extraction Vent	No parameter set	No limit set	--	--	--
A235 [NZ 5158 2658]	Stream 3 Spin Flash Drier Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A238 [NZ 5156 2657]	Stream 3 Transfer Bunker Filter Vent	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A246 [NZ 5157 2659]	Stream 3 FEM Stack	Particulate	50 mg/m ³	hourly average	Continuous	As agreed in writing with the Environment Agency
A251 [Point A1 on site plan in schedule 7]	LCP 671 Four natural gas fired boilers with common boiler stack exhaust	Stack gas volume flow	-	-	Indirect determination by calculation based on continuous measurement of fuel gas flow rate and periodic (at least annual) measurement of flue gas flow rate to the stack	BS EN 16911 & TGN M2
		Oxygen	-	-	Continuous As appropriate to reference	BS EN 14181
		Water vapour	-	-	Continuous As appropriate to reference ⁽⁵⁾	BS EN 14181

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

- emission limits and monitoring requirements shall apply from 01 July 2020

Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
		Stack gas temperature	-	-	Continuous As appropriate to reference	Traceable to national standards
		Stack gas pressure	-	-	Continuous As appropriate to reference	Traceable to national standards
		As required by the Method Implementation Document for BS EN 15259	-	-	Pre-operation and when there is a significant operational change	BS EN 15259
		Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	60 mg/m ³ Above MSUL/MSDL	Yearly average	Continuous	BS EN 14181
		Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	85 mg/m ³ Above MSUL/MSDL	Calendar monthly mean	Continuous	BS EN 14181
		Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	85 mg/m ³ Above MSUL/MSDL	Daily average	Continuous	BS EN 14181
		Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	200 mg/m ³ Above MSUL/MSDL	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181

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

- emission limits and monitoring requirements shall apply from 01 July 2020

Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
		Carbon Monoxide	15 mg/m ³ Above MSUL/MSDL	Yearly average	Continuous	BS EN 14181
		Carbon Monoxide	100 mg/m ³ Above MSUL/MSDL	Calendar monthly mean	Continuous	BS EN 14181
		Carbon Monoxide	110 mg/m ³ Above MSUL/MSDL	Daily average	Continuous	BS EN 14181
		Carbon Monoxide	200 mg/m ³ Above MSUL/MSDL	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
		Dust	5 mg/m ³ Above MSUL/MSDL	Average over the sampling period	At least every 6 months	BS EN 13284-1 and MID
		Sulphur dioxide	35 mg/m ³ Above MSUL/MSDL	Average over the sampling period	At least every 6 months	BS EN 14791

Table S3.1a Point source emissions to air – emission limits and monitoring requirements						
- emission limits and monitoring requirements shall apply from 01 July 2020						
Emission point ref. & location	Source	Parameter	Limit (including unit)-these limits do not apply during start up or shut down ⁽¹⁾	Reference period	Monitoring frequency	Monitoring standard or method
<p>Note 1: See Schedule 6 for reference conditions.</p> <p>Note 2: Applicable only when waste gas is on line to the thermal oxidiser. In addition for carbon monoxide the limit is only applicable when titanium tetrachloride is on line to the oxidation continuous oxidation reactor.</p> <p>Note 3: Excludes first 15 minutes after start up and last 5 minutes before shut down.</p> <p>Note 4: Chlorine monitoring is carried out at the exit of the Tail Gas Scrubbing system and converted to a concentration at the stack using estimated flow rates for waste gases and other post-abatement gaseous inputs.</p> <p>Note 5: Monitoring of water vapour in flue gas is not required if this parameter is not needed for referencing purposes because the flue gas sample is dried prior to analysis in the continuous emissions monitoring system.</p>						

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	Source	Parameter	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Flow rate	12,000 m ³ /d ⁶	--	Continuous	MCERT flow meter or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	pH range	5-9 ⁴	Auto sampler sample taken for each tidal pump-out period	Normally two per day	ISO 10523 or as otherwise agreed in writing with the Environment Agency

