

# **Permit with introductory note**

The Environmental Permitting (England & Wales) Regulations 2016

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**Vale Europe Limited**

**Clydach Nickel Refinery  
Clydach  
Swansea  
SA6 5QR**

Permit number

**EPR/BL4567IZ**

# **Clydach Nickel Refinery**

## **Permit number EPR/BL4567IZ**

### **Introductory note**

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

The main features of the permit are as follows.

Vale Europe Ltd operates a nickel refinery producing approximately 40,000 tonnes per annum of nickel pellets, powders and coated products using the 'nickel carbonyl' process. The nickel refinery plant operates continuously and has the following elements:

Process gas plant – The carbon monoxide (CO) and hydrogen (H<sub>2</sub>) needed for nickel refining are produced by the steam reforming of natural gas. The natural gas is de-sulphurised, mixed with steam and then decomposed over a catalyst at 800°C to give hydrogen, carbon monoxide, carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>). The yield can be up to 2800m<sup>3</sup>/hr hydrogen and 400m<sup>3</sup>/hr carbon monoxide. There is a small storage capacity for purified hydrogen and carbon monoxide but most goes directly to the process. Carbon dioxide is also recovered for use as an inert purge gas.

Kiln Plant – Impure nickel oxide imported from Canada as fine granules is stored in silos prior to transfer to the kiln plant which has two lines of rotary kilns. The oxide is reduced by counter current flow of hydrogen at temperatures between 300°C and 500°C producing impure nickel. This passes by gravity to an activation kiln where a sulphur containing gas and hydrogen are passed over the impure nickel. The activated material is passed to volatilisation kilns, where it is reacted with carbon monoxide. In the volatiliser the nickel is converted to gaseous nickel carbonyl Ni(CO)<sub>4</sub> this gas is passed through a cyclone and filtered before entering a ring main. Unreacted metallic process intermediates are transferred to a stabilisation kiln where partial oxidation makes the residues non-pyrophoric, before their return to Canada for reprocessing. The off gas from the reduction kiln is passed through cyclones and scrubbers. The remaining hydrogen is heated and returned to the reduction process. Gas from the activation kiln is cycloned and scrubbed before being returned to the reduction plant. Gas from the stabilisation kiln is cleaned by ceramic filters and then passed to the gaseous effluent plant. The carbon monoxide and nickel carbonyl gas are circulated around a ring main feeding the pellet and powder plant area:

Pellet and powder plant – This plant consists of 19 pellet units, 8 powder decomposers and a fluid bed decomposer. In the pellet units nickel carbonyl gas decomposes onto pre-heated pellets increasing their size. Pellets of the required size are removed, screened and packed. The powder decomposers operate at higher temperatures, the nickel carbonyl decomposes in the vessel head space

and powder falls under gravity into a consolidator before being removed, sieved, blended and packed. The fluid bed decomposer is used to produce speciality coated powders such as nickel-coated graphite.

Aqueous effluent plant – This plant is designed to treat all process effluent streams including surface and storm water.

The treatment involves dosing with caustic soda, thickening and sand filtration, with the treated water being discharged to the River Tawe and the thickener sludge being dewatered followed by thermal drying. The sand filter backwash is returned to the raw effluent sump from where it is fed forward into the plant.

As of the variation V007 modification to the treatment process involves the effluent from the Kiln 1&2 primary scrubber (K1&2PS) diverted to a K1&2PS sump tank (a hire tank until date of improvement condition IC11). The effluent is pumped to directed to emergency caustic dosing tank (ECDT) during where the coagulant Nalco 77135 is added. Caustic solution is added to the effluent in the ECDT which overflows to the thickner.

Gaseous effluent plant – Gas from the volatilisation kilns and the pellet and powder plants is incinerated to destroy residual nickel carbonyl. The waste gases then pass through a bag filtration plant, which remove solids before exhausting to the main stack.

Medium combustion plant – two boilers (other medium combustion plant) 100 % fuelled by natural gas with a combined thermal input of 8.9 MWth which will operate up to 8760 hours at 100% average load use.

The status log of the 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 received	20/12/2001	Application duly made 20/12/01
Operator requests Commercial Confidentiality for diagrams of the foam & fibre coating process	28/12/2001	Request agreed to. Notice of Determination sent to Operator 31/12/01
1 <sup>st</sup> Schedule 4 Notice Issued	24/01/2002	1st Schedule 4 Notice Response received 23/04/2002
2 <sup>nd</sup> Schedule 4 Notice Issued	07/06/2002	2 <sup>nd</sup> Schedule 4 Notice Response received 18/07/2002
Request from Agency (1) to extend determination date to 29/11/2002.	18/07/2002	Operator agrees to the extension to determination period. 23/07/2002
Request from Agency (2) to extend determination date to 28/03/2003.	19/11/2002	Operator agrees to the extension to determination period. 27/11/2002
3 <sup>rd</sup> Schedule 4 Notice Issued	17/03/2003	3 <sup>rd</sup> Schedule 4 Notice Response received

		25/07/2003
Operator informs the Agency of change of company registered office.	22/09/2003	Information added to application.
Request from Operator (1) to extend determination date to 22/09/2003.	27/07/2003	Agency agrees to extension to determination period. 27/07/2003
Request from Operator (2) to extend determination date to 22/10/2003.	15/09/2003	Agency agrees to extension to determination period. 15/09/2003
Additional information received on flood defence pumps	19/09/2003	Information added to application.
Request from Agency (3) to extend determination date to 31/10/2003.	14/10/2003	Operator agrees to the extension to determination period. 15/10/2003
Request from Operator (3) to extend determination date to 14/11/2003	15/10/2003	Agency agrees to extension to determination period. 15/10/2003
Permit Issued	14/11/2003	----

