

# Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

---

Tronox Pigment UK Limited

Stallingborough Titanium Dioxide Site  
Laporte Road  
Stallingborough  
Grimsby  
North East Lincolnshire  
DN40 2PR

**Variation application number**

EPR/UP3537SJ/V012

**Permit number**

EPR/UP3537SJ

# Stallingborough Titanium Dioxide Site

## Permit number EPR/UP3537SJ

### 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. Only the variations specified in schedule 1 are subject to a right of appeal.

This variation:

- Removes the restriction in Table S2.3 that Tronox Pigment UK Limited can accept from Singleton Birch Camp Wood Landfill Site no more than 0.3m<sup>3</sup> leachate/tonne filter cake deposited (annual average).
- Adds reverse osmosis as a permitted method for raw water purification.

The site continues to operate as follows.

The main activity of the installation is the production of titanium dioxide pigment using the Chlorine route, with an annual production capacity of approximately 185,000 tonnes. The process manufactures titanium dioxide pigment either from naturally occurring Rutile ore, recovered ore and coke (ROC) from the process or synthetic ore made from ilmenite. The ore is reacted with chlorine to convert all the metal oxides to chlorides. Titanium tetrachloride is separated by condensation and purified by distillation. The pure product is then reacted with oxygen to produce the raw pigment, the chlorine being recovered for reuse. The raw pigment is physically refined in a finishing section, dried, micronised and packed.

Chlorides of other metals are processed via the site effluent treatment facilities. Concentrated metal chloride liquors and dilute acidic effluent streams are processed through the neutralisation plant and converted to metal hydroxides in the form of a filter cake. The neutralised effluent is discharged to the Humber Estuary.

Tail gases from the process are scrubbed to remove hydrogen chloride, traces of silicon, tin, titanium chlorides and any unreacted chlorine. Hydrochloric acid recovered from this circuit is sold as an industrial grade acid, whilst acid not meeting the required specification for sale is discharged to the neutralisation plant. The gas stream passes through a Thermal Converter Unit where carbon monoxide is converted to carbon dioxide. The gas stream is scrubbed prior to discharge to the atmosphere to remove hydrogen chloride and sulphur dioxide. The unit generates a significant quantity of steam to supplement plant steam requirements. In the event of the Thermal Converter Unit being unavailable, the gas stream is passed through a caustic scrubber system to remove traces of hydrogen chloride and chlorine.

A separate scrubbing system cleans gases from the plant hygiene snake, which collects air from various parts of the plant which may be exposed to minor leaks of titanium tetrachloride or chlorine. This system is also designed to absorb any chlorine gas vented from the chlorine storage area.

A more detailed explanation of each stage in the process follows.

#### Raw Material Storage and Handling

Dry titanium oxide ore is brought to site by road tankers, and pneumatically conveyed to two ore silos, vented to atmosphere through a filter. Calcined petroleum coke and metallurgical coke are brought to site by road tanker and is transferred to coke silos either by discharge onto a conveyor, which feeds an elevator, or pneumatically. The silo is vented to air via a fan and bag filter, which returns the collected fines to the silo. A wet mixture of unreacted ore and coke recovered from the chlorination process is slurried with neutralisation effluent, filtered and then dried. The dry product is screened to remove trash and pneumatically conveyed to

the recovered ore hopper ready for use. Coke and ore are drawn from the storage silos and transferred pneumatically to the chlorination process via blow pots using compressed nitrogen. At the end of transfer the blow pots are vented down to air.

Liquid chlorine is imported to site by road tanker and off loaded by pressuring the road tanker with compressed nitrogen or dry air, displacing the chlorine to one of three nitrogen blanketed storage tanks. The contaminated nitrogen displaced is vented into the process or into the hygiene snake scrubber and thence to air. Liquid from the tanks is fed under nitrogen pressure to a vaporiser and thence into the chlorination process via a flow control system.

#### Chlorination and titanium tetrachloride purification

In the chlorination stage the ore is reacted in one of two fluidised bed reactors with gaseous chlorine, air and a reducing agent, coke, to form titanium tetrachloride. Gaseous titanium tetrachloride and the chlorides of the various impurities present in the ore, leave the top of the chlorinator together with blowover ore and coke. The gas stream is cooled by the injection of recycled impure titanium tetrachloride to condense out the impurity metal chlorides as a fine dust, leaving titanium tetrachloride in the vapour phase. The impure metal chlorides, together with the blowover ore and coke are separated from the remaining gases in a cyclone and are processed for subsequent treatment.

The gases leaving the cyclone are cooled further in a series of heat exchangers; the resulting condensed crude titanium tetrachloride is passed to storage. The cooling is provided by cooling water, recycled through an evaporative cooling tower, and refrigerated brine. Crude titanium tetrachloride is purified in a series of steps involving chemical treatment and distillation. The product from distillation passes to pure product storage. The residual stream containing the impurities chlorides and treatment residues is recycled to the chlorinator exit to cool the product gases.

In the gas treatment system, U600, process gases are scrubbed through a venturi and various packed column and spray tower acid scrubbers using different strength acids. Gases then pass via a particulate separator and on to the Thermal Converter Unit where carbon monoxide is converted into carbon dioxide. The gas stream is scrubbed prior to discharge to atmosphere to remove hydrogen chloride and sulphur dioxide.

In the event of the Thermal Converter Unit being unavailable, the gas stream passes to a caustic scrubber to remove trace hydrogen chloride and chlorine. The depleted caustic solution is discharged to the neutralisation plant where it is used to neutralise acidic effluent streams. Air from the hygiene snake extraction system is scrubbed with caustic soda solution and passes through a demister to the main chimney.

#### Oxidation

Titanium tetrachloride is dosed with aluminium chloride, vaporised in a gas fired heater, and reacted at high temperature with pre heated gaseous oxygen, to produce titanium dioxide powder in chlorine gas. The reaction products are cooled, and the raw pigment is separated from the chlorine in a bag filter. The recovered solids are discharged into a slurring tank where they are slurried in water before being sent to pigment slurry storage prior to finishing.

The gas which is recovered, mainly chlorine containing some nitrogen, hydrogen chloride, oxygen and carbon dioxide, is recycled to the chlorinator to provide gas for the reaction. Minor releases from the oxidation section are collected by the hygiene snake to be scrubbed before release via the main chimney.

#### Finishing

The final stage in pigment production involves a series of operations including milling and surface coating to suit a range of end uses. Pigment slurry is ground to remove large agglomerates, and then passed to bead mills. The product from the mills is classified to recycle oversize material, the fines passing forward for surface treatment. Surface coating is achieved by adding such substances as sodium silicate, aluminium sulphate, sodium aluminate, Calgon, zirconium oxychloride, cerium oxide, phosphoric acid and trimethylpropane under controlled conditions of rate of application, temperature and pH. On neutralisation, layered or mixed precipitates of silica, alumina and titania are formed on the pigment surface. The pigment is then washed on rotary vacuum filters, and final moisture removal achieved using spray/spin flash dryers.

The dried pigment is steam micronised to break up any agglomerates and to give optimum size distribution for the required properties. Pigment is also transferred to a bulk tanker loading facility. The micronised pigment is packed into paper or plastic sacks or into big bags for sale. Pneumatic transfer air and packing station hygiene extraction air are released to atmosphere via bag filters.

