Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Johnson Matthey PLC

Royston Site
Orchard Road
Royston
Hertfordshire
SG8 5HE

Variation application number

EPR/BT7086IJ/V015

Permit number

EPR/BT7086IJ

Royston Site
Permit number EPR/BT7086IJ

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.

The subject of this variation is the installation of a new process within the Procat 1 building to impregnate platinum (from platinum nitrate) onto zeolite followed by calcination in an oven to create a product for use in the auto catalyst market. The operator also requested that the activities referenced in Table S1.1 be updated to those in The Environmental Permitting (England and Wales) Regulations 2016.

This variation also adds the following as a result of an Environment Agency initiated variation:

- a notification category to Schedule 5 outlining notification requirements for a breach of permit conditions not related to limits;
- an updated definition of “Industrial Emissions Directive” to Schedule 6, Interpretation;
- an updated Improvement Condition, IC16, to reflect the fact that the 3-D printer which was the subject of variation, EPR/BT7086IJ/V014, has not yet been commissioned.

The remainder of the site and its operation will continue as before.

The main features of the installation are:

The site at Royston operates a wide variety of processes primarily focused on the refining of precious metals, the development of speciality chemicals and their subsequent processing into a diverse range of products.

The operations are by nature diverse and complex covering a wide range of activities including auto catalysts and process catalyst manufacture, precious metal refining and fabrication, chemical production and engine/auto catalyst test facilities.

These processes have been divided into three categories: main production activities, small-scale activities and ancillary operations.

Main production activities consist of the following business units: Emission Control Technologies (ECT), Refining & Chemicals Europe (R&CE), Noble Metals and Advanced Glass Technologies (AgT).

R&CE comprises of three separate production areas:

- Platinum Group Metals Refinery (PGMR) consisting of PGMR including the Insoluble Metals Refinery (IMR):
- Fine Chemicals consisting of Inorganics and Homogeneous Catalysts Process (HCP); and
- Supported Metal Catalysts production consisting of Procat 1 and Zeocat Plant.

The site product range includes:

- Autocatalysts for cleaning up emissions from vehicle exhausts;
- Process Catalysts for use in the chemical and pharmaceutical industries. These enable processes to operate at lower temperatures and pressures and with greater material efficiency giving the consequent environmental benefits of reduced energy and raw material consumption;

- Zeocat process for use in the food industry delaying the over-ripening process of fruit and vegetables thereby reducing waste;
- Precious Metals for investment purposes;
- Precious Metal Component Fabrication for engineering, glass and chemical applications;
- Precious Metal Inks, Pastes, Powders and Coatings for use in the electronic and automotive industries; and
- Speciality Chemicals for use in research and development applications.

These products are primarily manufactured using batch processing or on a campaign basis. The inherent high value of precious metals has a major bearing on processes and products in that every effort is made to prevent losses. Many of the Johnson Matthey products retain their value at the end of their working life, which encourages their return for precious metal recovery and subsequent reprocessing into new products.

The Johnson Matthey sister site at Brimsdown, Enfield undertakes the primary refining of feedstock before onward transfer to Royston.

Small-scale activities consist of the following operational units: Research and Development, Autocatalyst Testing and Metal Joining.

Ancillary operations are generally operated on a site wide basis and are mainly shared by more than one operational unit and consist of: Site Effluent Treatment Plant, Values Recovery Plant, Dispensing and Packing, Boiler House, Analytical Laboratories, Engineering, Main Stores, and Combined Heat and Power.

The installation emits low levels of particulates, chlorine, hydrogen chloride, ammonium chloride, oxides of nitrogen, volatile organic compounds, carbon monoxide and ammonia. Assessment of these releases by dispersion modelling shows that they will have no adverse environmental impact.

Releases to water are treated in Johnson Matthey's on-site effluent treatment plant to ensure levels are below Anglian Water Services trade effluent consent limits. The effluent is discharged to the foul sewer where it undergoes further treatment in Anglian Water Services Royston sewage treatment works. Other effluent streams are sent off-site for further treatment or recovery.

The Royston site is located in north-west Royston, between the town centre and the A505 bypass within the Orchard Road Industrial Estate.

There are two SSSIs within 2 km of the site; Therfield Heath and Holland Hall Railway cutting. There are also several other conservation sites within 2km of the site.

The installation operates to ISO14001 standards under a number of separate certifications.

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 for permit BT7086IJ received. (EPR/ BT7086IJ/A001)	27/06/2003	
Response to request for information	30/06/2003	Response received 14/07/2003
Duly made	14/07/2003	
Additional information received.	24/12/2003	Accepted 30/12/2003
Permit BT7086IJ issued	21/06/2004	
Application for variation NP3733BA (EPR/ BT7086IJ/V002)	23/07/2004	
Variation NP3733BA issued	27/07/2004	

Status log of the permit		
Description	**Date**	**Comments**
Application for variation DP3834SU received. (EPR/ BT7086IJ/V003)	22/03/2005	
Request for H1 assessment and Health based assessment as requested by PCT.	31/05/2005	Response received 27/06/2005
Request by Agency for ADMS modelling files for audit by AQMAU.	23/05/2005	Response received 02/06/2005
Request by Agency for JM to repeat air modelling due to bug in version 3.2 of ADMS and to repeat using 3 years met data following AQMAU audit.	07/07/2005	Response received 22/07/2005
Variation DP3834SU issued.	17/08/2005	
Application for variation NP3136LJ received. (EPR/ BT7086IJ/V004)	15/12/2006	
Schedule 7 Notice served.	11/01/2007	Response received 08/02/2007
Additional Information received.	14/02/2007	
Additional information received - Responses to question 2 detailing abatement equipment.	11/01/2007	Response received 14/02/2007
Additional information received - Platinum Reduction Project; information detailing re-ducting of platinum reduction process from stack A39 to A30.	15/03/2007	Response received 19/03/2007
Additional information received - Process Monitoring Requirements - Details of abatement process monitoring.	03/04/2007	Response received 26/04/2007
Variation notice BT7086IJ/NP3136LJ issued.	29/06/2007	
Application for variation KP3033XQ received. (EPR/ BT7086IJ/V005)	21/10/2007	
Variation Notice KP3033XQ issued	07/11/2007	
Application for variation EPR/BT7086IJ/V006 received	08/12/2010	
Variation EPR/BT7086IJ issued	03/03/2011	
Application for variation EPR/BT7086IJ/V007 received	24/06/2011	
Variation EPR/BT7086IJ/V007 issued	18/07/2011	
Application for variation EPR/BT7086IJ/V008 received	12/09/2011	
Variation EPR/BT7086IJ/V008 issued	09/12/2011	
Agency variation determined EPR/BT7086IJ/V009	28/05/2013	Agency variation to implement the changes introduced by IED.
Variation application EPR/BT7086IJ/V010	Duly made 21/11/2013	Expansion of storage facilities
Variation determined EPR/BT7086IJ/V010	09/12/2013	Varied permit issued.
Application EPR/BT7086IJ/V015 (variation)	Duly made 19/12/2014	Application to expand the CSF2 manufacturing facility.