Status log of the permit		
Description	Date	Comments
Application EPR/BL4567IZ/V002	Application received 27/01/2005	Application returned. Dealt with instead as a Regulation 16 notification of change.
Application EPR/BL4567IZ/V003	08/12/2008	Application duly made 29/01/2009
Variation Issued	30/01/2009	
Application EPR/BL4567IZ/V004	Application received 30/07/2010	Application duly made 30/07/2010
Additional Information Received	19/08/2010	
Variation issued	28/09/2010	
Application EPR/BL4567IZ/V005	Application received 02/04/2012	Application duly made 23/05/2012
Additional information received	19/06/2012	Document entitled 'Clarification: "Atmospheric Dispersion Modelling Study of Releases from Proposed Advanced Energy Project", P1028/R015 Rev 1, page 19' received.
Additional information received	28/06/2012	Appendix H to the application document 'Supporting document in respect of application to vary environmental permit reference BL4567IZ under the Pollution Prevention and Control (England and Wales) Regulations 2010' [sic], reference P1028/R007-Rev 1.
Request for further information issued	06/07/2012	Further information requested relating to the operation of the RTO and potential impacts associated with abnormal operation.
Additional information received	26/07/2012	Information relating to existing soil acidity in the locality and background metals concentrations at a range of monitoring stations.
Additional information received	27/07/2012	Document entitled 'Assessment of the impact of releases from the Vale AEP on the North and South bank of the River Tawe', document reference P1028/R020, issue date 26/07/12.
Response to request for further information dated 06/07/12 received	09/08/2012	
Additional information received	10/08/2012	Revised version of document entitled 'Atmospheric dispersion

## Status log of the permit

Description	Date	Comments
		modelling study of releases from proposed advanced energy project', reference P1028/R015 Rev 2, dated July 2012. This replaces the original version of this document that was included as Appendix 14 of the document 'Supporting document in respect of application to vary environmental permit reference BL4567IZ under the Pollution Prevention and Control (England and Wales) Regulations 2010' [sic], reference P1028/R007-Rev 1 when the application was received.
Variation and consolidation issued EPR/BL4567IZ/V005	14/12/2012	Notice of variation and consolidation issued (incorporating a new, consolidated permit).
Regulation 60(1) Notice of request for information	27/07/2016	
Regulation 60(1) response received	30/11/2016	Implementation of BAT conclusions under IED
Variation application received	21/12/2016	Application to vary the process for removing and drying solids from the waste water
Variation application received.	23/06/2017	Variation application to remove Pyrolysis plant received.
Natural Resources Wales Non-Ferrous Metals Sector Review 2016 Permit EPR/BL4567IZ Variation issued EPR/BL4567/V006	16/10/2017	Varied and consolidated permit issued in modern IED condition format.
Variation application received EPR/BL4567IZ/V007	Duly made 08/02/2021	Application for the use of coagulating in the effluent treatment process
Variation Issued	07/05/2021	Variation Issued to Vale Europe Limited
Variation application received EPR/BL4567IZ/V008	18/05/2022	Application to replace 2 existing boilers with 2 new boilers
Additional information received	06/09/2022	Revised H1 tool assessment received
Variation issued EPR/BL4567IZ/V008	22/11/2022	Variation issued to Vale Europe Limited
Variation application received PAN-020046 (EPR/BL4567IZ/V009)	30/11/2022	Application to install closed-loop waste-water recycling system
Additional information received in response to a Schedule 5 notice sent on 05/05/2023	16/05/2023	Assessment of emissions to water of Sodium and existing permitted pollutants
Additional information received following an informal request for information sent on 06/06/2023	08/06/2023	Further information on the use of sodium and sulphate and the emergency waste water containment tanks
Variation determined EPR/BL4567IZ/V009	27/09/2023	Varied permit issued

End of introductory note

# Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

**EPR/BL4567IZ**

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/BL4567IZ/V008 authorising,

**Vale Europe Limited** (“the operator”)

whose registered office is

**Suite 1  
7th Floor  
50 Broadway  
London  
United Kingdom  
SW1H 0BL**

company registration number **00137114**

to operate a regulated facility at

**Clydach Nickel Refinery  
Clydach  
Swansea  
SA6 5QR**

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

Signed

Date

<b>Holly Noble</b>	<b>27/09/2023</b>
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Authorised on behalf of Natural Resources Wales

# Conditions

## 1 Management

### 1.1 General management

- 1.1.1 The operator shall manage and operate the activities:
- (a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformance, 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;



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

## **2 Operations**

### **2.1 Permitted activities**

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

### **2.2 The site**

- 2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.
- 2.2.2 For the following activity, referenced A10 in Schedule 1, Table S1.1 no MCP shall be operated beyond the site of the grid reference specified for it in Schedule 1, Table S1.1 of the permit.

### **2.3 Operating techniques**

- 2.3.1
  - (a) The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by Natural Resources Wales.
  - (b) If notified by Natural Resources Wales that the activities are giving rise to pollution, the operator shall submit to Natural Resources Wales for approval within the period specified, a revision of any plan or other documentation (“plan”) specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.
- 2.3.2 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.
- 2.3.3 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.

- 2.3.4 For the following activity, referenced A10 in schedule 1, table S1.1 the activity shall be operated using the techniques and, in the manner, described in schedule 1, table S1.2A.

## **2.4 Improvement programme**

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

## **3 Emissions and monitoring**

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

- 3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1, S3.2 and S3.3.
- 3.1.2 The limits given in schedule 3 shall not be exceeded.
- 3.1.3 Total annual emissions from the emission point(s) set out in tables schedule 3 S3.1 of a substance listed in schedule 3 table S3.4 shall not exceed the relevant limit in table S3.4.
- 3.1.4 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination

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

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

### **3.3 Odour**

- 3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those

specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.3.2 The operator shall:

- (a) if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to odour, submit to Natural Resources Wales for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour; and
- (b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

### **3.4 Noise and vibration**

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

3.4.2 The operator shall:

- (a) if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to noise and vibration, submit to Natural Resources Wales for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;
- (b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

### **3.5 Monitoring**

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

- (a) point source emissions specified in tables S3.1, S3.2 and S3.3;
- (b) process monitoring specified in table S3.5

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 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1, S3.2 and S3.3 unless otherwise agreed in writing by Natural Resources Wales.