Supporting the finishing process is a chemical preparation plant, used for the production of sodium aluminate solution (from alumina hydrate and sodium hydroxide) and aluminium sulphate solution (from alumina and sulphuric acid) and dilution of sodium silicate, sodium hexametaphosphate and sodium hydroxide.

#### Effluent Treatment Plant – Neutralisation Plant

Concentrated metal chloride liquors and dilute acid streams are treated through the neutralisation plant, receiving the following feeds from the main process plant.

- Neutralised liquors from the rubber lined acid neutralisation pits (U600 acidic feeds).
- The scrubber purge of the ore and coke drier.
- Sluice liquor and dilute acidic process streams.
- Effluent in all sumps in the area of the neutralisation plant.
- Wash-bay effluent.
- Leachate from capped landfill.

These feeds pass into the equalisation surge tanks for mixing prior to being pumped forward to a series of neutralisation tanks which cascade from one to another. The acidic liquors are then dosed with lime slurry to neutralise the liquors to effect metal chloride precipitation as hydroxides.

The liquor is then dosed with flocculent prior to pumping to the sludge thickener vessel, where the solids are allowed to settle. The overflow from the thickener is pumped to the site effluent system. The majority of the underflow is passed forward to two filter presses to produce a cake of around 40% w/w solids, which is transported off site for disposal. Filtrates from the filter press are returned back to the lime slurry mixing tanks, to ensure that any particles that pass through the filter cloths are captured by the densification process. To carry out extended maintenance periods on the sludge thickener system, the unit can be by-passed and solids removal being achieved through the use of large filtration bags (Geotubes).

Lorry wheel wash points have been provided in the locations of the filter presses and the site landfill facility. All road drains discharge into the local interceptor pit which discharges into the site effluent system.

#### Effluent Drainage System

The composition of the final site effluent is made up of the combination of two distinct systems, discharging from the FU151 pit (W2) and the neutralisation plant (W1) respectively.

Discharges to the effluent neutralisation pit, FU151, comprise of both acidic and alkaline effluents, which is mixed to allow self-neutralisation before discharge to FU151. The effluent neutralisation pit is continuously pH monitored and can be adjusted with the addition of caustic.

Filter cake leachate returned from Camp Wood landfill site can be added to either the W1 or W2 outfall for disposal. Waste water via drains from the Arkema Coatings Resins Limited site can be added to the W2 outfall for disposal.

#### Water treatment

Raw water is treated on site to soften it using two processes. The main water treatment process is by reverse osmosis which uses a membrane filtration system which passes raw water through several membranes. These membranes act as a barrier to the dissolved salts and organic compounds. The water molecules, on the other hand can pass freely through the membranes which creates a purified product stream. The reverse osmosis treatment generates permeate water which is used by the plant and a concentrate water which is released through the effluent system and into the Humber Estuary.

Additionally, working alongside this, raw water is also softened by passing it through a bed of ion-exchange material, thus generating water containing sodium ions.

As the ion exchange material does not have unlimited capacity it is necessary to regenerate the material by passing a solution of salt (sodium chloride) through the bed. This regeneration involves disposal of water containing residual sodium chloride and calcium and magnesium salts expelled from the ion exchange bed.

A demineralisation plant provides treated water using ion exchange technology comprising dealkalisation, degasser, cation and anion units. Regeneration of these units uses weak sulphuric acid and weak sodium hydroxide solution.

Electrical energy and steam is produced on the installation by two Combined Heat and Power units (CHPs) although owned by Tronox Pigment UK Ltd is operated by PX Ltd as a directly associated activity under Section 1.1 A(1)(a) in Part 2 to Schedule 1 of the Environmental Permitting Regulations 2010 i.e. "Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts."

As detailed above, liquid effluent from the process is treated on site in the operator's own effluent treatment plant (ETP), prior to release to the Humber Estuary, the main contaminants being metals, of which chromium, copper, zinc, vanadium and iron are the main constituents. Solid waste from the ETP, in the form of various metal hydroxides, is sent off site to landfill. The main air emissions associated with the process are sulphur dioxide, nitrogen dioxide, particulates, carbon monoxide, hydrogen chloride, hydrogen sulphide and carbon dioxide, with air modelling predicting the emissions of particulates, nitrogen dioxide, sulphur dioxide and carbon monoxide to be approaching air quality objective levels.

The site has a controlled water course (land drain and dyke) around the perimeter of the operational section. The dyke is used for the discharge of rain water from the sites road drain system. In some instances process material can enter the road drain system and in periods of heavy rain overflow, by design, to the dyke. In these circumstances procedures are in place to sample the dyke and if process material is found to be present then a pen stock valve is closed and the dyke water will be remediated.

Other activities may take place on the site of this installation which are not regulated under this Permit or any other Permit referred to in the Table below. These activities include:

- Three closed Landfill activities - two have been capped, leachate management and gas analysis is ongoing.
- Accumulation and disposal of radioactive substances in the form of refractory bricks from the chlorinator and regulation as a radioactive site due to activity of the ore used.
- Radioactive substance permit for use of mobile radioactive source for monitoring purposes.

The schedules specify the changes made to the permit.

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

<b>Status log of the permit</b>		
<b>Description</b>	<b>Date</b>	<b>Comments</b>
Application UP3537SJ received.	20/09/05	
Request to extend determination.	18/01/06	Request accepted
Request for further information.	06/02/06	
Further information received questions 4, 13, 16, 18, 24, 26, 27 & 30.	16/02/06	
Further information received questions 1, 2, 7, 8 & 9.	01/03/06	
Further information received questions 15, 17 & 29.	27/03/06	
Further information received questions 21, 22, 23 & 25.	06/04/06	

<b>Status log of the permit</b>		
<b>Description</b>	<b>Date</b>	<b>Comments</b>
Further information received questions 10, 11, 12, 19, 20 & 28.	11/04/06	
Further information received questions 3 & 5.	13/04/06	
Further information received question 14.	21/04/06	
Request to extend determination.	09/05/06	Request accepted
Permit granted (EPR/UP3537SJ).	30/06/06	
Variation WP3334UV received (EPR/UP3537SJ/V002).	24/05/07	
Variation WP3334UV issued (EPR/UP3537SJ/V002).	31/05/07	
Variation JP3533GE received (EPR/UP3537SJ/V003).	21/07/08	
Variation JP3533GE issued (EPR/UP3537SJ/V003).	17/10/08	
Variation EPR/UP3537SJ/V004 received (FP3830KE).	12/05/09	
Variation EPR/UP3537SJ/V004 issued.	06/08/10	
Variation EPR/UP3537SJ/V005 received.	Duly Made 20/05/10	
Variation EPR/UP3537SJ/V005 issued.	05/11/10	
Variation EPR/UP3537SJ/V006 received.	Duly Made 12/01/12	
Additional information correcting stack reference numbers received.	24/02/12	
Variation EPR/UP3537SJ/V006 issued.	21/03/12	
Variation and consolidation application EPR/UP3537SJ/V007.	Duly made 25/10/12	Application to vary and update the permit to modern conditions.
Variation and consolidation EPR/UP3537SJ/V007 determined.	22/01/13	Varied and consolidated permit issued in modern condition format.
Environment Agency Initiated Variation issued EPR/UP3537SJ/V008.	19/12/13	
Variation EPR/UP3537SJ/V009.	Duly Made 31/03/16	
Schedule 5 Notice dated 13/06/16.	Response received 30/06/16	