Status log of the permit		
Description	**Date**	**Comments**
Additional information received	23/01/2015	Emission to air monitoring results for the CSF dryer cooling exhaust and ECT Tank Vents CSF2.
Variation determined EPR/BT7086IJEPRBT7089IJ/V011	11/02/2015	Varied permit issued.
Variation application EPR/BT7086IJ/V012	Duly made 21/04/2016	New production area PU12 to replace PU8-10
Schedule 5 notice issued on 25/05/16	Response 14/06/2016 and 21/06/2016	
Schedule 5 notice issued on 13/07/16	Response dated 01/08/2016	Questions about dispersion modelling.
Variation determined EPR/BT7086IJ/V012	06/09/2016	
Variation application EPR/BT7086IJ/V013	Duly made 28/09/2017	Application to replace two combined heat & power engines.
Variation application EPR/BT7086IJ/V014	Duly made 08/09/2017	Application to add a 3D printing pilot plant with two local exhaust ventilation emission points served by a dust extraction and filtration system.
Additional information received	31/08/2017	New engines specification
	29/09/2017	Stack and vents map
	10/10/2017	Improvement condition timescale and kiln details
Variation determined EPR/BT7086IJ	23/10/2017	Variations V013 and V014 issued in consolidated format with Environment Agency Variation to add in multi-product protocol condition and correct the point source emissions condition.
Application EPR/BT7086IJ/V015 (variation and consolidation)	Duly made 17/06/2020	Application to add a process to impregnate platinum onto zeolite.
Additional information received	24/07/2020	Revised air dispersion modelling report and backing data to include scenario of adding only the platinum on zeolite process.
Additional information received	26/08/2020	Updated dispersion modelling data for the platinum on zeolite process scenario.
Additional information received	17/11/2020	Response to Schedule 5 Notice dated 25/09/2020.
Additional information received	05/01/2021	Response to request for further information dated 31/12/2020.
Variation determined and consolidation issued EPR/BT7086IJ Billing ref. AP3905BH	10/03/2021	Varied and consolidated permit issued in modern format.

End of introductory note

Notice of variation and consolidation

The Environmental Permitting (England and Wales) Regulations 2016

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

Permit number

EPR/BT7086IJ

Issued to

Johnson Matthey PLC ("the operator")

whose registered office is

5th Floor
25 Farrington Street
London
EC4A 4AB

company registration number 00033774

to operate a regulated facility at

Royston Site
Orchard Road
Royston
Hertfordshire
SG8 5HE

to the extent set out in the schedules.

The notice shall take effect from 10/03/2021.

Name	Date
David Griffiths	**10/03/2021**

Authorised on behalf of the Environment Agency

Schedule 1

Only the following conditions have been varied by the consolidated permit EPR/BT7086IJ.

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

- Table S1.1 as referenced in conditions 2.1.1 and 2.3.7;
- Table S1.2 as referenced in conditions 2.3.1 and 2.3.2;
- Table S1.3 as referenced in condition 2.4.1; and
- Table S3.1 (d) as referenced in conditions 3.1.1, 3.5.1 and 3.5.4.

The following Table was varied as a result of an Environment Agency initiated variation:

- Table S1.3 as referenced in condition 2.4.1.

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

- Schedule 5 – Notification;
- Schedule 6 – Interpretation.

Schedule 2 – consolidated permit

Consolidated permit issued as a separate document.

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/BT7086IJ

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/BT7086IJ/V015 authorising,

Johnson Matthey PLC ("the operator")

whose registered office is

5th Floor
25 Farrington Street
London
EC4A 4AB

company registration number 00033774

to operate an installation at

Royston Site
Orchard Road
Royston
Hertfordshire
SG8 5HE

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

Name	Date
David Griffiths	**10/03/2021**

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 Multi product protocol

1.5.1 Where the operator proposes to make a change under a multi product protocol that is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified of the proposed change;

(b) the notification shall contain a description of the change including: an assessment of its environmental impact; any relevant supporting assessments and drawings; and the proposed implementation date;

(c) the change shall not be implemented unless approved in writing by the Environment Agency;

(d) as from any approved implementation date, the operator shall operate in accordance with the changed multi product protocol in place of the previously approved version.

2 Operations

2.1 Permitted activities

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

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

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 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; 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.

Hazardous waste storage and treatment

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

2.4 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 S3.1a-n and S3.2.

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

3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

3.2 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 S3.1a-n, and S3.2; and

(b) process monitoring specified in table S3.3.

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and 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 S3.1a-n and S3.2 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 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; and

(b) the performance parameters set out in schedule 4, table S4.2 using the forms specified in table S4.3 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 S4.3; and

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

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.

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 and WFD Annex I and II operations**	**Limits of specified activity and waste types**
AR1	S4.1 A1 (a) (vii)	Carried out in Homogeneous catalyst process of Fine Chemicals production area, which is part of Refining & Chemicals Europe (R&CE) business unit.	From receipt of raw materials to despatch/use of finished product incorporating the activities in Table S1.1.
AR2	S4.2 A1 (a) (iv)	Carried out in Refining & Chemicals Europe (R&CE), within the Platinum Group Metals Refinery (PGMR), (comprising the platinum and palladium refinery, and the Insolubles Metals Refinery (IMR)), and Inorganic Fine Chemicals production area. It is also carried out in research and development within R&CE Process Technology, including Advanced Glass Technologies (AgT) development, and Emission Control Technologies (ECT) Technology Centre. Inorganic speciality chemicals are produced within Fine Chemicals Divisional Products (FCDP).	From receipt of raw materials to despatch/use of finished product incorporating the activities in Table S1.1.
AR3	S4.2 A (1) (c)	Carried out in the manufacture of coatings for the autocatalyst (Fastcat) and catalytic soot filter (CSF) manufacture within the ECT business unit. Also for the manufacture of high purity inorganic chemicals mainly for laboratory use within the FCDP production unit. Also carried out in the manufacturing of other materials (Zeocat) in Chemicals, Catalysts and Refining (CCR) business unit.	From receipt of raw materials to despatch/use of finished product incorporating activities in Table S1.1.
AR4	S4.2 A (1) (f)	Carried out in the manufacture of coatings for the autocatalyst (Fastcat) and catalytic soot filter (CSF) manufacture within the ECT business unit.	From receipt of raw materials to despatch/use of finished product incorporating the activities listed in Table S1.1.
AR5	S6.4 B (a)	Coating operations in the manufacture of catalysts within the supported metal catalysts (Procat 1 and ZeoCat) production area of the	From receipt of raw materials to despatch/use of finished