3.5.4 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 Natural Resources Wales. For activity A3 referenced in schedule 1, table S1.1, newly installed CEMs, or CEMs replacing existing CEMs, shall have MCERTS certification and have an MCERTS certified range which is not greater than 1.5 times the daily emission limit value (ELV) specified in schedule 3 table S3.1(c). The CEM shall also be able to measure instantaneous values over the ranges which are to be expected during all operating

conditions. If it is necessary to use more than one range setting of the CEM to achieve this requirement, the CEM shall be verified for monitoring supplementary, higher ranges.

- 3.5.5 The Operator shall monitor daily the water temperature of the canal abstraction at NGR SN 6955 0145.
- 3.5.6 For the following activity, referenced A10 in Schedule 1, Table S1.1 the first monitoring measurements will be carried out within four months of the issue date of this permit or the date when the MCP is first put into operation whichever is later.

## **4 Information**

### **4.1 Records**

- 4.1.1 All records required to be made by this permit shall:
- (a) be legible;
  - (b) be made as soon as reasonably practicable;
  - (c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and
  - (d) be retained, unless otherwise agreed in writing by Natural Resources Wales, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:
    - (i) off-site environmental effects; and
    - (ii) matters which affect the condition of the land and groundwater.
- 4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by Natural Resources Wales.
- 4.1.3 The operator shall maintain a record of the type and quantity of fuel used and the total annual hours of operation for each MCP and/or generator.

### **4.2 Reporting**

- 4.2.1 The operator shall send all reports and notifications required by the permit to Natural Resources Wales using the contact details supplied in writing by Natural Resources Wales.
- 4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 January (or other date agreed in writing by Natural Resources Wales) each year. The report(s) shall include as a minimum:
- (a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;
- 4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by Natural Resources Wales, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:
- (a) in respect of the parameters and emission points specified in schedule 4 table S4.1;
  - (b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.2 ; and

- (c) giving the information from such results and assessments as may be required by the forms specified in those tables.
- 4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to Natural Resources Wales, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

## 4.3 Notifications

- 4.3.1 (a) In the event that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—
- (i) inform Natural Resources Wales,
  - (ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and
  - (iii) take the measures necessary to prevent further possible incidents or accidents;
- (b) in the event of a breach of any permit condition the operator must immediately—
- (i) inform Natural Resources Wales, and
  - (ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;
- (c) in the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.
- 4.3.2 Any information provided under condition 4.3.1 (a)(i), or 4.3.1 (b)(i) where the information relates to the breach of a limit specified in the permit, shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.
- 4.3.3 Where Natural Resources Wales has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform Natural Resources Wales when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to Natural Resources Wales at least 14 days before the date the monitoring is to be undertaken.
- 4.3.4 Natural Resources Wales shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:
- Where the operator is a registered company:
- (a) any change in the operator's trading name, registered name or registered office address; and
  - (b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.
- Where the operator is a corporate body other than a registered company:
- (a) any change in the operator's name or address; and
  - (b) any steps taken with a view to the dissolution of the operator.
- In any other case:

- (a) the death of any of the named operators (where the operator consists of more than one named individual);
  - (b) any change in the operator's name(s) or address(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) Natural Resources Wales shall be notified at least 14 days before making the change; and
  - (b) the notification shall contain a description of the proposed change in operation.
- 4.3.6 Natural Resources Wales shall be given at least 14 days notice before implementation of any part of the site closure plan.
- 4.3.7 Where the operator has entered into a climate change agreement with the Government, Natural Resources Wales shall be notified within one month of:
  - (a) a decision by the Secretary of State not to re-certify the agreement;
  - (b) a decision by either the operator or the Secretary of State to terminate the agreement; and
  - (c) any subsequent decision by the Secretary of State to re-certify such an agreement.

## **4.4 Interpretation**

- 4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.
- 4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "without delay", in which case it may be provided by telephone.

# Schedule 1 - Operations

Table S1.1 activities			
Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity	Limits of specified activity
A1	S2.2 A(1)(a)	Producing nickel pellets and powder by the nickel carbonyl process.	Receipt of raw materials to nickel powder and pellets being transported off-site.
A2	S4.2 A(1)(a)(v)	Producing nickel carbonyl gas for directly associated processes	Receipt of raw materials to material being transferred to nickel coating process.
A5	S4.2 A(1)(a)(i)	Producing of gasses including hydrogen and oxides of carbon	Gases for use within boundaries of site
Directly Associated Activity			
A6	Gaseous effluent plant	Burning and filtering waste gases	Gaseous waste as generated within boundaries of site
A7	Water discharges to foul sewers	Discharge of ammonia from the installation.	From interceptors to point of entry to sewer
A8	Main effluent plant	Discharge of process water	Use of coagulant in effluent treatment limited to Nalco 77135 and subject to conditions in table s1.2 and s1.3 Unless otherwise agreed in writing by NRW
A9	site drainage from the installation.	From interceptors to point of entry to controlled waters	
Medium Combustion Plant			
Activity reference	Activity listed in the EP Regulations	Description of MCP and/or Specified Generator	Limits of specified activity
A10	Schedule 25A – Medium Combustion Plant as detailed in Schedule 8	2x 4.45 MWth input boilers fuelled on natural gas comprising 1x 8.90 MWth input new Medium Combustion Plant	From receipt of fuel to despatch of combustion products to air.
<b>Boiler 1 (A30)</b> <b>NGR:</b> SN 69575 00942  <b>Boiler 2 (A31)</b> <b>NGR:</b> SN 69577 00938			

Table S1.2 Operating techniques		
Description	Parts	Date Received
Permit application	The following parts of the application: <ul style="list-style-type: none"> <li>- The response to question 2.1 given in section 2.1</li> <li>- The response given to question 2.2 given in section 2.2</li> </ul>	20/12/2001