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	Source	Parameter	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Suspended solids	150 mg/l	Auto sampler sample taken for each tidal pump-out period. Average of results from each individual pump-out in that month.	Normally two per day	BS EN 872 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Total kg Chloride per tonne of Titanium Dioxide equivalent produced ⁷	130 ¹ 228 ² 450 ³ every 3 months	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Cadmium	2.5 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN 17294 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Mercury	1.0 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN ISO 17852 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Hexachlorobenzene	1.0 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN ISO 6468 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	1,2 Dichloroethane	5.0 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN ISO 6468 or as otherwise agreed in writing with the Environment Agency

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	Source	Parameter	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Lead	25 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN 17294 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Zinc	240 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN 17294 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Iron	75000 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN 11885 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Chromium	90 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN ISO 15586 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Vanadium	200 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN 11885 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Copper	100 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN 17294 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Nickel	300 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS EN 17294 or as otherwise agreed in writing with the Environment Agency

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	Source	Parameter	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Arsenic	25 µg/l	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	BS ISO 17378-2 or as otherwise agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Sulphate	No limit set	Flow proportional fortnightly composite prepared from individual pump-out samples	Fortnightly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Total Organic Carbon	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Manganese	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Calcium	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Boron	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Magnesium	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	Source	Parameter	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Aluminium	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Zirconium	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Titanium	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Niobium	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	1,1,1 Trichloroethane	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Chloroform	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency
W1 [NZ 5230 2640 to Seaton Channel]	Effluent Treatment Plant Liquor	Carbon tetrachloride	No limit set	Flow proportional quarterly composite prepared from individual pump-out samples	Quarterly	As agreed in writing with the Environment Agency

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	Source	Parameter	Limit (incl. unit)	Reference period	Monitoring frequency	Monitoring standard or method
W2 [NZ 5172 2659 to Greenabella Marsh]	Site Surface Water Drain East 1	pH	5-9 ⁵	Continuous monitoring		BS ISO 10523 or as otherwise agreed in writing with the Environment Agency
W3 [NZ 5170 2637 to Greenabella Marsh]	Site Surface Water Drain East 2	pH	5-9 ⁵	Continuous monitoring		BS ISO 10523 or as otherwise agreed in writing with the Environment Agency
W5 [NZ 5157 2630 to Greenabella Marsh]	Site Surface Water Drain East 4	pH	5-9 ⁵	Continuous monitoring		BS ISO 10523 or as otherwise agreed in writing with the Environment Agency
W6 [NZ 5161 2617 to Greenabella Marsh]	Site Surface Water Drain East 5 (ICON 2 Storm Drain)	pH	5-9 ⁵	Manual monitoring	Only monitored when opened	BS ISO 10523 or as otherwise agreed in writing with the Environment Agency
<p>Note 1: When using Natural Rutile ore.</p> <p>Note 2: When using Synthetic Rutile ore.</p> <p>Note 3: When using slag.</p> <p>Note 4: Limit refers to each pump out.</p> <p>Note 5: Limit only applies when in use as follows: W2, W3, W5 and W6, whether alone or in any combination, is only permitted under flood conditions and their discharges will be monitored for pH using the installed meter.</p> <p>Note 6: The process liquid effluent shall be discharged at a rate not exceeding 2,000 m³/hr for 4.5 hours during the 5 hours commencing immediately after the time of local high water (a pump out). The volume of process liquid effluent shall not exceed 12,000 cubic meters per day and may include up to 80 cubic meters of treated sewage effluent.</p> <p>Note 7: “Titanium Dioxide Equivalent Produced” means the sum of the actual titanium dioxide produced plus the titanium dioxide that could be produced from the titanium tetrachloride product despatched from the factory assuming 1 Tonne of titanium tetrachloride would yield 0.421 tonne of titanium dioxide.</p>						