<b>Status log of the permit</b>		
<b>Description</b>	<b>Date</b>	<b>Comments</b>
Variation EPR/UP3537SJ/V009 determined.	26/07/16	Varied and consolidated permit issued in modern condition format.
Variation and consolidation application EPR/UP3537SJ/V010 received.	Duly Made 02/05/19	Application to remove the requirement for the thermal converter to operate for a minimum of 90% availability.
Variation and consolidation application EPR/UP3537SJ/V010 refused.	07/10/20	
Notification of change of site name.	24/09/20	Company name and site name changed to Tronox Pigment UK Limited.
Variation issued EPR/UP3537SJ/V011	02/11/20	Varied permit issued to Tronox Pigment UK limited.
Application EPR/UP3537SJ/V012 (variation and consolidation)	Duly made 12/07/22	Application to vary the permit to: <ul style="list-style-type: none"> <li>- Add reverse osmosis as a method for raw water purification on site.</li> <li>- Remove the 0.3m<sup>3</sup>/tonne of filter cake restriction in Table S2.3 on the amount of leachate that can be taken from Singleton Birch Camp Wood Landfill Site to Tronox Pigment UK Limited Stallingborough.</li> </ul>
Additional information received Response to Schedule 5 Notice dated 25/07/22	15/08/22 and 14/09/22	Additional information received on: <ul style="list-style-type: none"> <li>- Acceptance and disposal of leachate.</li> <li>- Operation of reverse osmosis plant.</li> </ul>
Variation determined and consolidation issued EPR/UP3537SJ (Billing Ref: BP3842QJ)	13/10/22	Varied and consolidated permit issued.

<b>Other Part A installation permits relating to this installation</b>		
<b>Operator</b>	<b>Permit number</b>	<b>Date of issue</b>
PX Limited	EPR/FP3031HJ	01/04/11

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/UP3537SJ

### Issued to

**Tronox Pigment UK Limited** (“the operator”)

whose registered office is

**Laporte Road  
Stallingborough  
Grimsby  
North East Lincolnshire  
DN40 2PR**

company registration number 00162303

to operate part of a regulated facility at

**Stallingborough Titanium Dioxide Site  
Laporte Road  
Stallingborough  
Grimsby  
North East Lincolnshire  
DN40 2PR**

to the extent set out in the schedules.

The notice shall take effect from 13/10/2022.

<b>Name</b>	<b>Date</b>
<b>Daniel Kirk</b>	<b>13/10/2022</b>

Authorised on behalf of the Environment Agency



## **Schedule 1**

The following conditions were varied as a result of the application made by the operator:

- Table S1.1 as referenced by conditions 2.1.1 and 4.2.2 is varied to add reference to membrane filtration in Directly Associated Activity, A8, 'Water Treatment'.
- Table S1.2 as referenced by conditions 2.3.1 and 2.3.2 is varied to add new operating techniques.
- Table S2.3 as referenced by condition 2.3.4 is varied to remove the restriction relating to acceptance of no more than 0.3m<sup>3</sup> leachate/tonne filter cake sent to landfill - annual average.

The following conditions were varied as a result of an Environment Agency initiated variation:

- Schedule 5 as referenced by condition 4.3.2 is varied to include section (c), 'Notification requirements for the breach of permit conditions not related to limits' (as required by the current permit template).
- Schedule 6 as referenced by condition 4.4.1 is varied to include a definition of "Industrial Emissions Directive".
- Table S1.3 as referenced by condition 2.4.1 is varied to update Improvement Condition 15 (IC15) as 'Complete'.

## **Schedule 2 – consolidated permit**

Consolidated permit issued as a separate document.

# Permit

## The Environmental Permitting (England and Wales) Regulations 2016

### Permit number

**EPR/UP3537SJ**

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/UP3537SJ/V012 authorising,

**Tronox Pigment UK Limited** (“the operator”),

whose registered office is/whose principal office is

**Laporte Road  
Stallingborough  
Grimsby  
North East Lincolnshire  
DN40 2PR**

company registration number 00162303

to operate part of an installation at

**Stallingborough Titanium Dioxide Site  
Laporte Road  
Stallingborough  
Grimsby  
North East Lincolnshire  
DN40 2PR**

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

Name	Date
Daniel Kirk	13/10/2022

Authorised on behalf of the Environment Agency

# Conditions

## 1 Management

### 1.1 General management

- 1.1.1 The operator shall manage and operate the activities:
- (a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and
  - (b) using sufficient competent persons and resources.
- 1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.
- 1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

### 1.2 Energy efficiency

- 1.2.1 The operator shall:
- (a) take appropriate measures to ensure that energy is used efficiently in the activities;
  - (b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and
  - (c) take any further appropriate measures identified by a review.

### 1.3 Efficient use of raw materials

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

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

- 1.4.1 The operator shall take appropriate measures to ensure that:
- (a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and
  - (b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and
  - (c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.
- 1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

## **1.5 Multiple operator installations**

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

## **2 Operations**

### **2.1 Permitted activities**

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

### **2.2 The site**

- 2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit that represents the extent of the installation covered by this permit, but excluding the area edged in red on the site plan that presents the installation covered by the permit of another operator of the installation.

### **2.3 Operating techniques**

- 2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.
- 2.3.2 If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan 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.
- 2.3.3 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.
- 2.3.4 Waste shall only be accepted if:
- (a) it is of a type and quantity listed in schedule 2 table S2.2 or S2.3; and
  - (b) it conforms to the description in the documentation supplied by the producer and holder.
- 2.3.5 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.
- 2.3.6 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, S3.2, S3.2a and S3.3.
- 3.1.2 The limits given in schedule 3 shall not be exceeded.
- 3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

### **3.2 Emissions of substances not controlled by emission limits**

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

### **3.3 Odour**

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

## **3.4 Noise and vibration**

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

## **3.5 Monitoring**

- 3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring specified in the following tables in schedule 3 to this permit:
- (a) point source emissions specified in tables S3.1, S3.2 and S3.2a;
  - (b) process monitoring specified in table S3.3.
- 3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.
- 3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the Environment Agency.
- 3.5.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1, S3.2 and S3.2a unless otherwise agreed in writing by the Environment Agency.

# **4 Information**

## **4.1 Records**

- 4.1.1 All records required to be made by this permit shall:
- (a) be legible;
  - (b) be made as soon as reasonably practicable;
  - (c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and
  - (d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:
    - (i) off-site environmental effects; and
    - (ii) matters which affect the condition of the land and groundwater.

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

## 4.2 Reporting

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

4.2.2 For the activities referenced in schedule 1, table S1.1 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 Within 1 month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter, if during that quarter the total amount accepted exceeds 100 tonnes of non-hazardous waste or 10 tonnes of hazardous waste.

## 4.3 Notifications

4.3.1 In the event:

- (a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—
  - (i) inform the Environment Agency,
  - (ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and
  - (iii) take the measures necessary to prevent further possible incidents or accidents;
- (b) of a breach of any permit condition the operator must immediately—
  - (i) inform the Environment Agency, and
  - (ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;

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

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

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

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

Where the operator is a registered company:

- (a) any change in the operator's trading name, registered name or registered office address; and
- (b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

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

- (a) any change in the operator's name or address; and
- (b) any steps taken with a view to the dissolution of the operator.