**Table S1.2 Operating techniques**

Description	Parts	Date Received
	<ul style="list-style-type: none"> <li>- The response to question 2.3 given in section 2.3</li> <li>- The responses to question 2.4 given in sections 1.3, 2.4 and 2.10</li> <li>- The response to question 2.5 given in section 2.5</li> <li>- The response to question 2.6 given in section 2.6</li> <li>- The response to question 2.7 given in section 2.7</li> <li>- The response to question 2.8 given in section 2.8</li> <li>- The response to question 2.9 given in section 2.9</li> <li>- The response to question 2.10 given in section 2.10</li> <li>- The response to question 2.11 given in section 2.11</li> </ul>	
Response to 1 <sup>st</sup> Schedule 4 Part 1 Notice	Response to question 1	23/04/2002
Response to 2 <sup>nd</sup> Schedule 4 Part 1 Notice	Responses to questions 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33	18/07/2002
EPR/BL4567IZ/V004 Response to further queries	Plan referenced: 301-146-X-01 Refinery Works Plan	19/08/2010
Responses to improvement conditions	The proposals approved in writing by the Environment Agency under improvement condition IC8(c).	As set out in table S1.3 of schedule 1.
Variation application	Introduction and process description document received with variation application	21/12/2016
Variation application EPR/BL4567IZ/V007	<ul style="list-style-type: none"> <li>• 301_1-2-1 Trial description v1.0 description of effluent treatment process and coagulant Nalco 77135</li> <li>• HAZOP risk assessment</li> </ul>	12/11/2020
Variation application PAN-020046	Document 2.3.11 – ETP Process Detail – Nov 22	30/11/2022
Variation application PAN-020046	Environmental Risk Assessment – Cooling Water Project – November 2022	30/11/2022

**Table S1.2A Operating techniques for Medium Combustion Plant as detailed in Schedule 8**

Description
Each MCP must be operated in accordance with the manufacturer's instructions and records must be made and retained to demonstrate this
The operator must keep periods of start-up and shut-down of each MCP as short as possible
There must be no persistent emission of 'dark smoke' as defined in Section 3(1) of The Clean Air Act 1993

**Table S1.3 Improvement programme requirements**

Reference	Requirement	Date
IC1	Removed	N/A
IC2	Removed	N/A
IC3	Removed	N/A
IC4	Removed	N/A



**Table S1.3 Improvement programme requirements**

Reference	Requirement	Date
IC5	Removed	N/A
IC6	Removed	N/A
IC7	Removed	N/A
IC8	<p>The Operator shall:</p> <ul style="list-style-type: none"> <li>(a) Review all point-source emissions to air at the installation with a view to reducing their total number;</li> <li>(b) Submit to the Environment Agency at the Reporting Address for approval written proposals for the reduction in number of point-source emissions to air, incorporating any existing such programmes at the installation. The proposals shall include a proposed timetable for their implementation; and</li> <li>(c) Implement the proposals in accordance with the written approval of Natural Resources Wales.</li> </ul>	<p>Completed</p> <p>Completed</p> <p>In respect of item (b), in accordance with the written approval of Natural Resources Wales.</p>
IC9	<p>The Operator shall:</p> <ul style="list-style-type: none"> <li>(a) Review and quantify (where possible) annually all point-source and fugitive emissions for nickel to air.</li> <li>(b) Detail improvements made on the installation to minimise nickel releases from point sources and fugitive releases.</li> <li>(c) Submit to Natural Resources Wales at the Reporting Address for approval.</li> </ul> <p>Submission Annually each August.</p>	Annually until 31 August 2025
IC10	<p>The Operator shall:</p> <p>Inform NRW in writing when the operator are to use the coagulant in the main effluent treatment process.</p>	Minimum of 10 days prior to the start of process
IC11	<p>The Operator shall:</p> <ul style="list-style-type: none"> <li>(a) Review the trial to use the coagulant in the effluent treatment process and submit a report highlighting the outcomes of the trial.</li> <li>(b) An agreement in writing between Operator and Natural Resources Wales to continue the use of coagulant on a permanent basis. If agreed the operator must submit to Natural Resources Wales an updated operating technique, highlight if any changes are made (with the agreement of Natural Resources Wales).</li> </ul>	3 Months after completion of IC10
IC12	The Operator shall agree in writing with Natural Resources Wales the location of the River Tawe temperature monitoring point.	Within three months of 27/09/2023
IC13	The Operator shall install and commission a temperature monitoring device at the location agreed upon in IC12.	Within six months of the date of completion of IC12

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

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

Raw materials and fuel description	Specification
-	-

## Schedule 3 – Emissions and monitoring

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

Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A1 and A2 [Points 1 and 2 respectively on relevant site plan in Schedule 7]	Kiln Plant 'Born' Heater – 36 m stacks	Sulphur dioxide	80 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	Annually (minimum 16 weeks interval between monitoring)	BS 6069-4.4:1993
		Oxides of Nitrogen (as NO <sub>2</sub> )	100 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 14792
		Carbon monoxide (as CO)	15 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 15058
A3 to A21 [Points 3 – 21 respectively on relevant site plan in Schedule 7]	Pellet decomposers 1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 2, 4, 6, 8, 10, 12, 14, 16, 18 relate to emission points A3 to A21 respectively. All 23 m stack heights.	Sulphur dioxide	80 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	Annually (minimum 16 weeks interval between monitoring)	BS 6069-4.4:1993
		Oxides of Nitrogen (as NO <sub>2</sub> )	100 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 14792
		Carbon monoxide (as CO)	15 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 15058
A25 and A26 [Points 25 and 26 respectively on relevant site plan in Schedule 7]	Hydrogen plant vaporiser – 25 m height	Sulphur dioxide	80 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	Annually (minimum 16 weeks interval between monitoring)	BS 6069-4.4:1993