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
		R&CE business unit. Also within the Fastcat and CSF production areas of the ECT business unit.	product incorporating activities in Table S1.1.
AR6	S5.4 A1 (a) (ii)	Physico-chemical treatment of waste waters and storage of sludge.	From receipt of process effluent to the discharge to Anglian Water foul sewer including sludge tanker loading.
	Directly Associated Activity		
AR7	Refining any non-ferrous metal or alloy, other than the electrolytic refining of copper	Carried out in Noble Metals business unit. Precious metal components are fabricated for engineering, glass and chemical applications.	From receipt of raw materials to despatch/use of finished product incorporating activities in Table S1.1.
AR8	Ceramic production	Manufacturing less than 20 tonnes per year of ceramic catalyst/abatement support products using 3D printing and firing in kilns. Carried out in the Noble Metals business unit.	From receipt of raw materials to despatch/use of finished product.
AR9	Values Recovery Plant	For the recovery of precious metals from process effluent prior to final effluent treatment.	The recovery of precious metals from process effluent prior to final effluent treatment.
AR10	Steam and electrical power supply	2 x CHP gas engines with a thermal input of 4.5MWth. 3 gas fired boilers rated at a thermal input of 5.3MW each. Used for provision of process steam and hot water.	Includes oil receipt and storage. Oil is used as a fuel in temporary boilers in emergencies or during plant maintenance of main boilers.
AR11	Support Engineering Services	These exist in R&CE, ECT and Noble Metals.	These exist in R&CE, ECT and Noble Metals.
AR12	Analytical Services Laboratory	These exist in R&CE, ECT and Noble Metals.	These exist in R&CE, ECT and Noble Metals.
AR13	Dispensing and packing	For products.	
AR14	Fuel Storage, transport and handling	The storage and handling of fuels, supplying engine and vehicle test work at the Emission Control Technologies (ECT) Technology Centre.	Includes fuel receipt, storage and transfer.

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application	The response to questions 2.1 and 2.2 given in section 2.1 and 2.2 of volume 1 of the application BT7086IJ	27/06/2003
	The response to questions 2.1 and 2.2 given in section 2.1, 2.2 and 2.6 of volume 1 of the application DP3834SU	22/03/2005
	The response to questions 2.1 and 2.2 given in section 2.1, and 2.2 in the Application NP3136LJ	15/12/2006
	The response to questions 2.1 and 2.2 given in section 2 of the BAT assessment ammonia stripping plant and acid scrubbing in application KP3033XQ.	22/10/2007
Multi-product protocol	Multi-Product Protocol Procedure ref. RS.EHS.006a	24/10/2007
Schedule 7 Notice Request dated 11/01/07	Response to question 1 detailing process control.	14/02/2007
Additional information (Schedule 7 response)	Responses to question 2 detailing abatement equipment.	14/02/2007
Platinum Reduction Project dated 15/03/07	Information detailing re-ducting of platinum reduction process from stack A39 to A30.	19/03/2007
Process Monitoring Requirements	Details of abatement process monitoring	26/04/2007
ECT Tech Centre Release Points	Listed under heading, Schedule 5, paragraph 13, details of release points in ECT Tech Centre	24/05/2007
Variation EPR/BT7086IJ/V006	Response to question 3 of Part C3 of the application.	08/12/2010
Additional information EPR/BT7086IJ/V006	Minor changes to detail relating to updated calcining technique	21/02/2011
Variation EPR/BT7086IJ/V007	The operating techniques described in the application for variation	24/06/2011
Variation EPR/BT7086IJ/V008	The operating techniques described in the application for variation, specifically referring to the operation of a fuel tank farm and fuel transfer system for the use of the specified fuel and fuel additives.	12/09/2011
Variation application EPR/BT7086IJ/V010	Parts C2 and C3 of the application form and referenced supporting documents.	29/10/2013
Variation application EPR/BT7086IJ/V010 further information request response	Answers to questions 1, 2 and 3 in email confirming details on emissions to air and bunding specifications.	21/11/2013
Variation application EPR/BT7086IJ/V011	Parts C2 and C3 of the application documents and all supporting information. Responses to request for information (email dated 18/12/14) and revised air emissions site plan.	19/12/2014
Variation application EPR/BT7086IJ/V011 further information request response	Emission to air monitoring results for the CSF dryer cooling exhaust and ECT Tank Vents CSF2.	23/01/2015
Variation application EPR/BT7086IJ/V012	Application document EPR/BT7086IJ/V012, sections 3, 4.1, 4.2, 4.3, 4.4, 4.5 and 4.6	21/04/2016

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Response to schedule 5 notice dated 25/05/16	Response to questions 1 and 4	14/06/2016
Variation Application EPR/BT7086IJ/V013	Section 2.2 of the application document.	28/09/2017
Variation Application EPR/BT7086IJ/V014	Sections 2.1 and 2.2 of the application document.	08/09/2017
	Stack map ref. PPC Stacks and Vents	29/09/2017
Variation application EPR/BT7086IJ/V015	Technical standards and operating techniques detailed in document: - EPR Application for a Normal Variation to Permit No. BT7086IJ/V015 provided in response to section 3a – technical standards, Part C3 of the application form. Technical standards and operating techniques detailed in document: - Johnson Matthey response to platinum on zeolite not duly made letter (response dated 27/05/20).	17/06/2020
Air Quality Report and dispersion modelling data provided with Application EPR/BT7086IJ/V015	Minimum scrubber of 80% for recovery of NOx prior to discharge from stack, A11.	24/07/2020 and 26/08/2020
Response to Schedule 5 Notice dated 25/09/20	Operating techniques described in the responses to the Notice (including accompanying information): - Response to Questions 1 -2 on operating techniques to demonstrate compliance with Best Available Techniques (BAT); - Response to Question 9 on operation of local exhaust ventilation (LEV): - Response to Question 11 on handling of liquids within sumps in the buildings used for the PTZ process; - Response to Question 12 on operation of aqueous effluent abatement systems; - Response to Question 13 on operational procedure, PC 2103R126; - Response to Question 14 on ensuring containment of materials whilst transferring zeolite to the charging impregnator vessels; - Response to Question 15 on inspection and maintenance of assets within the Procat 1 building; - Response to Question 17 on the storage and handling of materials used within the PTZ process; - Response to Question 18 on the control of fire water; - Response to Question 19 on the use of reagents within the PTZ process to minimise odour.	13/11/2020