In any other case:

- (a) the death of any of the named operators (where the operator consists of more than one named individual);
- (b) any change in the operator's name(s) or address(es); and
- (c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

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

- (a) the Environment Agency shall be notified at least 14 days before making the change; and
- (b) the notification shall contain a description of the proposed change in operation.

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

4.3.7 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 “without delay”, in which case it may be provided by telephone.

# Schedule 1 – Operations

<b>Table S1.1 activities</b>			
<b>Activity reference</b>	<b>Activity listed in Schedule 1 of the EP Regulations</b>	<b>Description of specified activity and WFD Annex I and II operations</b>	<b>Limits of specified activity and waste types</b>
A1	Section 4.2 A(1)(a)(v) – “Producing inorganic chemicals such as non-metals, metal oxides, metal carbonyls or other inorganic compounds such as calcium carbide, silicon, silicon carbide, titanium dioxide”	Manufacture of titanium dioxide pigment from ore using the chlorination process	Receipt of raw material to despatch of finished product.
A2	Section 5.4 A(1)(a)(ii) – “Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by physico-chemical treatment.	The treatment of waste water including mixing, pH adjustment, settlement and filtration prior to discharge to the River Humber.	Treatment of waste water arising from: <ul style="list-style-type: none"> <li>• operations within the installation,</li> <li>• received by drain from Arkema Coatings Resins Limited</li> <li>• filter cake leachate received from Singleton Birch’s Camp Wood landfill site.</li> </ul>
<b>Directly Associated Activity</b>			
A3	Recovery of ore and coke (ROC)	The isolation, storage and drying of ROC for reuse in the listed activity	Ore and coke mixture generated by operation of the chlorinators on the installation.
A4	Waste gas treatment	Treatment of waste process gases by scrubbing and thermal conversion of carbon monoxide.	Process gases from operations within the installation, and fugitive emissions captured by the air extraction system.
A5	Receipt and storage of coke and titanium ore	Storage of coke and rutile ore delivered to the site for the purpose of manufacture of titanium dioxide	Only coke and ore used in the chlorination stage of the operations permitted on the installation.
A6	Receipt and storage of chlorine	Storage of chlorine delivered to the installation.	Storage of chlorine to be used in the operations permitted on the installation. Stored in accordance with the requirements of COMAH regulations.
A7	Storage, handling and preparation of raw materials	Receipt of raw materials and storage until use. Preparation of materials for use by dilution. Formation of aluminium sulphate and sodium aluminate.	Storage of materials for use in the operations permitted on the installation. Preparation of raw materials for use in the permitted activities.
A8	Water treatment	Membrane filtration system and demineralisation and deionisation of water into the installation.	Water for use within the installation.

<b>Table S1.1 activities</b>			
<b>Activity reference</b>	<b>Activity listed in Schedule 1 of the EP Regulations</b>	<b>Description of specified activity and WFD Annex I and II operations</b>	<b>Limits of specified activity and waste types</b>
A9	Finishing / storage of product	Size reduction and drying of final product. Packing and storage of product prior to despatch.	Titanium dioxide pigment produced by the operations permitted on the installation.

<b>Table S1.2 Operating techniques</b>		
<b>Description</b>	<b>Parts</b>	<b>Date Received</b>
Application	The response to questions B2.1 and B2.2 given in section 2 of the application's supporting documentation (ref. Env/ext/203).	20/09/05
Response to request for further information	Response to question 10 - clarification of water emissions from U500	01/03/06
Response to request for further information	Response to question 15 & 29 - Emissions breakdown for release points A1 - A9	27/03/06
Response to request for further information	Response to question 6 & 12 - Details of land protection measures and information re. functioning of abatement scrubbers.	11/04/06
Response to request for further information	Response to question 13 - Details of procedure for managing odour complaints	13/04/06
Relevant Change Update	Response to request for procedure for temporarily managing the neutralisation plant thickener using Geotubes ref. env/ext/0526	11/11/08
Variation Application EPR/UP3537SJ/V005	Operation of vent train to stack A2 when thermal converter is off line and venturi scrubber is bypassed and procedure to enable the use of warm-up stack A33 to vent air/nitrogen to facilitate the draining of Chlorinator bed material as detailed in Application attachments env/ext/0612-0615.	07/04/2010
Response to request for further information	Planning Gantt chart ENG1863 Dated 13/07/10 for Scrubber Unit replacement phases 1 and 2. (Referred to as Ph1/2a in correspondence).	24/08/10
Response to request for further information	e-mail request dated 27/08/10 requesting confirmation of telephone conversation concerning A2 stack and sodium hydroxide scrubber details.	08/09/10
Variation Application EPR/UP3537SJ/V006	Parts C2 and C3 and the supplementary information supplied with these parts.	12/01/12
Variation Application EPR/UP3537SJ/V007	Parts C2 and C3 and the supplementary information supplied with these parts.	25/10/12
Variation Application EPR/UP3537SJ/V009	Application Supporting documentation Env-ext-916A non-technical summary Env-ext-916D Receipt & Disposal of Filter Cake Leachate Waste	Duly Made 31/03/16
Variation Application EPR/UP3537SJ/V009	Schedule 5 notice dated 13/06/16 Response to questions 1-9 and 11.	Received 30/06/16
Variation Application EPR/UP3537SJ/V009	Additional information listing current monitoring sampling and analysis methods for emission points to air A1 to A9	Received 21/07/16
Application EPR/UP3537SJ/V012	Documents 'Env-ext-1035a' and 'Env-ext-1036a' provided in response to Section 3a, Technical Standards, in Application Form C3.	Duly made 12/07/22
Response to Schedule 5 Notice dated 25/07/22	Operating techniques described in the response to the Notice (including accompanying information): <ul style="list-style-type: none"> <li>- Response to question 3a on the sampling and testing of leachate samples from road tankers.</li> <li>- Responses to questions 3c and 3d on use of trigger levels to determine acceptability of leachate.</li> <li>- Response to question 3e on actions taken should leachate composition not be consistent.</li> <li>- Response to questions 4a, 4b, 4c and 4d on delivery and offloading of leachate.</li> <li>- Response to question 4e on actions taken if a road tanker of leachate cannot be offloaded at Tronox.</li> <li>- Response to questions 5b and 5c on disposal of concentrate from reverse osmosis plant.</li> </ul>	15/08/22