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

Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
plan in Schedule 7]		Oxides of Nitrogen (as NO <sub>2</sub> )	100 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	monitoring)	BS EN 14792
		Carbon monoxide (as CO)	15 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 15058
A27 and A28 [Points 27 and 28 respectively on relevant site plan in Schedule 7]	Hydrogen Plant Reformer Furnace and Flue Gas Heaters – 40 m height	Sulphur dioxide	80 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	Annually (minimum 16 weeks interval between monitoring)	BS 6069-4.4:1993
		Oxides of Nitrogen (as NO <sub>2</sub> )	100 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 14181
		Carbon monoxide (as CO)	15 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 15058
A30 and A31 [Points 30 and 31 respectively on relevant site plan in Schedule 7]	2x Hydrogen plant boilers – new MCP – 20 m height	Oxides of Nitrogen (as NO <sub>2</sub> )	100 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	Annually (minimum 16 weeks interval between monitoring)	BS EN 14792
		Carbon monoxide (as CO)	No limit set	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 15058

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

Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A34, A36, A37, A39a, A40, A41, A42, A43, A44, A45, A46, A47 [Points 34, 36, 37, 39a, 40, A41, 42, 43, 44, 45, 46, 47 respectively on relevant site plan in Schedule 7]	A34 – Filtered extract from FMW container clearner – 2 m height A36 & A37 – filtered extract frm Pellet and Powder plant vacuum cleaning system – 2 m height A39a – Filtered extract from Kiln plant central vacuum cleaning system – 2m height A40 – Filtered extract from FMW off-loading area – lower belt extraction – 7m height A41 – Filtered extract from FMW off-loading area – container common extraction – 7m height A42 – Filtered extract from FMW off-loading area – tower belt extraction – 12 m height A43 – Filtered extract from FMW off-loading area – transfer lower oxide silo and recovery conveyor system – 24 m height A44 – Filtered extract from FMW off-loading area – oxide silo extraction – 24 m height A45 – Filtered extract from FMW off-loading area – transfer lower oxide silo and recovery conveyor system – 24 m height A46 & A47 – Filtered extract from FMW off-loading area – recovery conveyor system – 3m height A47	Dust	5 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	Annually (minimum 16 weeks interval between monitoring)	BS EN 14181

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

Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A48 [Point 48 on relevant site plan in Schedule 7]	Filtered extract from Kiln Plant concentrate bagging vent – 10 m height	Dust	5 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	6-monthly (minimum 16 weeks interval between monitoring)	BS EN 14181
		Nickel compounds (as Ni)	3 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 14385
		Gas flow rate m <sup>3</sup> /hour	None set			
A54a [Point 54a on relevant site plan in Schedule 7]	Main stack – electrostatic precipitators, sulphur dioxide plant, kiln line 1 head seal extract, kiln line 2 head seal extract – 100 m height	Sulphur dioxide	150 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	6-monthly (minimum 16 weeks interval between monitoring)	BS 6069-4.4:1993
		Oxides of Nitrogen (as NO <sub>2</sub> )	100 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 14792
		Carbon monoxide (as CO)	450 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 15058
		Dust	5 mg/m <sup>3</sup>	Daily average	Continuous	BS EN 14181
		Dust	5 mg/m <sup>3</sup>	Periodic over a minimum of 30 minutes and maximum of 8 hours.	Annually	BS EN 13284-1
		Nickel compounds (as Ni)	1 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	6-monthly (minimum 16 weeks interval between monitoring)	BS EN 14385

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

Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A54b [Point 54b on relevant site plan in Schedule 7]	Main stack – electrostatic precipitators, sulphur dioxide plant, kiln line 1 head seal extract, kiln line 2 head seal extract – 100 m height	Sulphur dioxide	150 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	6-monthly (minimum 16 weeks interval between monitoring)	BS 6069-4.4:1993
		Oxides of Nitrogen (as NO <sub>2</sub> )	100 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 14792
		Carbon monoxide (as CO)	450 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period		BS EN 15058
		Dust	5 mg/m <sup>3</sup>	Daily average	Continuous	BS EN 14181
		Dust	5 mg/m <sup>3</sup>	Periodic over a minimum of 30 minutes and maximum of 8 hours.	Annually	BS EN 13284-1
		Nickel compounds (as Ni)	1 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	6-monthly (minimum 16 weeks interval between monitoring)	BS EN 14385
A55 [Point 55 on relevant site plan in Schedule 7]	Hydrogen lute pot relief vent – 30 m height	No parameters set	No limit set	-	-	-
A56 [Point 56 on relevant site plan in Schedule 7]	Kiln head seal area extract, Reduction Kilns and Volatiser Kiln line 2 roof vent – 25 m height	No parameters set	No limit set	-	-	-

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

<b>Emission point ref. &amp; location</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</b>
A57 [Point 57 on relevant site plan in Schedule 7]	Kiln head seal area extract, Reduction Kilns and Volatiser Kiln line 2 roof vent – 25 m height	No parameters set	No limit set	-	-	-
A58 [Point 58 on relevant site plan in Schedule 7]	Kiln head seal area extract, Reduction Kilns and Volatiser Kiln line 2 roof vent – 25 m height	No parameters set	No limit set	-	-	-
A59 [Point 59 on relevant site plan in Schedule 7]	Kiln head seal area extract, Reduction Kilns and Volatiser Kiln line 2 roof vent – 25 m height	No parameters set	No limit set	-	-	-
A60 [Point 60 on relevant site plan in Schedule 7]	Kiln head seal area extract, Reduction Kilns and Volatiser Kiln line 2 roof vent – 25 m height	No parameters set	No limit set	-	-	-
A61 [Point 61 on relevant site plan in Schedule 7]	Kiln head seal area extract, Reduction Kilns and Volatiser Kiln line 2 roof vent – 25 m height	No parameters set	No limit set	-	-	-
A62 [Point 62 on relevant site plan in Schedule 7]	Powder Plant Air Mixers – 17 m height	Dust	5 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	Annually (minimum 16 weeks interval between monitoring)	BS EN 14181
A78 [Point 78 on relevant site plan in Schedule 7]	T123 Powder Plant dust extraction – 23.5 m height	Dust	5 mg/m <sup>3</sup>	Periodic over minimum 30 minutes, maximum 8 hour period	Annually (minimum 16 weeks interval between monitoring)	BS EN 14181