Table S3.3 Annual limits		
Substance	Medium	Limit (including unit) - these limits do not apply during start up or shut down
Oxides of nitrogen Emission point A250	Air	LCP 354 - TNP Limit Emission allowance figure shown in the TNP Register as at 30 April the following year Assessment year 01/01/16 and subsequent years until 31/12/19 01/01/20-30/06/20

Table S3.4 Process monitoring requirements				
Emission point reference or source or description of point of measurement	Parameter	Monitoring frequency	Monitoring standard or method	Other specifications
LCP 671	Net total fuel utilisation	Once within 4 months after commissioning and then after each modification that could significantly affect these parameters	EN Standards or equivalent	

Schedule 4 – Reporting

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

Table S4.1 Reporting of monitoring data			
Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Oxides of nitrogen	A251 (LCP671)	Every 3 months	1 January, 1 April, 1 July, 1 October
	A250 (LCP354) ^{Note 1}	Every 6 months	1 January, 1 July
Carbon Monoxide	A251 (LCP671)	Every 3 months	1 January, 1 April, 1 July, 1 October
	A122/1, A122/2 A250 (LCP354) ^{Note 1}	Every 6 months	1 January, 1 July
Sulphur dioxide	A122/1, A122/2, A250 (LCP354) ^{Note 1} , A251 (LCP671)	Every 6 months	1 January, 1 July
Particulate / Dust	A19, A67, A68, A69, A70, A121, A122/1, A122/2, A123, A202, A224 A235, A238, A246, A250 (LCP354) ^{Note 1} , A251 (LCP671)	Every 6 months	1 January, 1 July
Hydrogen sulphide mg/m ³	A122/1, A122/2	Every 6 months	1 January, 1 July
Carbonyl sulphide mg/m ³	A122/1, A122/2	Every 6 months	1 January, 1 July
Hydrogen chloride mg/m ³	A19, A122/1, A122/2, A202, A224	Every 6 months	1 January, 1 July
Chlorine mg/m ³	A19, A90, A122/1, A122/2, A202, A225	Every 6 months	1 January, 1 July
Operating hours	A250 (LCP354) ^{Note 1}	Every 3 months	1 January, 1 April, 1 July, 1 October
Suspended solids mg/l	W1	Every 6 months	1 January, 1 July
Total kg chloride per tonne of Titanium Dioxide equivalent produced	W1	Every 6 months	1 January, 1 July
Cadmium (µg/l)	W1	Every 6 months	1 January, 1 July
Mercury (µg/l)	W1	Every 6 months	1 January, 1 July
Hexachlorobenzene (µg/l)	W1	Every 6 months	1 January, 1 July
1,2 Dichloroethane (µg/l)	W1	Every 6 months	1 January, 1 July
Lead (µg/l)	W1	Every 6 months	1 January, 1 July
Zinc (µg/l)	W1	Every 6 months	1 January, 1 July

Table S4.1 Reporting of monitoring data			
Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Iron (µg/l)	W1	Every 6 months	1 January, 1 July
Vanadium (µg/l)	W1	Every 6 months	1 January, 1 July
Chromium (µg/l)	W1	Every 6 months	1 January, 1 July
Copper (µg/l)	W1	Every 6 months	1 January, 1 July
Nickel (µg/l)	W1	Every 6 months	1 January, 1 July
Arsenic (µg/l)	W1	Every 6 months	1 January, 1 July
pH max	W1	Every 6 months	1 January, 1 July
pH min	W1	Every 6 months	1 January, 1 July
Notes			
1. Reporting requirements for A250 (LCP354) to cover period of operation for this LCP until the end of TNP on 30/06/20.			