<b>Table S1.3 Improvement programme requirements</b>		
<b>Reference</b>	<b>Requirement</b>	<b>Date</b>
IC1	<p>The Operator shall provide a feasibility report on minimising emissions to air from release point A2 (U600 main stack) during periods of thermal converter downtime based on plant trials using the following techniques:</p> <ul style="list-style-type: none"> <li>(i) CO/COS reduction techniques: and</li> <li>(ii) TiCl4 pour back or spray injection, into the chlorinator.</li> </ul> <p>The Operator shall provide an initial progress report to the Agency by 31/1/07, a further progress report by 31/10/07 and the final feasibility study to the Agency by 31/1/08. If these techniques prove viable and are approved by the Agency, the Operator will install the techniques by 30/4/08 and will bring the techniques into full operation during periods of thermal converter downtime by 1/10/08.</p> <p>On issue of the feasibility report to the Agency and the Operator will determine the viability of these techniques and document the determination. The Agency will inform the Operator in writing within 28 days of issue of the feasibility report whether it approves or does not approve these techniques. Should the Agency not approve the techniques because they are not viable, the Operator will install a flare in accordance with its initial report dated 31 August 2006 by 1 April 2009.</p>	Complete
IC2	The Operator shall carry out a detailed assessment against UK air quality regulation objectives of the sulphur dioxide emissions from the installation in relation to the daily, hourly and 15 minute means. A written report shall be submitted to the Agency presenting the results of the assessment, including detailed modelling concentration plots, and conclusions drawn about the impact of emissions from the installation on the environmental benchmarks.	Complete  Ref env/ext/0328 27/09/06
IC3	Improvement Programme Reference is now deleted.	N/A
IC4	The Operator shall investigate the combustion efficiency of gas burners used throughout the installation, excluding those associated with the CHP plant. A written report shall be submitted to the Agency giving details of the scope of the investigation and results relating to the efficiency of the burners. A list of improvements and timetable for implementation shall form part of the report.	Complete  Ref env/ext/0556 19/06/09
IC5	The Operator shall inform the Agency in writing of the details of the agreement between the Operator and Npower Cogen Limited regarding the actions required by condition 2.12.1 of this permit relating to the operation of the Site Protection and Monitoring Program.	Complete  Ref env/ext/0340 01/11/06
IC6	<p>The Operator shall submit a written report to the Environment Agency that summarises a review of the provision of MCERTS accreditation for the monitoring equipment, personnel and organisations employed for the emissions monitoring program in condition 2.10.1. This shall include review of air emission stack testing methods 1 and 9 and access to the sampling platform associated with ROC drier discharge point A3, as detailed in application improvement IA16.</p> <p>The report shall also propose a timetable for achieving this standard for any elements that are not at the MCERTS standard or MCERTS certified.</p>	Complete  Ref env/ext/0340 22/12/06
IC7	The Operator shall install a pH correction system to control the pH of effluent discharged from point W2, allowing correction of both high and low pH (as detailed in section 2.3 of Annex 1 of PPC Application).	Complete  Ref env/ext/0502 30/06/08

<b>Table S1.3 Improvement programme requirements</b>		
<b>Reference</b>	<b>Requirement</b>	<b>Date</b>
IC8	The Operator shall investigate the sources of process losses with the potential of affecting the pH of tank F680 and implement a programme to reduce or eliminate such emissions (as detailed in section 2.2 of Annex 1 of PPC Application). A report summarising the results of the investigation and detailing the measures implemented shall be submitted to the Agency.	Complete  Ref env/ext/0650
IC9	The Operator shall design and install a new wash bay and scrubber plant for removal of particulates and hydrogen chloride from air emission point A2 (as detailed in section 2.4 of Annex 1 of PPC Application.	Complete  Ref env/ext/0503 30/06/08
IC10	The operator shall reduce water used onsite by 10% per tonne of pigment (based on 2003 data) generated at full production capacity, as detailed in application improvement IA09.	Complete.  Annual reporting to confirm performance maintained
IC11	The Operator shall review the feasibility for monitoring of particulates emitted from the U100 ore, coke and ROC silo vents during normal plant operation, as detailed in application improvement IA17. A report shall be submitted to the Agency detailing the outcome the review, including a timetable for performing the monitoring if feasible.	Complete  Ref env/ext/0415 29/06/07
IC12	The Operator shall develop a site closure plan in accordance with section 2.11 of Sector guidance note S4.03 "Guidance for the Inorganic Chemicals Sector" (dated 20 May 2004), as detailed in application improvement IA18.	Complete  Ref env/ext/0417 29/06/07
IC13	The Operator shall submit a written report to the Environment Agency on the COS releases from release point A2 when using low and high sulphur coke, to establish the abatement potential of oxygen injection into the chlorinator.	Complete
IC14	The operator shall submit written reports of the progress in replacement of scrubbing units phase 1 and phase 2 against the latest plan submitted as part of the variation application.	Complete
IC15	The operator shall submit to the Environment Agency a written post commissioning report regarding acceptance and disposal of leachate from Camp Wood landfill site including, but not limited to details of: <ul style="list-style-type: none"> <li>• Quarterly (and annual if received in the period) leachate composition analysis data received from Singleton Birch.</li> <li>• Integration of quarterly review of these received data into the operator's EMS.</li> <li>• Confirmatory analyses performed by the operator on samples from tanker acceptance.</li> <li>• Confirmatory evaluation of the impact of leachate addition on the analysed site discharge composition and volume.</li> <li>• Derived 'normal ranges' of monitored analytes for acceptance of leachate.</li> <li>• Suspended solids levels in received leachate.</li> <li>• Integration of derived limits and operational measures into the operator's EMS with evidence of operation of a clear waste acceptance/rejection procedure based upon them.</li> </ul>	Complete

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

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	Specification
Low Sulphur Diesel Oil	Less than 0.005% sulphur content
Coke	Nominal 4% w/w sulphur content.

Table S2.2 Permitted waste types and quantities via on-site neutralisation plant.	
<b>Maximum quantity</b>	5 m <sup>3</sup> /day annual average 100 m <sup>3</sup> /day maximum
<b>Waste code</b>	<b>Description</b>
19 07 03	leachate from capped landfills, Area 2 (WML 55/12/142) and Area 3 (WML 55/19/820).

Table S2.3 Permitted waste types and quantities for disposal via W1/W2	
Waste code	Description
19 07 03	waste water via drains from Arkema Coatings Resins Limited site.
19 07 03	leachate from Tronox Pigment UK Limited filter cake disposed at Singleton Birch's Camp Wood Landfill Site. Maximum quantity - 150 m <sup>3</sup> / day maximum.

## Schedule 3 – Emissions and monitoring

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point reference	Source	Parameter	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method (Note 3)
A1	Thermal Converter	Oxides of Nitrogen	50 mg/m <sup>3</sup>	Hourly average	Quarterly	AM for BS EN 14792
		Hydrogen Chloride	10 mg/m <sup>3</sup>	Hourly average	Quarterly	In house method based on BS EN 1911 as agreed with Environment Agency
		Chlorine	5 mg/m <sup>3</sup> 40 mg/m <sup>3</sup>	Daily average Maximum	Continuous	In house method as agreed with Environment Agency
		Hydrogen Sulphide	5 mg/m <sup>3</sup>	Over sample duration	Quarterly	In house method as agreed with Environment Agency
		Sulphur dioxide	300 mg/m <sup>3</sup>	Over sample duration	Quarterly	In house method based on TGN M21 (AM for BS EN 14791) as agreed with Environment Agency
		Carbon Monoxide	No Limit Set	-	Continuous	In house method based on BS EN 15058 as agreed with Environment Agency
A2	U600 Chlorination Gas Scrubbing, Thermal Converter Online	Hydrogen Chloride	10 mg/m <sup>3</sup>	Hourly average	Quarterly	In house method based on BS EN 1911 as agreed with Environment Agency
		Chlorine	5 mg/m <sup>3</sup> 40 mg/m <sup>3</sup>	Daily Average Maximum	Continuous	In house method as agreed with Environment Agency
A2	U600 Chlorination Gas Scrubbing, Thermal Converter Offline	Hydrogen Chloride	30 mg/m <sup>3</sup>	Hourly average	Quarterly	In house method based on BS EN 1911 as agreed with Environment Agency
		Chlorine	5 mg/m <sup>3</sup> 40 mg/m <sup>3</sup>	Daily average Maximum	Continuous	In house method as agreed with Environment Agency
		Carbon Monoxide (Note 1)	2000 kg/hr 3000 kg/hr (Note 2)	8 hour average	Continuous	In house method based on BS EN 15058 as agreed with Environment Agency. Flow by DCS mass balance
		Oxides of nitrogen	100 mg/m <sup>3</sup>	Hourly average	Quarterly	In house method as agreed with Environment Agency
		Hydrogen Sulphide	5 mg/m <sup>3</sup>	Over sample duration	Quarterly	In house method as agreed with Environment Agency
		Sulphur dioxide	300 mg/m <sup>3</sup>	Over sample duration	Quarterly	In house method as agreed with Environment Agency