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

Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A79 [Point 79 on relevant site plan in Schedule 7]	Nitrogen purge vent – 12 m height	No parameters set	No limit set	-	-	-
A80 [point 80 on relevant site plan in schedule 7]	Nitrogen purge vent – 12 m height	No parameters set	No limit set	-	-	-
A81 [point 81 on relevant site plan in schedule 7]	400 Unit mid-stream vent – 17 m height	No parameters set	No limit set	-	-	-
A82 [point 82 on relevant site plan in schedule 7]	500 Unit mid-stream vent – 17 m height	No parameters set	No limit set	-	-	-

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

Emission point ref. & location	Source	Parameter	Limit (incl. Unit)	Reference period	Monitoring frequency	Monitoring standard or method
W1 [Point W1 as shown on relevant site plan in Schedule 7]	Main effluent treatment plant outfall into River Tawe	Flow rate	15000 m <sup>3</sup> /day	Daily	Continuous	MCERTS
		Flow rate	625 m <sup>3</sup> /hour	hourly	Continuous	MCERTS
		pH maximum	9	Continuous	Continuous	ISO 10523
		pH minimum	6	Continuous	Continuous	ISO 10523
		Temperature	25(°C) above adjacent temperature of the River Tawe <sup>Note 1</sup>	Continuous	Continuous	
		Suspended Solids	10 mg/l	Continuous	Continuous	BS EN 13284-2

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

Emission point ref. & location	Source	Parameter	Limit (incl. Unit)	Reference period	Monitoring frequency	Monitoring standard or method
		Total Copper	0.5 mg/l	Daily Average	Daily	ISO 17294-2 ISO 11885 ISO 15586
		Soluble Copper	0.5 mg/l	As above	Daily	
		Total Nickel	2.0 mg/l	As above	Daily	
		Soluble Nickel	2 mg/l	As above	Daily	
		Total Cobalt	0.5 mg/l	As above	Daily	
		Soluble Cobalt	0.5 mg/l	As above	Daily	
		Arsenic (AS)	0.3 mg/l	As above	Daily	
		Cadmium (Cd)	0.1 mg/l	As above	Daily	
		Lead (Pb)	0.5 mg/l	As above	Daily	
		Zinc (Zn)	1.0 mg/l	As above	Daily	
		Mercury (Hg)	0.05 mg/l	As above	Daily	
		Fixed & Free Ammonia as N	5 mg/l		Weekly	ISO 5664
		Oxygen demand (PV4)	3 mg/l		Weekly	
W2 [Point W2 as shown on relevant site plan in Schedule 7]	Uncontaminated storm water overflow into River Tawe	No parameters set	No limit set	-	-	
W3 [point W3 as shown on relevant plan in schedule 7]	Overflow from river water tanks	No parameters set	No limit set	-	-	
W4 [point W4 as shown on relevant plan in schedule 7]	Discharge from river water tanks	No parameters set	No limit set	-	-	
W5 [point W5 as shown on relevant plan in schedule 7]	River water rotary screen backwash	No parameters set	No limit set	-	-	
W6 [point W6 as shown on relevant plan in schedule 7]	Backwash from river water cartridge filters	No parameters set	No limit set	-	-	

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

Emission point ref. & location	Source	Parameter	Limit (incl. Unit)	Reference period	Monitoring frequency	Monitoring standard or method
W7 [point W7 as shown on relevant plan in schedule 7]	30" emergency untreated trade discharge	No parameters set	No limit set	-	-	
W8 [point W8 as shown on relevant plan in schedule 7]	Warehouse drain and weighbridge toilet and old research laboratory	No parameters set	No limit set	-	-	
W9 [point W9 as shown on relevant plan in schedule 7]	Canal Water Overflow	No parameters set	No limit set	-	-	
W10 [point W10 as shown on relevant plan in schedule 7]	Flood defence pump system	No parameters set	No limit set	-	-	

Note 1. The location of the River Tawe water temperature monitoring point to be agreed in writing with NRW.

**Table S3.3 Point source emissions to sewer, effluent treatment plant or other transfers off-site – emission limits and monitoring requirements**

Emission point ref. & location	Source	Parameter	Limit (incl. Unit)	Reference period	Monitoring frequency	Monitoring standard or method
S1 [Point S1 as shown on relevant site plan in Schedule 7] emission to Dŵr Cymruu Welsh Water	Purge liquor from carbon dioxide wash tower	No parameters set	No limit set	-	-	-
S2 [Point S2 as shown on relevant site plan in Schedule 7] emission to Dŵr Cymruu Welsh Water	Foul water	No parameters set	No limit set	-	-	-

**Table S3.4 Annual limits for emissions to air from nickel refinery plant**

Substance	Medium	Limit (including unit)
Nickel compounds expressed as Ni	Air	2500 kg
Sulphur dioxide	Air	15,000 kg
Oxides of nitrogen	Air	130,000 kg

**Table S3.5 Process monitoring requirements**

Emission point reference or source or description of point of measurement	Parameter	Monitoring frequency	Monitoring standard or method	Other specifications
W1 Use of coagulant in the effluent treatment	Fixed & Free Ammonia as N	Daily	ISO 5664	
	Phosphorus	Daily	Not applicable	
	Oxygen demand (PV4)	Daily		