Table S4.2: Annual production/treatment	
Parameter	Units
High pressure steam production (LCP 671)	Tonnes

Table S4.3 Large Combustion Plant Performance parameters for reporting to DEFRA and other Performance parameters		
Parameter	Frequency of assessment	Units
Thermal Input Capacity for each LCP	Annually	MW
Annual Fuel Usage for each LCP	Annually	TJ
Total Emissions to Air of NO _x for each LCP	Annually	t
Total Emissions to Air of SO ₂ for each LCP	Annually	t
Total Emissions to Air of Dust for each LCP	Annually	t
Operating Hours for each LCP (Load Factor)	Annually	hr
Thermal oxidiser availability ICON 1&2	Annually	%
Energy usage	Annually	MWh
Water usage	Annually	tonnes

Table S4.4 Reporting forms			
Media/ parameter	Reporting format	Agency recipient	Date of form
Air(Periodic Monitoring)	A1	Area Office	31/12/15
Air (Continuous monitoring-chlorine and particulates)	A2	Area Office	31/12/15
Air (Continuous monitoring-sulphur dioxide and carbon monoxide)	A3	Area Office	31/12/15
Operation of Release Points - A19 and A202 (divert stacks)	A4	Area Office	31/12/15
Air & Energy	Form IED AR1 – SO ₂ , NO _x and dust mass emission and energy	National and Area Office	December 17 Note 1
LCP	Form IED HR1 – operating hours	National and Area Office	31/12/15 ^{Note 1}
Air	Form IED RTA1 – TNP quarterly emissions summary log	National and Area Office	31/12/15
Air	Form IED CON 1 – continuous monitoring.	Area Office	31/12/15 ^{Note 1}
CEMs	Form IED CEM – Invalidation Log	Area Office	31/12/15 ^{Note 1}
Air	Form IED PM1 - discontinuous monitoring and load.	Area Office	31/12/15 ^{Note 1}
Water (excluding sewer)	W1	Area Office	31/12/15
Energy	E1	Area Office	31/12/15
Performance data	PI1 or other form as agreed in writing by the Environment Agency	Area Office	31/12/15
Notes:			
1. Or any later version provided by the Environment Agency.			

Schedule 5 – Notification

These pages outline the information that the operator must provide.

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

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

Part A

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

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

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

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
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

Part C - Malfunction or breakdown of abatement equipment

To be notified within 72 hours of the end of the dual divert period to ICON1 and ICON2 Divert Process Stacks (emission points A19 and A202)

Permit Number	
Name of Operator	
Location of Installation	

Time at which Thermal Converter from ICON 1&2 diverted simultaneously.	
Time at which Thermal Converter from ICON 1&2 divert no longer simultaneously diverted.	
Duration of this incidence.	
Reasons for diverting ICON1 to emission point A19	
Reasons for diverting ICON2 to emission point A202	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

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

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

“authorised officer” means any person authorised by 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.

“average over the sampling period” means the average value of three consecutive measurements of at least 30 minutes each or as agreed in writing with the Environment Agency.

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

“commissioning” means testing of the installation that involves any operation of a Large Combustion Plant referenced in schedule 1, table S1.1 or as agreed with the Environment Agency.

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

“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.

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

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

“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 in Annex III of the Waste Framework Directive.

“Hourly average” means the average value from continuous monitoring over each 60 minute period starting on the hour at 1.00, 2.00 etc.

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

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

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

“Net total fuel utilisation” means the ratio between the net produced energy minus the imported electrical and/or thermal energy and the fuel energy input at the combustion unit boundary over a given period of time.

“Waste code” means the six digit code referable to a type of waste in accordance with the List of Wastes and in relation to hazardous waste, includes the asterisk.