<b>Table S3.1 Point source emissions to air – emission limits and monitoring requirements</b>						
<b>Emission point reference</b>	<b>Source</b>	<b>Parameter</b>	<b>Limit (including unit)</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method (Note 3)</b>
A3	U100 ROC Drier	Hydrogen Chloride	10 mg/m <sup>3</sup>	Hourly average	Quarterly	In house method based on BS EN 1911 as agreed with Environment Agency
		Hydrogen Sulphide	5 mg/m <sup>3</sup>	Over sample duration	Quarterly	In house method as agreed with Environment Agency
		Oxides of nitrogen	125 mg/m <sup>3</sup>	Hourly average	Quarterly	AM for BS EN 14792
		Carbon Monoxide	No Limit Set	Hourly average	Quarterly	AM for BS EN 15058
A4	TiCl <sub>4</sub> and O <sub>2</sub> Heater (B325B)	Oxides of nitrogen	125 mg/m <sup>3</sup>	Hourly average	Quarterly	AM for BS EN 14792
		Carbon Monoxide	No Limit Set	Hourly average	Quarterly	AM for BS EN 15058
A5	O <sub>2</sub> Heater (B325A)	Oxides of nitrogen	180 mg/m <sup>3</sup>	Hourly average	Quarterly	AM for BS EN 14792
		Carbon Monoxide	No Limit Set	Hourly average	Quarterly	AM for BS EN 15058
A6	Spray Drier 1	Oxides of nitrogen	125 mg/m <sup>3</sup>	Hourly average	Quarterly	AM for BS EN 14792
		Carbon Monoxide	No Limit Set	Hourly average	Quarterly	AM for BS EN 15058
A7	Spray Drier 2	Oxides of nitrogen	125 mg/m <sup>3</sup>	Hourly average	Quarterly	AM for BS EN 14792
		Carbon Monoxide	No Limit Set	Hourly Average	Quarterly	AM for BS EN 15058
A8	Spin Flash Drier 3A	Oxides of nitrogen	125 mg/m <sup>3</sup>	Hourly Average	Quarterly	AM for BS EN 14792
		Carbon Monoxide	No Limit Set	Hourly Average	Quarterly	AM for BS EN 15058
A9	Spin Flash Drier 3B	Oxides of nitrogen	125 mg/m <sup>3</sup>	Hourly Average	Quarterly	AM for BS EN 14792
		Carbon Monoxide	No Limit Set	Hourly Average	Quarterly	AM for BS EN 15058
A13	Ore blow egg exhaust	Particulates	No Limit Set	--	--	--
A14	Ore blow egg exhaust	Particulates	No Limit Set	--	--	--
A15	Ore silo bag filter exhaust	Particulates	No Limit Set	--	--	--
A16	Ore silo bag filter exhaust	Particulates	No Limit Set	--	--	--
A17	Coke silo bag filter exhaust	Particulates	No Limit Set	--	--	--
A18	Coke blow egg exhaust	Particulates	No Limit Set	--	--	--
A19	Enclosed skip for coke line clearing	Particulates	No Limit Set	--	--	--
A20	Chlorinator warm up stack	Particulates	No Limit Set	--	--	--

<b>Table S3.1 Point source emissions to air – emission limits and monitoring requirements</b>						
<b>Emission point reference</b>	<b>Source</b>	<b>Parameter</b>	<b>Limit (including unit)</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method (Note 3)</b>
A21	Bursting disc vent stack - Titanium tetrachloride / oxygen heater and discharge slurry tank.	Hydrogen Chloride	No Limit Set	--	--	--
A22	Stream 1 hot gas bag filter bursting disc vent	Particulates	No Limit Set	--	--	--
A23	Stream 2 hot gas bag filter bursting disc vent	Particulates	No Limit Set	--	--	--
A24	Titanium tetrachloride dilution scrubber vent	Particulates	No Limit Set	--	--	--
A25	Streams 3a & 3b hot gas bag filter bursting disc vent	Particulates	No Limit Set	--	--	--
A26	Unit 200 / unit 300 cooling tower	Particulates	No Limit Set	--	--	--
A27	U100 Ore handling vents (9 vents)	Particulates	No Limit Set	--	--	--
A28	U100 Coke handling vents (6 vents)	Particulates	No Limit Set	--	--	--
A29	U100 ROC handling vents (4 vents)	Particulates	No Limit Set	--	--	--
A30	U100 Delkor feed tank	Particulates	No Limit Set	--	--	--
A31	U200 sluice tank vent	Particulates	No Limit Set	--	--	--
A32	U200 hydrocarbon oil tank vent	Particulates	No Limit Set	--	--	--
A33	U200 chlorinator warm up vents	Particulates	No Limit Set	--	--	--
A34	U300 hydrocarbon solvent tank	Particulates	No Limit Set	--	--	--
A35	U400 surface treatment tank vent (4 vents)	Particulates	No Limit Set	--	--	--
A36	U400 acid storage vents	Particulates	No Limit Set	--	--	--
A37	U400 extraction vents (6 vents)	Particulates	No Limit Set	--	--	--
A38	U400 scrubber vents (5 vents)	Particulates	No Limit Set	--	--	--
A39	U400 burst disc vents (6 vents)	Particulates	No Limit Set	--	--	--
A40	U400 bag filter vents (9 vents)	Particulates	No Limit Set	--	--	--

<b>Emission point reference</b>	<b>Source</b>	<b>Parameter</b>	<b>Limit (including unit)</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method (Note 3)</b>
A41	U400 cooling towers (2 releases points)	Particulates	No Limit Set	--	--	--
A42	U500 Aluminium hydrate digesters vents (2 vents)	Particulates	No Limit Set	--	--	--
A43	U500 titanium tetrachloride dilution vent	Particulates	No Limit Set	--	--	--
A44	Water treatment plant vent	Particulates	No Limit Set	--	--	--
A45	U700 neutralisation pits vents (2 vents)	Particulates	No Limit Set	--	--	--
A46	U700 effluent neutralisation plant vent	Particulates	No Limit Set	--	--	--
A47	U700 lime silo vent	Particulates	No Limit Set	--	--	--

**Note 1:** Limits apply when the TiCl<sub>4</sub> block valve has been open for over 2.5 hours and the plant rate is greater than 8tph.