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC 9	A written report shall be submitted to the Agency for approval. The report should detail the development and implementation of a strategy for reducing releases of Class B VOCs from AgT to less than 75 mg/m^3. The notification requirements of condition 2.4.2 shall be deemed to have been complied with on submission of the procedure. Any improvements arising from the strategy shall be implemented by the operator from the date of approval in writing by the Agency.	Complete
IC13	The operator shall conduct monitoring of the new clean air vents from the muenstermann ovens. A written report demonstrating the conclusions of the monitoring should be submitted to the Environment Agency for approval. The report shall include but not be limited to the following: • Monthly samples for six months of NO_x, VOC and Particulate emissions from new emission points to air A272-A278.	Complete
IC 14	The operator shall investigate the use of sub-metering of water. The operator shall submit a report summarising the investigation to the Environment Agency. The report shall include proposals for implementing sub-metering where appropriate.	Complete
IC15	A written report shall be submitted to the Agency. The report should detail options out to reduce HCl emissions to 10 mg/m^3 from stacks A28, A30 and A31. The notification requirements of condition 2.4.2 shall be deemed to have been complied with on submission of the report. The preferred option shall be implemented by the operator from the date of approval in writing by the Agency.	Complete
IC16	(a) The operator shall submit a written proposal to the Environment Agency for approval on the commissioning of the 3-D printing plant. This report shall include: - The date of commencement of commissioning; - Details of all activities to be carried out during commissioning (including emissions monitoring); - The extent and duration of commissioning; - Criteria for confirming the completion of commissioning. Approved commissioning proposals shall be implemented by the operator in line with the timescales approved by the Environment Agency subject to such amendments or additions as notified by the Environment Agency. (b) The operator shall submit a written report to the Environment Agency for approval that details the emissions to air during the commissioning of the 3D Printing Plant LEVs from stacks A284 and A285 and the kiln from stack A243. The report shall compare the emissions from the stacks to the emission conclusions made in application EPR/BT7086IJ/V014. In the event that the monitoring identifies the need for further dust and particulate matter abatement measures or monitoring, the operator shall propose additional measures along with timescales for implementation to the Environment Agency for written approval.	(a) At least one month before commencing commissioning. (b) Within two months of completion of commissioning.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	The operator shall implement any further abatement measures in line with the timescales agreed with the Environment Agency subject to such amendments or additions as notified by the Environment Agency.	
IC17	A written report shall be submitted to the Environment Agency. The report should detail the emissions to air following the commissioning of the new CHP engines from stacks A8a and A8b. The report should compare the emissions from the stacks to the emission conclusions made in application EPR/BT7086IJ/V013. In the event the monitoring identifies the need for further abatement measures or monitoring the operator shall propose additional measures along with timescales for implementation to the Environment Agency for written approval. The Operator shall implement any further abatement measures in line with the timescales agreed with the Environment Agency.	Complete
IC18	The operator shall submit a written report to the Environment Agency for approval on the commissioning of the PTZ process. This report shall include: - the results of monitoring of gaseous emissions from release point A11 to demonstrate compliance with permitted emission limit values; - an assessment of the operation of the LEV dust abatement within the PTZ process; - an review of noise and odour arising from the operation of the PTZ process to verify the assessments provided for each in the permit variation application; - an updated assessment of the stoichiometry of the decomposition reaction during calcination and an updated assessment of the proportion of N_2O and N_2O in the off-gases from the decomposition process. The report shall also contain an updated assessment of the expected chemical reactions occurring and the decomposition products created within the impregnation and calcination stages of the PTZ process. The report shall also include any recommendations with timescales for further optimisation of the PTZ process to minimise its potential for environmental impact. Any approved proposals shall be implemented by the operator in line with the timescales approved by the Environment Agency subject to such amendments or additions as notified by the Environment Agency.	30/09/2021

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC19	The operator shall submit a written report to the Environment Agency for approval to verify the conclusions of mass balance calculations submitted in the variation application relating to the concentration of nitrate and nitrite species produced from abatement of off-gases from the platinum on zeolite process. The report shall include: - results of sampling and testing of site effluent for nitrate and nitrite prior to final discharge from site to sewer; - results of sampling and testing of the receiving waters after Royston waste water treatment works for nitrate and nitrite; - an assessment of the monitored levels of nitrate and nitrite compared with those levels predicted in the permit application; - an assessment of the environmental impact of the monitored levels of nitrate and nitrite on receiving waters using the Environment Agency's H1 risk assessment tool, detailed water modelling or an equivalent mechanism; - any proposals with timescales for further reduction in levels of nitrate and nitrite released from site or proposals to reduce the potential environmental impact of those releases of nitrate and nitrite. Any approved proposals shall be implemented by the operator in line with the timescales approved by the Environment Agency subject to such amendments or additions as notified by the Environment Agency.	31/12/2021
IC 20	The operator shall submit a written report to the Environment Agency for approval that confirms, with monitoring data, a minimum NOx abatement efficiency of 80% for emissions discharged from stack, A11. Should the monitoring data indicate that abatement efficiency is not at least 80%, the report shall include proposals and timescales for achieving 80% NOx abatement for releases from stack A11. Any approved proposals shall be implemented by the operator in line with the timescales approved by the Environment Agency subject to such amendments or additions as notified by the Environment Agency.	31/12/2021

Schedule 2 – Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	**Specification**
Mercury content of sodium hydroxide	Discharges of mercury as a result of the impurities of raw materials used shall be controlled by ensuring that impurity levels are the minimum available in the commercial product
Mercury and cadmium content of hydrochloric acid	Discharges of mercury and cadmium as a result of the impurities of raw materials used shall be controlled by ensuring that impurity levels are the minimum available in the commercial product
Gas oil	Less than 0.1% w/w sulphur content

Table S2.2 Permitted waste types and quantities for Noble Metals process	
Maximum quantity	**-**
Waste code	**Description**
12	**WASTES FROM SHAPING AND PHYSICAL AND MECHANICAL SURFACE TREATMENT OF METALS AND PLASTICS**
12 01	**wastes from shaping and physical and mechanical surface treatment of metals and plastics**
12 01 99	crucibles, coated sheets and wires
16	**WASTES NOT OTHERWISE SPECIFIED IN THE LIST**
16 08	**spent catalysts**
16 08 07*	spent catalysts contaminated with hazardous substances