## Schedule 4 – Reporting

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

**Table S4.1 Reporting of monitoring data – nickel refinery plant**

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Sulphur dioxide mg m <sup>-3</sup>	A1 to A21 inclusive, A25 to A28 inclusive A67	Annually	01/01
Sulphur dioxide mg m <sup>-3</sup>	A54a, A54b	6-monthly	01/01, 01/07
Oxides of nitrogen mg m <sup>-3</sup>	A1 to A21 inclusive, A25 to A28 inclusive, A30, A31, A67, A77	Annually	01/01
Oxides of nitrogen mg m <sup>-3</sup>	A54a, A54b	6-monthly	01/01, 01/07
Carbon Monoxide mg m <sup>-3</sup>	A1 to A21 inclusive, A25 to A28 inclusive, A30, A31, A67	Annually	01/01
Carbon Monoxide mg m <sup>-3</sup>	A54a, A54b	6-monthly	01/01, 01/07
Particulates mg m <sup>-3</sup>	A34 to A47 inclusive	Annually	01/01
Particulates mg m <sup>-3</sup>	A62 and A78	Annually	01/01
Particulates mg m <sup>-3</sup>	A48, A67, A77	6-monthly	01/01, 01/07
Particulates mg m <sup>-3</sup>	A54a, A54b	3-monthly	01/01, 01/04, 01/07, 01/10
Nickel compounds expressed as Ni kg/month	A54a, A54b	3-monthly	01/01, 01/04, 01/07, 01/10
Nickel compounds expressed as Ni kg/month	A48	6-monthly	01/01, 01/07
Nickel compounds expressed as Ni mg m <sup>-3</sup>	A48, A67, A77, A54a, A54b	6-monthly	01/01, 01/07
Gas flow rate m <sup>3</sup> /hr	A67, A77	Annually	01/01
Gas flow rate m <sup>3</sup> /hr	A48	6-monthly	01/01, 01/07
Bypass of abatement time hh:mm	A54a, A54b	3-monthly	01/01, 01/04, 01/07 01/10
CEM availability %	A54a, A54b	3-monthly	01/01, 01/04, 01/07, 01/10
Flue switching	A54a, A54b	3-monthly	01/01, 01/04, 01/07, 01/10
Maximum flow m <sup>3</sup> /hr	W1, W3, W4, W5, W6, W7, W8, W9	3-monthly	01/01, 01/04, 01/07, 01/10

**Table S4.1 Reporting of monitoring data – nickel refinery plant**

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Maximum flow m <sup>3</sup> /day	W1, W3, W4, W5, W6, W7, W8, W9	3-monthly	01/01, 01/04, 01/07, 01/10
Mean flow m <sup>3</sup> /hr	W1	3-monthly	01/01, 01/04, 01/07, 01/10

Mean flow m <sup>3</sup> /day	W1	3-monthly	01/01, 01/04, 01/07, 01/10
pH maximum	W1	3-monthly	01/01, 01/04, 01/07, 01/10
pH minimum	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Mean pH	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Temperature (°C)	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Suspended solids mg l <sup>-1</sup>	W1, W5, W6	3-monthly	01/01, 01/04, 01/07, 01/10
Total copper mg/l	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Soluble copper mg/l	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Total nickel mg/l	W1, W7	3-monthly	01/01, 01/04, 01/07, 01/10
Soluble nickel mg/l	W1, W7	3-monthly	01/01, 01/04, 01/07, 01/10
Total cobalt mg/l	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Soluble cobalt mg/l	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Arsenic	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Cadmium	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Lead	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Zinc	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Mercury	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Total ammonia (free and fixed ammonia as nitrogen) mg/l	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Oxygen demand (PV4) mg/l	W1	3-monthly	01/01, 01/04, 01/07, 01/10
Temperature (°C)	River Tawe at NGR XX XXXX XXXX	3-monthly	01/01, 01/04, 01/07, 01/10
Maximum flow m <sup>3</sup> /hr	S1	3-monthly	01/01, 01/04, 01/07, 01/10
Maximum flow m <sup>3</sup> /day	S1	3-monthly	01/01, 01/04, 01/07, 01/10
Suspended solids mg l <sup>-1</sup>	S1	3-monthly	01/01, 01/04, 01/07, 01/10
Fixed ammonia (as N) mg/l	S1	3-monthly	01/01, 01/04, 01/07, 01/10
Free ammonia (as N) mg/l	S1	3-monthly	01/01, 01/04, 01/07, 01/10
pH maximum	S1	3-monthly	01/01, 01/04, 01/07, 01/10
pH minimum	S1	3-monthly	01/01, 01/04, 01/07, 01/10
Temperature (°C)	S1	3-monthly	01/01, 01/04, 01/07, 01/10

**Table S4.1 Reporting of monitoring data – nickel refinery plant**

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Sludges and solid wastes containing metals sent for landfill and/or treatment and/or recovery	N/A	Annually	01/01
Other process wastes sent for landfill	N/A	Annually	01/01
Mass release to air of Nickel compounds expressed as Ni	N/A	Annually	01/01
Mass release to air of Sulphur dioxide	N/A	Annually	01/01
Mass release to air of oxides of nitrogen	N/A	Annually	01/01
Mass release to water of total nickel	N/A	Annually	01/01
Mass release to water of soluble nickel	N/A	Annually	01/01
Mass release to water of total copper	N/A	Annually	01/01
Mass release to water of soluble copper	N/A	Annually	01/01
Mass release to water of total cobalt	N/A	Annually	01/01
Mass release to water of soluble cobalt	N/A	Annually	01/01

**Table S4.2 Reporting forms – nickel refinery plant**

Parameter	Reporting format
Air quarterly	As agreed in writing by Natural Resources Wales
Air 6-monthly	As agreed in writing by Natural Resources Wales
Air annual releases SO <sub>2</sub>	As agreed in writing by Natural Resources Wales
Air annual releases NO <sub>2</sub>	As agreed in writing by Natural Resources Wales
Air annual releases CO	As agreed in writing by Natural Resources Wales
Air annual releases particulates	As agreed in writing by Natural Resources Wales
Water	As agreed in writing by Natural Resources Wales
Sewer	As agreed in writing by Natural Resources Wales
All media/annual releases	As agreed in writing by Natural Resources Wales

## Schedule 5 - Notification

These pages outline the information that the operator must provide.