**Note 2:** This limit applies during periods when the production rate is 17 tonnes per hour or lower. At start up a short excursion in the limit will then be followed by a long normal production run with the thermal converter.

**Note 3:** Description of agreed in-house methods for A1 to A9 is included in the additional information listing current monitoring sampling and analysis methods referenced in Table S1.2.

<b>Emission point reference</b>	<b>Source</b>	<b>Parameter</b>	<b>Limit (incl. unit) (Note 1)</b>	<b>Reference Period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
W1	U700 neutralisation plant (Effluent tank F7753) and U200 tank F674	pH	5-9	24 hour rolling mean	Continuous	Meter
		Temperature	40°C			Thermometer
		Suspended solids	1000 mg/l	Weekly	Composite flow sample made up of daily composite flow samples	Dissolved metal concentration as described in the application
		Iron	50 mg/l			
		Manganese	200 mg/l			
		Zinc	0.5 mg/l			
		Copper	0.2 mg/l			
		Lead	2 mg/l			
		Titanium	50 mg/l			
		Chromium	1 mg/l			
		Nickel	0.5 mg/l			
		Vanadium	3 mg/l			
		Mercury	5 µg/l			
		Cadmium	5 µg/l			
Arsenic	0.01 mg/l					

<b>Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements</b>						
<b>Emission point reference</b>	<b>Source</b>	<b>Parameter</b>	<b>Limit (incl. unit) (Note 1)</b>	<b>Reference Period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
W2	Effluent system and stormwater drainage from chamber CL1 via FU151	pH	5-9	24 hour rolling mean	Continuous	Meter
		Temperature	40°C			Thermometer
		Suspended solids	1000 mg/l	Weekly	Composite flow sample made up of daily composite flow samples	Dissolved metal concentration as described in the application
		Iron	50 mg/l			
		Manganese	200 mg/l			
		Zinc	0.5 mg/l			
		Copper	0.2 mg/l			
		Lead	2 mg/l			
		Titanium	50 mg/l			
		Chromium	1 mg/l			
		Nickel	0.5 mg/l			
		Vanadium	3 mg/l			
		Mercury	5 µg/l			
		Cadmium	5 µg/l			
Arsenic	0.01 mg/l					
W1 and W2	Installation	Total flow	18,000 m <sup>3</sup> /day	Daily	Continuous	As described in the application
		Hexachlorobenzene	Level indicating good operation 0.1 µg/l <sup>-1</sup>	Quarterly	Combined daily flow composite sample	
		Hexachlorobutadiene	Level indicating good operation 0.1 µg/l <sup>-1</sup>			
		Trichlorobenzene	Level indicating good operation 0.4 µg/l <sup>-1</sup> total of all isomers i.e. 1,2,3, 1,2,4 & 1,3,5 trichlorobenzene			

**Note 1:** Limits apply 24 hours after the thickener returns to service.

<b>Table S3.2a Point Source emissions to water (other than sewer) and land – during operation involving Geo-tubes – emission limits and monitoring requirements</b>						
<b>Emission point reference</b>	<b>Source</b>	<b>Parameter</b>	<b>Limit (incl. unit)</b>	<b>Reference Period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
W1	U700 neutralisation plant (Effluent tank F7753) and U200 tank F674	pH	5-9	24 hour rolling mean	Continuous	Meter
		Temperature	40°C			Thermometer
		Suspended solids	2000 mg/l	Weekly		

<b>Table S3.2a Point Source emissions to water (other than sewer) and land – during operation involving Geo-tubes – emission limits and monitoring requirements</b>							
<b>Emission point reference</b>	<b>Source</b>	<b>Parameter</b>	<b>Limit (incl. unit)</b>	<b>Reference Period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>	
		Iron	500 mg/l		Composite flow sample made up of daily composite flow samples	Dissolved metal concentration as described in the application	
		Manganese	400 mg/l				
		Zinc	1 mg/l				
		Copper	0.4 mg/l				
		Lead	2 mg/l				
		Titanium	50 mg/l				
		Chromium	2 mg/l				
		Nickel	1 mg/l				
		Vanadium	6 mg/l				
		Mercury	5 µg/l				
		Cadmium	5 µg/l				
		Arsenic	0.01 mg/l				
W2	Effluent system and stormwater drainage from chamber CL1 via FU151	pH	5-9	24 hour rolling mean	Continuous	Meter	
		Temperature	40°C			Thermometer	
		Suspended solids	1000 mg/l	Weekly	Composite flow sample made up of daily composite flow samples	Dissolved metal concentration as described in the application	
		Iron	50 mg/l				
		Manganese	200 mg/l				
		Zinc	0.5 mg/l				
		Copper	0.2 mg/l				
		Lead	2 mg/l				
		Titanium	50 mg/l				
		Chromium	1 mg/l				
		Nickel	0.5 mg/l				
		Vanadium	3 mg/l				
		Mercury	5 µg/l				
		Cadmium	5 µg/l				
		Arsenic	0.01 mg/l				
W1 and W2	Installation	Total flow	18,000 m <sup>3</sup> /day	Daily	Continuous	As described in the application	
		Hexachlorobenzene	Level indicating good operation 0.1 µg/l <sup>-1</sup>	Quarterly			Combined daily flow composite sample
		Hexachlorobutadiene	Level indicating good operation 0.1 µg/l <sup>-1</sup>				
		Trichlorobenzene	Level indicating good operation 0.4 µg/l <sup>-1</sup> total of all isomers i.e. 1,2,3, 1,2,4 & 1,3,5 trichlorobenzene				

<b>Table S3.3 Process monitoring requirements</b>				
<b>Emission point reference or source or description of point of measurement</b>	<b>Parameter</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>	<b>Other specifications</b>
A1 Thermal Convertor	On line time	Continuous	Not applicable	90% Availability

## Schedule 4 – Reporting

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

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Sulphur dioxide mg m <sup>-3</sup>	A1	Quarterly	01/04/10
Sulphur dioxide mg m <sup>-3</sup>	A2	Quarterly	01/04/10
Sulphur dioxide mg m <sup>-3</sup>	A4 - A9	Annually	01/04/10
Hydrogen Sulphide mg m <sup>-3</sup>	A1, A3	Quarterly	01/04/10
Hydrogen Sulphide mg m <sup>-3</sup>	A2	Quarterly	01/04/10
Oxides of nitrogen mg m <sup>-3</sup>	A1	Quarterly	01/04/10
Oxides of nitrogen mg m <sup>-3</sup>	A2	Quarterly	01/04/10
Oxides of nitrogen mg m <sup>-3</sup>	A3 - A9	Quarterly	01/04/10
Gaseous chlorides as HCl mg m <sup>-3</sup>	A1, A2, A3	Quarterly	01/04/10
Chlorine mg m <sup>-3</sup>	A1, A2	Quarterly	01/04/10
Carbon monoxide mg m <sup>-3</sup>	A1	Quarterly	01/04/10
Carbon monoxide mg m <sup>-3</sup>	A3 - A9	Annually	01/04/10
Carbonyl sulphide mg m <sup>-3</sup>	A2	Quarterly	01/04/10
Suspended solids mg l <sup>-1</sup>	W1, W2	Quarterly	01/04/10
pH	W1, W2	Quarterly	01/04/10
Total effluent flow m <sup>3</sup> /d	Combined W1 & W2	Quarterly	01/04/10
Temperature °C	W1, W2	Quarterly	01/04/10
Dissolved metals (Iron, manganese, zinc, copper, lead, titanium, chromium, nickel, vanadium, arsenic as mg l <sup>-1</sup> ; mercury, cadmium as µg l <sup>-1</sup> )	W1, W2	Quarterly	01/04/10
Hexachlorobenzene, Hexachlorobutadiene, trichlorobenzene, µg l <sup>-1</sup>	W1, W2	Annually	01/04/10