Schedule 3 – Emissions and monitoring

Table S3.1a Point source emissions to air – emission limits and monitoring requirements from ECT						
Emission point Ref. & Location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring Frequency**	**Monitoring Standard or Method**
A207	Abatement plant	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	50 mg/m^3	95 percent of monthly hourly averages	Continuous	Chemiluminescence
			50 mg/m^3	Average of minimum 1 hour period	Annually	Chemiluminescence BSEN 14792
		Carbon Monoxide	100mg/m^3	Average of minimum 1 hour period	Annually	NDIR BS EN 15058:2006
		Ammonia	15 mg/m^3	Average of minimum 1 hour period	Annually	Procedural requirements of BS EN 14791 for sampling
		Volatile Organic Compounds (VOCs) as total carbon	20 mg/m^3	Average of minimum 1 hour period	Annually	FID method BS EN 12619
A230	Abatement plant	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	50 mg/m^3	95 percent of monthly hourly averages	Continuous	Chemiluminescence
		Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	50 mg/m^3	Average of minimum 1 hour period	Annually	Chemiluminescence BSEN 14792
		Carbon Monoxide	100 mg/m^3	Average of minimum 1 hour period	Annually	NDIR BS EN 15058:2006
		Ammonia	15 mg/m^3	Average of minimum 1 hour period	Annually	Procedural requirements of BS EN 14791 for sampling
		Volatile Organic Compounds (VOCs) as total carbon	20 mg/m^3	Average of minimum 1 hour period	Annually	FID method BS EN 12619

Table S3.1a Point source emissions to air – emission limits and monitoring requirements from ECT						
Emission point Ref. & Location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring Frequency**	**Monitoring Standard or Method**
A231	Abatement	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	50 mg/m^3	95 percent of monthly hourly averages	Continuous	Chemiluminescence
		Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	50 mg/m^3	Average of minimum 1 hour period	Annually	Chemiluminescence BSEN 14792
		Carbon Monoxide	100 mg/m^3	Average of minimum 1 hour period	Annually	NDIR BS EN 15058:2006
		Ammonia	15 mg/m^3	Average of minimum 1 hour period	Annually	Procedural requirements of BS EN 14791 for sampling
		Volatile Organic Compounds (VOCs) as total carbon	20 mg/m^3	Average of minimum 1 hour period	Annually	FID method BS EN 12619
A272	Muenstermann oven (clean air cooling vent)	No parameters set	No limits set	--	--	--
A273	Muenstermann oven (clean air cooling vent)	No parameters set	No limits set	--	--	--
A274	Muenstermann oven (clean air cooling vent)	No parameters set	No limits set	--	--	--
A275	Muenstermann oven (clean air cooling vent)	No parameters set	No limits set	--	--	--
A276	Muenstermann oven (clean air cooling vent)	No parameters set	No limits set	--	--	--
A277	Muenstermann oven (clean air cooling vent)	No parameters set	No limits set	--	--	--
A278	Muenstermann oven (clean air cooling vent)	No parameters set	No limits set	--	--	--
A279	Vent from 39 washer vessels	No parameters set	No limits set	--	--	--

Table S3.1a Point source emissions to air – emission limits and monitoring requirements from ECT						
Emission point Ref. & Location	**Source**	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring Frequency**	**Monitoring Standard or Method**
A280	Fastcat and CSF1 vessel extraction	No parameters set	No limits set	--	--	--
A281	Clean cooling air exhaust from dryer 3 within CSF2.	Products of combustion	No limits set	--	--	--

Table S3.1b Point source emissions to air – emission limits and monitoring requirements – Procat 1						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A152	Abatement plant	No parameters set	-	-	-	-
A178	Abatement plant	No parameters set	-	-	-	-
A182	Abatement plant	Total Particulate matter	20 mg/m^3	Average of minimum 1 hour period	Annually	Manual method BS EN 13284

Table S3.1c Point source emissions to air – emission limits and monitoring requirements – AgT						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A57	Sturvent Fan (AgT1)	Volatile Organic Compounds (VOCs)	No limits set	Average of minimum 1 hour period	6 monthly	FID method BS EN 13526
A109	Main Ext Fan (AgT1)	Volatile Organic Compounds (VOCs)	No limits set	Average of minimum 1 hour period	6 monthly	FID method BS EN 13526
A117	Barlow Whitney Oven 2 (AgT1)	Volatile Organic Compounds (VOCs)	No limits set	Average of minimum 1 hour period	6 monthly	FID method BS EN 13526
A205	Dustmaster unit (AgT1)	No parameters set	No limits set	-	-	-
A228	Abatement plant (AgT2)	Volatile Organic Compounds (VOCs)	75 mg/m^3	Average of minimum 1 hour period	6 monthly	FID method BS EN 13526

Table S3.1d Point source emissions to air – emission limits and monitoring requirements –Fine Chemicals – Inorganics						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A4	Abatement Plant	Hydrogen chloride	10 mg/m^3	Average of minimum 1 hour period	Annually	BS EN 1911
A4	Abatement plant	Chlorine	10 mg/m^3	Average of minimum 1 hour period	Annually	USEPA method 26A
A4	Abatement plant	Oxides of Nitrogen (expressed as NO_2)	200 mg/m^3	Average of minimum 1 hour period	Annually	BS EN 14792
A4	Abatement plant	Total particulate matter	20 mg/m^3	Average of minimum 1 hour period	Annually	BS EN 13284-1
A4	Abatement plant	Ammonia	15 mg/m^3	Average of minimum 1 hour period	Annually	Procedural requirements of BS EN 14791 for sampling
A11	Abatement plant	Oxides of Nitrogen (expressed as NO_2)	200 mg/m^3	Average of minimum 1 hour period	Annually	BS EN 14792:2017
A11	Abatement plant	Nitrous Oxide	200 mg/m^3	Average of minimum 1 hour period	Annually	EN 21258:2010
A11	Abatement plant	Acetic Acid	50 mg/m^3	Average of minimum 1 hour period	Annually	Sampling BS CEN/TS 13649, NIOSH 1603 for analysis

Table S3.1e Point source emissions to air – emission limits and monitoring requirements – Fine Chemicals - HCP						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A197	Abatement plant	Volatile Organic Compounds (VOCs) as acetone	5 tonne/annum	Maximum value	Continuous	FID-BS EN 13526:2002

Table S3.1f Point source emissions to air – emission limits and monitoring requirements – PGMR – PPR						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A28	Abatement plant	Hydrogen chloride	10 $mg/m^{3(1)}$	Average of minimum 1 hour period	3-monthly	USEPA method 26A
		Chlorine	70 mg/m^3	95 percent of monthly hourly averages	Continuous	Electrochemical diffusion sensor
		Ammonium chloride (NH_4Cl)	10 mg/m^3	Average of minimum 1 hour period	3-monthly	As agreed in writing
A30	Abatement plant	Hydrogen chloride	10 $mg/m^{3(1)}$	Average of minimum 1 hour period	3-monthly	USEPA method 26A
		Chlorine	70 mg/m^3	95 percent of monthly hourly averages	Continuous	Electrochemical diffusion sensor
		Ammonium chloride (NH_4Cl)	10 mg/m^3	Average of minimum 1 hour period	3-monthly	As agreed in writing
A31	Abatement plant	Ammonium chloride (NH_4Cl)	10 mg/m^3	Average of minimum 1 hour period	3-monthly	As agreed in writing
		Hydrogen chloride	10 mg/m^3	Average of minimum 1 hour period	3-monthly	USEPA method 26A
		Chlorine	70 mg/m^3	95 percent of monthly hourly averages	Continuous	Electrochemical diffusion sensor