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

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

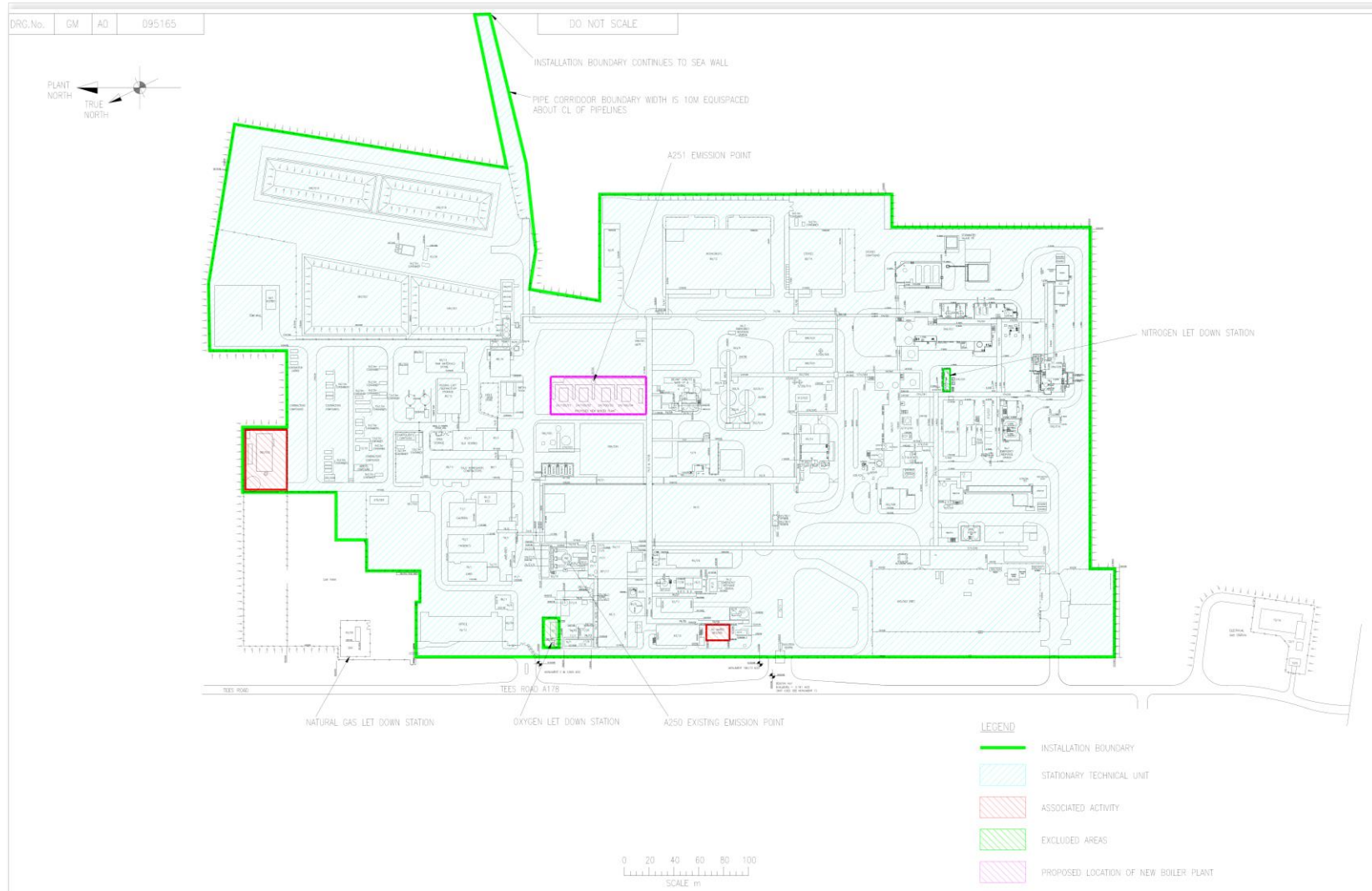
Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

- in relation to emissions from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid and gaseous fuels other than gas engines or gas turbines, 6% dry for solid fuels; and/or
- in relation to emissions from gas engines or gas turbines, 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
- in relation to emissions from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content.

“year” means calendar year ending 31 December.

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

Schedule 7 – Site plan



END OF PERMIT