Parameter	Units
-	-

Parameter	Frequency of assessment	Units
Thermal Convertor availability	Annually	% On Line
Water usage	Annually	Tonnes
Energy usage	Annually	MWh
Waste disposal	Annually	Tonnes
Production of titanium dioxide	Annually	Tonnes
Water use	Annually	m <sup>3</sup> /tonne product
Liquid effluent volume	Annually	m <sup>3</sup> /tonne product
Leachate received via tanker from Singleton Birch's Camp Wood landfill site	Quarterly	m <sup>3</sup> leachate received

<b>Table S4.3 Performance parameters</b>		
<b>Parameter</b>	<b>Frequency of assessment</b>	<b>Units</b>
Leachate received via tanker from Singleton Birch's Camp Wood landfill site	Quarterly	m <sup>3</sup> leachate received / tonne filter cake disposed to landfill

<b>Table S4.4 Reporting forms</b>		
<b>Media/parameter</b>	<b>Reporting format</b>	<b>Date of form</b>
Air	Form air 1 or other form as agreed in writing by the Agency	30/06/06
Water	Form water 1 or other form as agreed in writing by the Agency	30/06/06
Water usage	Form water usage1 or other form as agreed in writing by the Agency	30/06/06
Energy usage	Form energy 1 or other form as agreed in writing by the Agency	30/06/06
Waste Recovery and Disposal	Form Waste 1 or other form as agreed in writing by the Agency	30/06/06
Thermal Convertor Availability	Form TC1	30/06/06
Performance indicators	Form performance 1 or other form as agreed in writing by the Agency	30/06/06



# Schedule 5 – Notification

These pages outline the information that the operator must provide.

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

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

## Part A

Permit Number	<b>EPR/UP3537SJ</b>
Name of operator	<b>Tronox Pigment UK Limited</b>
Location of Facility	<b>Stallingborough Titanium Dioxide Site Laporte Road Stallingborough Grimsby North East Lincolnshire DN40 2PR</b>
Time and date of the detection	

<b>(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</b>	
<b>To be notified within 24 hours of detection</b>	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

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

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

<b>Time periods for notification following detection of a breach of a limit</b>	
<b>Parameter</b>	<b>Notification period</b>

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

<b>(d) Notification requirements for the detection of any significant adverse environmental effect</b>	
<b>To be notified within 24 hours of detection</b>	
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 Tronox Pigment UK Limited

## Schedule 6 – Interpretation

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

"annually" means once every year.

“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.

“emissions to land” includes emissions to groundwater.

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

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

“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.

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

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

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

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

“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.

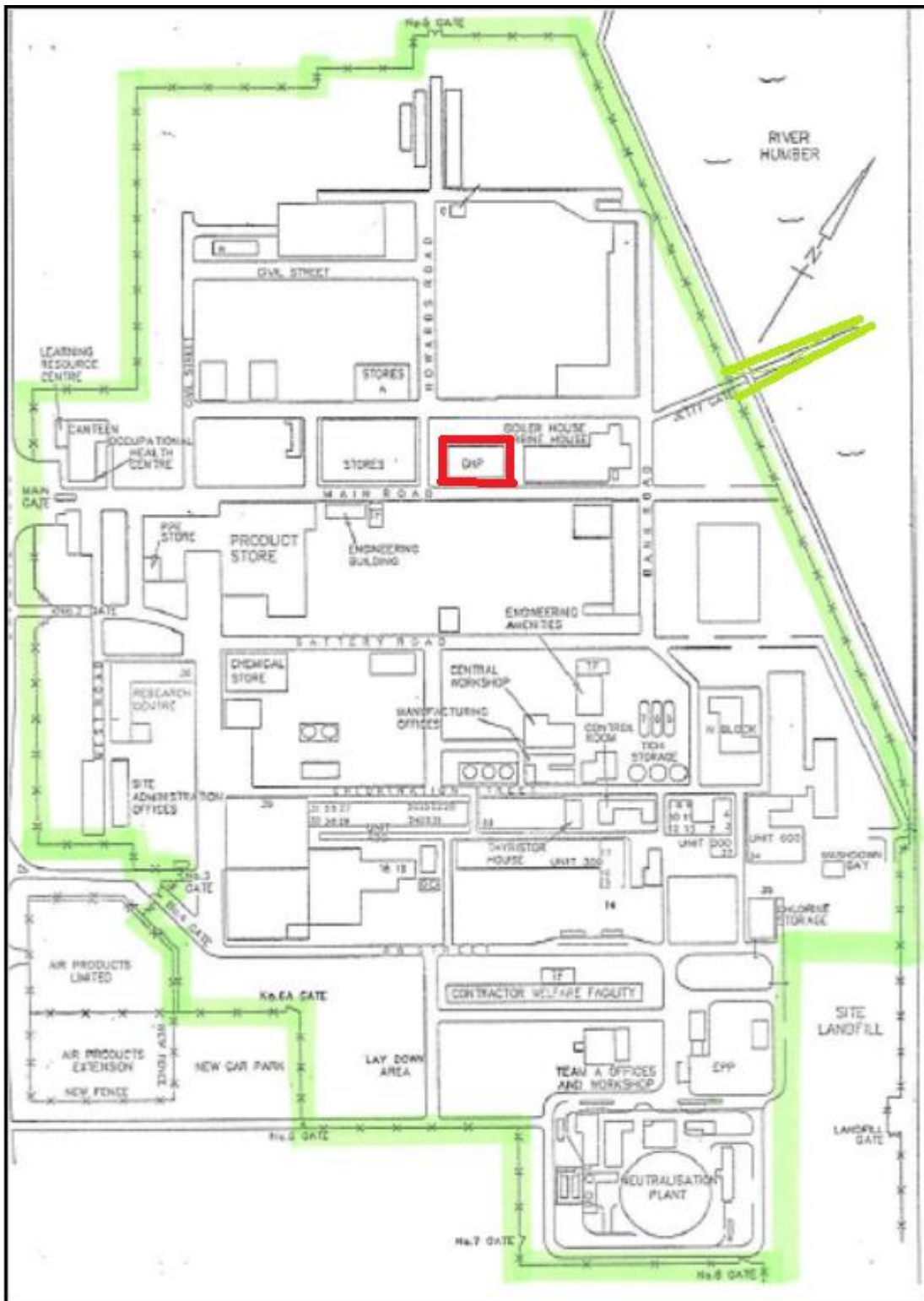
“year” means calendar year ending 31 December.

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

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

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

# Schedule 7 – Site plan



END OF PERMIT