Note 1: Increased to 50 mg/m^3 until completion of improvement condition IC15 in table S1.3, or as agreed in writing with the Environment Agency

Table S3.1g Point source emissions to air – emission limits and monitoring requirements – PGMR – IMR						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A35	Abatement plant	Hydrogen chloride	10 mg/m^3	Average of minimum 1 hour period	Annually	Manual method BS EN 1911
A35	Abatement plant	Chlorine	5 mg/m^3	Average of minimum 1 hour period	Annually	US EPA method 26/26a
A80	Abatement plant	Hydrogen chloride	10 mg/m^3	Average of minimum 1 hour period	Annually	Manual method BS EN 1911
A80	Abatement plant	Volatile Organic Compounds (VOCs) (class B) as total carbon	75 mg/m^3	Average of minimum 1 hour period	Annually	Manual method BS EN 13649 [1]

Note 1: Method used in conjunction with FID method BS EN 13526 to give temporal profile of total VOC emissions.

Table S3.1h Point source emissions to air – emission limits and monitoring requirements – Noble Metals						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A225	Abatement plant	Hydrogen chloride	10 mg/m^3	Average of minimum 1 hour period	Annually	Manual method BS EN 1911
A225	Abatement plant	Chlorine	10 mg/m^3	Average of minimum 1 hour period	Annually	US EPA method 26/26a
A226	Abatement plant	Hydrogen chloride	10 mg/m^3	Average of minimum 1 hour period	Annually	Manual method BS EN 1911
A226	Abatement plant	Oxides of Nitrogen (expressed as NO_2)	150 mg/m^3	Average of minimum 1 hour period	Annually	Chemiluminecsence BSEN 14792
A243	Firing Kiln	No parameters set	No limits set	-	-	-
A284	3D Printing Plant LEV	No parameters set	No limits set	-	-	-
A285	3D Printing Plant LEV	No parameters set	No limits set	-	-	-

Table S3.1 i Point source emissions to air – emission limits and monitoring requirements – FDCP						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A1	Abatement plant	Hydrogen chloride	10 mg/m^3	Average of minimum 1 hour period	Annually	Manual method BS EN 1911

Table S3.1j Point source emissions to air – emission limits and monitoring requirements - CHP						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A8a	SCR - CHP	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	200 mg/m^3	Average over minimum 1 hour period	Annually	Chemiluminescence method BS EN 14792
A8b	SCR - CHP	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	200 mg/m^3	Average over minimum 1 hour period	Annually	Chemiluminescence method BS EN 14792

Table S3.1k Point source emissions to air – emission limits and monitoring requirements - Boilerhouse						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A13	Boiler house	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	300 mg/m^3	Average of minimum 1 hour period	Annually	Chemiluminescence method BS EN 14792
		Carbon monoxide	100 mg/m^3	Average of minimum 1 hour period	Annually	NDIR BS EN 15058:2006
A15	Boiler house	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	300 mg/m^3	Average of minimum 1 hour period	Annually	Chemiluminescence method BS EN 14792
		Carbon monoxide	100 mg/m^3	Average of minimum 1 hour period	Annually	NDIR BS EN 15058:2006
A16	Boiler house	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	300 mg/m^3	Average of minimum 1 hour period	Annually	Chemiluminescence method BS EN 14792
		Carbon monoxide	100 mg/m^3	Average of minimum 1 hour period	Annually	NDIR BS EN 15058:2006

Table S3.1l Point source emissions to air – emission limits and monitoring requirements - VRP						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A27	VRP	Hydrogen chloride	10 mg/m^3	Average of minimum 1 hour period	Annually	Manual method BS EN 1911
		Total Volatile Organic Compounds as total carbon	100 mg/m^3	Average of minimum 1 hour period	Annually	BS EN 12619
		Ammonia	10 mg/m^3	Average of minimum of 1 hour period	Annually	Procedural requirements of BS EN 14791 for sampling

Table S3.1m Point source emissions to air – emission limits and monitoring requirements – ECT Tech Centre						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A232	TC3	No parameters set	No limits set	-	-	-
A3	Tech centre	No parameters set	No limits set	-	-	-
A42	Synthetic catalyst activity test orbital rig	No parameters set	No limits set	-	-	-
A51	FCDP	No parameters set	No limits set	-	-	-
A74	Synthetic catalyst activity test SIGU rig	No parameters set	No limits set	-	-	-
A82	Cell 1	No parameters set	No limits set	-	-	-
A85	Cell 1	No parameters set	No limits set	-	-	-
A86	Cell 2	No parameters set	No limits set	-	-	-
A91	Cell 2	No parameters set	No limits set	-	-	-
A92	Cell 3	No parameters set	No limits set	-	-	-
A94	Cell 3	No parameters set	No limits set	-	-	-

Table S3.1m Point source emissions to air – emission limits and monitoring requirements – ECT Tech Centre						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A95	Cell 4	No parameters set	No limits set	-	-	-
A96	Cell 4	No parameters set	No limits set	-	-	-
A112	Cell 5	No parameters set	No limits set	-	-	-
A129	Cell 5	No parameters set	No limits set	-	-	-
A130	Cell 6	No parameters set	No limits set	-	-	-
A131	Cell 6	No parameters set	No limits set	-	-	-
A153	Cell 7	No parameters set	No limits set	-	-	-
A158	Cell 8	No parameters set	No limits set	-	-	-
A159	Cell 9	No parameters set	No limits set	-	-	-
A160	Constant volume sampling 1	No parameters set	No limits set	-	-	-
A161	Super ultra low emissions vehicles cell	No parameters set	No limits set	-	-	-
A162	Mileage accumulation facility cell	No parameters set	No limits set	-	-	-
A233	Vehicle prep area	No parameters set	No limits set	-	-	-