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

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

### Part A

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

<b>(a) Notification requirements for any activity that gives rise to an incident or accident which significantly affects or may significantly affect the environment</b>	
<b>To be notified Immediately</b>	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

<b>(b) Notification requirements for the breach of a permit condition</b>	
<b>To be notified immediately</b>	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	



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

<b>(c) In the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment:</b>	
<b>To be notified immediately</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.	

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

\* authorised to sign on behalf of the operator

## Schedule 6 - Interpretation

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

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

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

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

*“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.

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

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

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

*“Medium Combustion Plant”* or *“MCP”* means a combustion plant with a rated thermal input equal to or greater than 1 MW but less than 50 MW.

*“Medium Combustion Plant Directive”* or *“MCPD”* means Directive 2015/2193/EU of the European Parliament and of the Council of the limitation of emissions of certain pollutants into the air from medium combustion plants.

*“new MCP”* means an MCP first put into operation on or after 20/12/2018.

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

*“background concentration”* means such concentration of that substance as is present in:

- for emissions to surface water, the surface water quality up-gradient of the site; or
- for emissions to sewer, the surface water quality up-gradient of the sewage treatment works discharge.

*“hazardous property”* has the meaning given in Schedule 3 of the Hazardous Waste (England and Wales) Regulations 2005 No.894 and the Hazardous Waste (Wales) Regulations 2005 No. 1806 (W.138).

*“Industrial Emissions Directive”* means Directive 2010/75/EU Of The European Parliament and of the Council of 24 November 2010 on industrial emissions

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

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

*“Waste code”* means the six digit code referable to a type of waste in accordance with the List of Wastes (Wales) Regulations 2005 and in relation to hazardous waste, includes the asterisk.

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

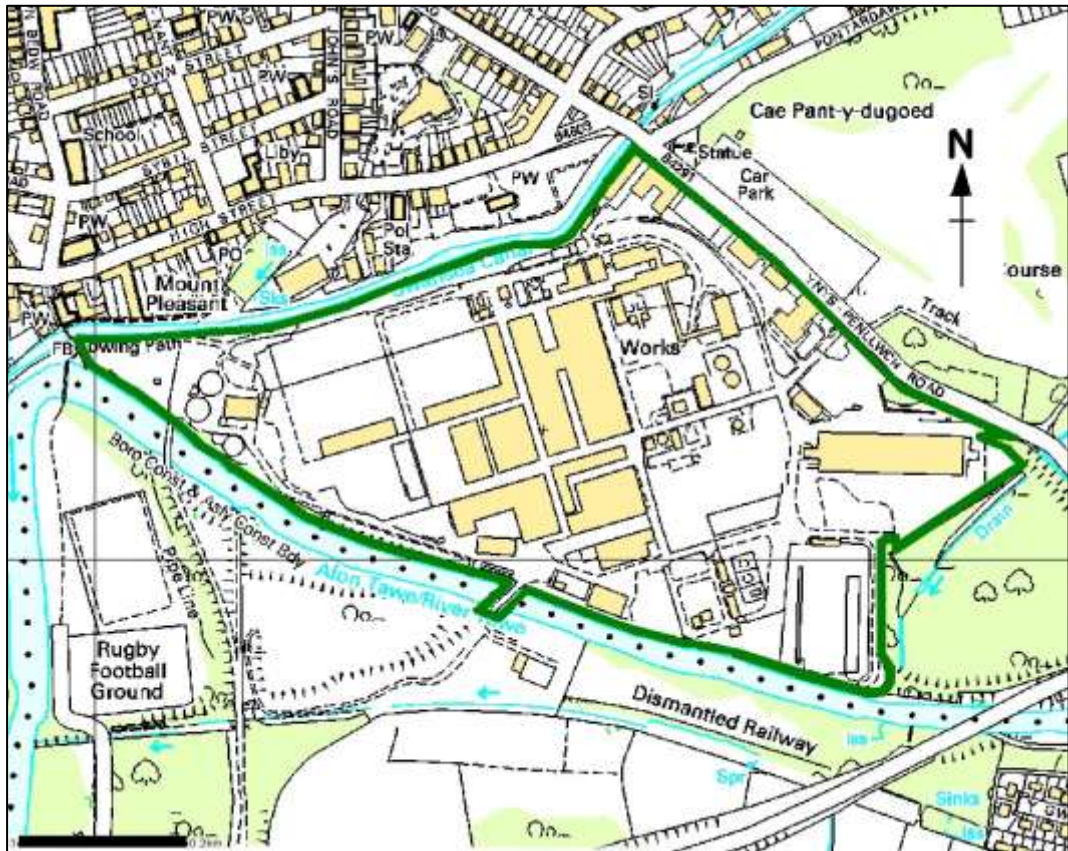
Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

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

- (b) in relation to emissions from 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.

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.

## Installation boundary plan



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## Site layout plan

### **Points of emission to air, water and sewer from the installation**

#### **Western part of the site**

Location of installation boundary relative to emission points is shown in green. Coloured, numbered symbols indicate emission points.



## Eastern part of the site

Location of installation boundary relative to emission points is shown in green. Coloured, numbered symbols indicate emission points.



## Schedule 8 – Annex I of MCPD

1. Rated thermal input (MW) of the medium combustion plant.	4.45 each, aggregated total 8.90
2. Type of the medium combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	Boiler (other Medium Combustion Plant)
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	100 % Natural gas
4. Date of the start of the operation of the medium combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	30/09/2022
5. Sector of activity of the medium combustion plant or the facility in which it is applied (NACE code)	C24.4.5 – Other non-ferrous metal production
6. Expected number of annual operating hours of the medium combustion plant and average load in use.	8760 hours, 100% average load in use
7. Where the option of exemption under Article 6(3) or Article 6(8) is used, a declaration signed by the operator that the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs.	n/a
8. Name and registered office of the operator and, in the case of stationary medium combustion plants, the address where the plant is located.	<p>Registered head office:</p> <p>Vale Europe Limited 7th Floor 50 Broadway London United Kingdom SW1H 0BL</p> <p>Facility address:</p> <p>Clydach Nickel Refinery Clydach Swansea SA6 5QR</p>

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