Table S3.1n Point source emissions to air – emission limits and monitoring requirements – Fine chemicals in plant PU12						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A97	Abatement plant	Hydrogen chloride	3 mg/m^3	Average over sampling period	Annual	BS EN 1911
	Abatement plant	Chlorine	3 mg/m^3	Average over sampling period	Annual	USEPA method 26A
A98	Abatement plant	Oxides of Nitrogen (expressed as NO_2)	200 mg/m^3	Average over sampling period	Annual	BS EN 14792
	Abatement plant	Ammonia	1.3 mg/m^3	Average over sampling period	Annual	Procedural requirements of BS EN 14791 for sampling
A99	Abatement plant	Hydrogen chloride	3 mg/m^3	Average over sampling period	Annual	BS EN 1911
	Abatement plant	Chlorine	3 mg/m^3	Average over sampling period	Annual	USEPA method 26A
	Abatement plant	Oxides of Nitrogen (expressed as NO_2)	200 mg/m^3	Average over sampling period	Annual	BS EN 14792
	Abatement plant	Ammonia	1.3 mg/m^3	Average over sampling period	Annual	Procedural requirements of BS EN 14791 for sampling
	Abatement plant	Acetic acid	50 mg/m^3	Average over sampling period	Annual	BS CEN/TS 13649 and NIOSH 1603
A100	Fume cupboards	No parameters set	No limits set	-	-	-

Table S3.2 Point source emissions to sewer, effluent treatment plant or other transfers off-site– emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (incl. Unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
S1	Site effluent treatment plant	No parameters set	No limits set	-	-	-

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Process scrubber - Fastcat	Liquor flow rate	Continuous	Not applicable	-
Process scrubber – Fastcat, venturi, demister and packing	Pressure drop	Continuous	Not applicable	-
Process scrubber – PGMR, A28	Liquor flow rate	Continuous	Not applicable	-
Process scrubber – PGMR, A28	Pressure drop	Continuous	Not applicable	-
Process scrubber – PGMR, A30	Liquor flow rate	Continuous	Not applicable	-
Process scrubber – PGMR, A30	Pressure drop	Continuous	Not applicable	
Process scrubber – PGMR, A31	Liquor flow rate	Continuous	Not applicable	-
Process scrubber – PGMR, A31	Pressure drop	Continuous	Not applicable	-
Process scrubber – PGMR, A35	pH	Continuous	Not applicable	-
Process scrubber – Fine Chem, A4	pH	Continuous	Not applicable	-
Process scrubber – Fine Chem, A11	pH	Continuous	Not applicable	-
Particulate Bag Plant – Zeocat A265	Pressure drop	Continuous	Not applicable	-
Process scrubber – HCP, A197	pH	Daily	Not applicable	-
Process scrubber – Noble metals, A225	pH	Daily	Not applicable	-
Process scrubber – Noble metals, A226	pH	Daily	Not applicable	-
Process scrubber – FDCP, A1	Liquor flow rate	Continuous	Not applicable	-
Process scrubber – FDCP, A1	pH	Continuous	Not applicable	-
SCR – Fastcat, A207	Pressure drop	Continuous	Not applicable	-
SCR – Fastcat, A207	Temperature	Continuous	Not applicable	-
SCR – CSF 1, A230	Pressure drop	Continuous	Not applicable	-
SCR – CSF 1, A230	Temperature	Continuous	Not applicable	-

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
SCR – CSF 2, A231 & A207	Pressure drop	Continuous	Not applicable	-
SCR – CSF 2, A231 & A207	Temperature	Continuous	Not applicable	-
SCR – CHP, A8a and b	Pressure drop	Continuous	Not applicable	-
SCR – CHP, A8a and b	Temperature	Continuous	Not applicable	-
Fabric filter - Fastcat, A207	Pressure drop	Continuous	Not applicable	-
Fabric filter – Procat 1, A178	Pressure drop	Continuous	Not applicable	-
Fabric filter – Procat 1, A182	Pressure drop	Continuous	Not applicable	-
Fabric filter – AgT 2, A229	Pressure drop	Continuous	Not applicable	-
Cyclone – CSF, A230	Pressure drop	Continuous	Not applicable	-
Carbon bed – AgT 2, A228	Temperature	Continuous	Not applicable	-
Carbon bed – AgT 2, A228	Pressure drop	Continuous	Not applicable	-
Carbon bed – HCP, A197	Temperature	Continuous	Not applicable	-
Acid scrubber - VRP	Pressure drop (demister and packing)	Daily	Not applicable	-
Acid scrubber - VRP	pH	Continuous	Not applicable	-
Scrubbers serving A97, A98 and A99	pH, pressure drop, liquid flow rate, specific gravity of liquor	Continuous	Not applicable	-

Schedule 4 – Reporting

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Oxides of Nitrogen mg m^{-3}	A207, A4, A226, A230, A231, A201, A11, A13, A15, A16, A8a, A8b, A98, A99	Annually	01/07/2007
Oxides of Nitrogen mg m^{-3}	A207, A230, A231	Quarterly	01/07/2007
Nitrous oxide mg m^{-3}	A11	Annually	01/01/2021
Carbon monoxide mg m^{-3}	A230, A231, A207, A13, A15, A16	Annually	01/07/2007
Ammonia mg m^{-3}	A230, A231, A207, A4, A27, A98, A99	Annually	01/07/2007
Total VOCs as carbon mg m^{-3}	A207, A230, A231, A27	Annually	01/07/2007
VOCs as acetone mg m^{-3}	A197	Quarterly	01/07/2007
VOCs (Class B) as total carbon mg m^{-3}	A57, A58, A69, A117, A228	6 monthly	01/07/2007
VOCs (Class B) as total carbon mg m^{-3}	A80	Annually	01/07/2007
Gaseous chlorides as HCl mg m^{-3}	A1, A4, A225, A226, A27, A35, A80, A97, A99	Annually	01/07/2007
Gaseous chlorides as HCl mg m^{-3}	A28, A30, A31	Quarterly	01/07/2007
Chlorine mg m^{-3}	A4, A225, A35, A97, A99	Annually	01/07/2007
Chlorine mg m^{-3}	A28, A30, A31	Quarterly	01/07/2007
Ammonium chloride mg m^{-3}	A28, A30, A31	Quarterly	01/07/2007
Hydrogen sulphide mg m^{-3}	A4	Annually	01/07/2007
Acetic acid mg m^{-3}	A11, A99	Annually	01/07/2007
Total Particulate matter mg m^{-3}	A182, A4	Annually	01/07/2007
Note1. Quarterly reporting is required for all continuous monitoring. The results are to be expressed as the average of the hourly means for each month. Also the report shall include the hourly maximums for each day. Readings obtained where the process is not operating are not to be included in the calculation.			

Table S4.2 Performance parameters	
Parameter	**Frequency of assessment**
Water usage (for each business unit) (tonnes)	Annually
Energy usage (MWh)	Annually
Energy usage per site unit of operation (MWh/Uop)	Annually
PGMR Inputs	
Energy/UoP	Annually
Tonne chlorine/tonnePt	Annually
PGMR Waste	
Tonne chlorine (air)/UoP	Annually
Tonne HCl (air)/UoP	Annually
Tonne waste (for disposal)/UoP	Annually
Tonne waste (for recovery)/UoP	Annually
ETP Wastes	
Tonne effluent press cake(recovery)/UoP	Annually
Tonne effluent press cake(disposal)/UoP	Annually
FDCP Inputs	
Energy/UoP	Annually
Fine Chemicals Inputs	
Energy/UoP	Annually
Tonne chlorine/UoP	Annually
Fine Chemicals Waste	
Tonne chlorine (air)/UoP	Annually
Tonne HCl (air)/UoP	Annually
HOM CAT Inputs	
Energy/UoP	Annually
HOM CAT waste	
Reverts to refining as % metal input	Annually
PRO CAT 1 Input	
Energy/UoP	Annually
PRO CAT 1 Waste	
Reverts to refining as % metal input	Annually
PGMs to effluent as % metal input	Annually
Tonne solvent waste (for recovery)/UoP	Annually
Tonne VOCs (air)/UoP	Annually
AgT Input	
Energy/UoP	Annually
Tonne solvent/UoP	Annually
AgT Waste	
Tonne of PGM waste (refining for recovery)/UoP	Annually
Tonne of PGM waste (to landfill for disposal)/UoP	Annually
Tonne solvent waste (for recovery)/UoP	Annually
NOBLE METALS Input	
Energy/UoP	Annually
Tonne chlorine/UoP	Annually
Tonne de-greasing solvent/UoP	Annually
NOBLE METALS waste	

Table S4.2 Performance parameters	
Parameter	**Frequency of assessment**
Tonne chlorine (air)/UoP	Annually
Tonne HCl (air/UoP	Annually
Tonne spent crucibles (for recovery)/UoP	Annually
Tonne spent crucibles (for disposal)/UoP	Annually
Tonne of liquid waste/UoP	Annually
ECT, Fastcat and CSF 1 and 2 Input	
Energy/UoP	Annually
ECT, Fastcat and CSF 1 and 2 Waste	
Tonne NOx/UoP	Annually

Table S4.3 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Air	Form air 1 or other form as agreed in writing by the Agency	-
Water usage	Form water usage1 or other form as agreed in writing by the Agency	-
Energy usage and energy/ UoP	Form energy 1 or other form as agreed in writing by the Agency	-
Other performance indicators	Form performance 1 or other form as agreed in writing by the Agency	-

Schedule 5 – Notification

These pages outline the information that the operator must provide.

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

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

Part A

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

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

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

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
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 breach of permit conditions not related to limits	
To be notified within 24 hours of detection	
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.	

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

Part B – to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	

Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

“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.

“emissions to land” includes emissions to groundwater.

“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.

“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.

“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.

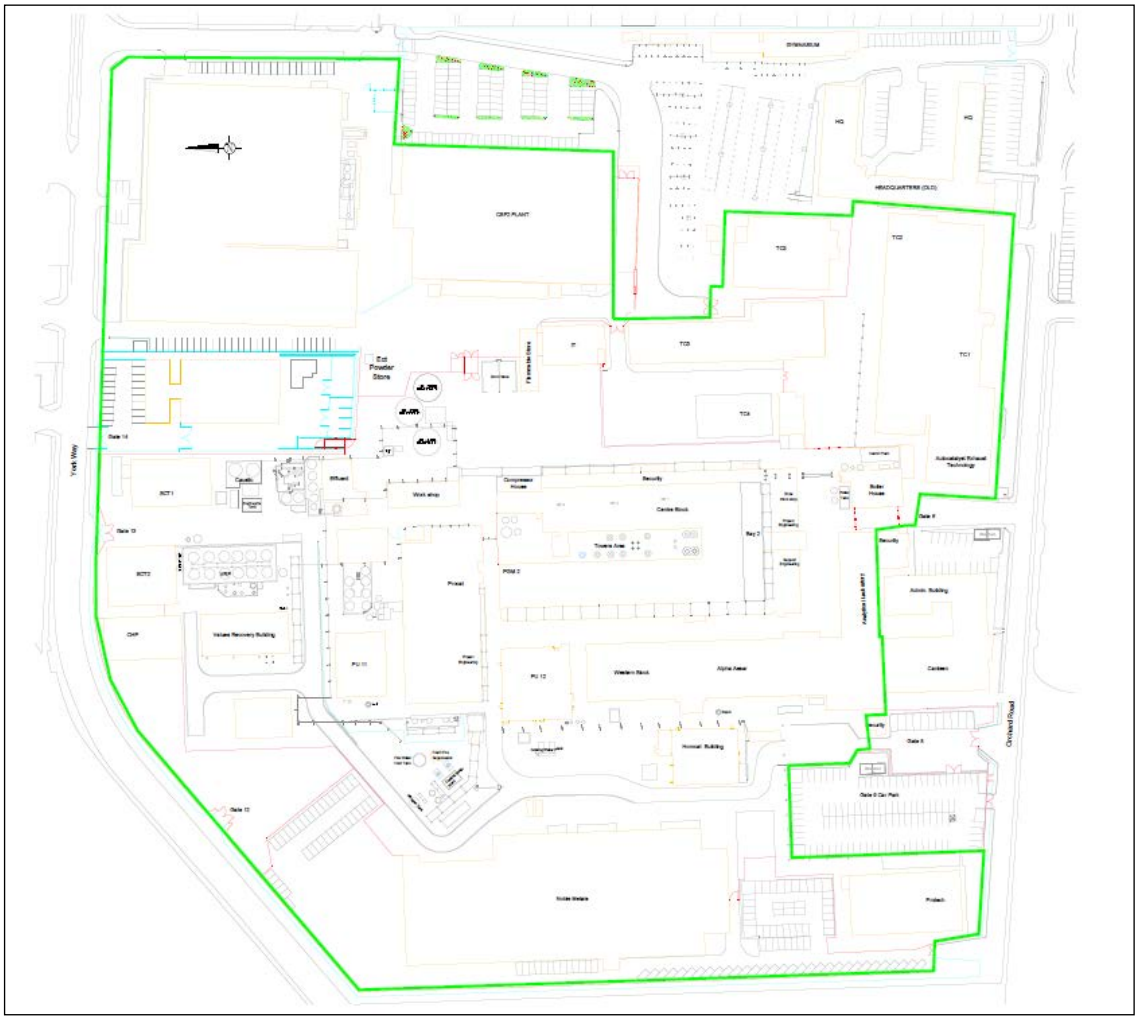
Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

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.

“year” means calendar year ending 31 December.

Schedule 7 – Site plan



END OF PERMIT