

Compliance Assessment Report

Report ID:
CAR_NRW0025274

This form will report compliance with your permit as determined by an NRW officer

Site	Port Talbot Steel Works EPR/BL7108IM	Permit Ref	BL7108IM		
Operator/Permit holder	Tata Steel UK Limited				
Regime	Installations				
Date of assessment	21/06/2016	Time in	13:00	Out	16:00
Assessment type	Audit				
Parts of the permit assessed	2 Operations; 3 Emissions and monitoring; 4 Information				
Lead officer's name	Cowie, Douglas				
Accompanied by	Broom, Mark,Baskerville, Guy				
Recipient's name/position	Fiona Abbott/ Environment Manager	Date issued	25/11/2016		

Section 1 – Compliance Assessment Summary

This is based on the requirements of the permit under the Environmental Permitting Regulations. A detailed explanation is captured in "Compliance Assessment Report Detail" (Section 2) and any actions you may need to take are given in the "Action(s)" (section 4). This summary details where we believe any non-compliance with the permit has occurred, the relevant condition and how the non-compliance has been categorised using our Compliance Classification Scheme (CCS). CCS Scores can be consolidated or suspended where appropriate, to reflect the impact of some non-compliances more accurately. For more details of our CCS scheme, contact your local office.

Permit conditions and compliance summary	CCS Category	Condition(s) breached
B1 - Infrastructure - Engineering for prevention and control of emissions	A	
B5 - Infrastructure - Plant and equipment	A	
C2 - General Management - Management system and operating procedures	A	
E1 - Emissions - Air	A	
G1 - Monitoring and Records, Maintenance and Reporting - Monitoring of emissions and environment	A	
G2 - Monitoring and Records, Maintenance and Reporting - Records of activity, site diary/journal/events	A	
G4 - Monitoring and Records, Maintenance and Reporting - Reporting and notification to Natural Resources Wales	A	

KEY: See Section 5 for breach categories, suspended scores will be indicated as such.

A = Assessed or assessed in part (no evidence of non-compliance), **X** = Action only,

O = Ongoing non-compliance, not scored.

Number of breaches recorded	0	Total compliance score (see section 5 for scoring scheme)	0
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If the Number of breaches recorded is greater than zero, please see Section 3 for our proposed enforcement response

Section 2 – Compliance Assessment Report Detail

This section contains a report of our findings and will usually include information on:

- The part(s) of the permit that were assessed (eg. Maintenance, training, combustion plant, etc)
- Where the type of assessment was 'Data Review' details of the report/results triggering the assessment
- Any non-compliances identified
- Any non-compliances with directly applicable legislation
- Details of any multiple non-compliances
- Information on the compliance score accrued inc.
- Details of advice given
- Any other areas of concern
- Any actions requested
- Any examples of good practice
- A reference to photos taken

Site description

Tata Steel UK Ltd (Tata) operates an integrated iron and steel works at Port Talbot, Neath Port Talbot. The site is permitted as an installation under the Environmental Permitting Regulations (EPR). The steelworks has several identifiable permitted processes which are carried out sequentially across the installation to convert raw iron ores and coal to semi finished (slab) and finished steel products (such as hot rolled, pickled and oiled, cold rolled and annealed). The permit also covers coke making and the reception, stockpiling and blending of raw iron making materials. Three other companies, Cambrian Stone, Harsco Metals and ICL, undertake separately-permitted slag handling, iron plating and cold mill effluent treatment activities at the steelworks on Tata's behalf.

Purpose of visit/assessment

The main purpose was to review increased bleeder valve openings from Blast Furnaces No. 4 and No.5 during May and June 2016 and understand the reasons for these openings. We also discussed start-up and shutdown periods for the sinter plant with the aim of better defining the criteria under which certain emissions monitoring data can be identified as unrepresentative of normal operating conditions. Such data can be excluded from the emissions monitoring required by Tata's permit.

Person(s) present

Fiona Abbott (All)	Doug Cowie
Jason Heatman (All)	Guy Baskerville
Jason Massey (All)	Mark Broom
Ian Vaughan (BF)	
Andrew Townsend (BF)	
Richard Brown (BF)	
John Lord (BF)	
Tom Watson (Sinter)	
Darren Isaac (Sinter)	

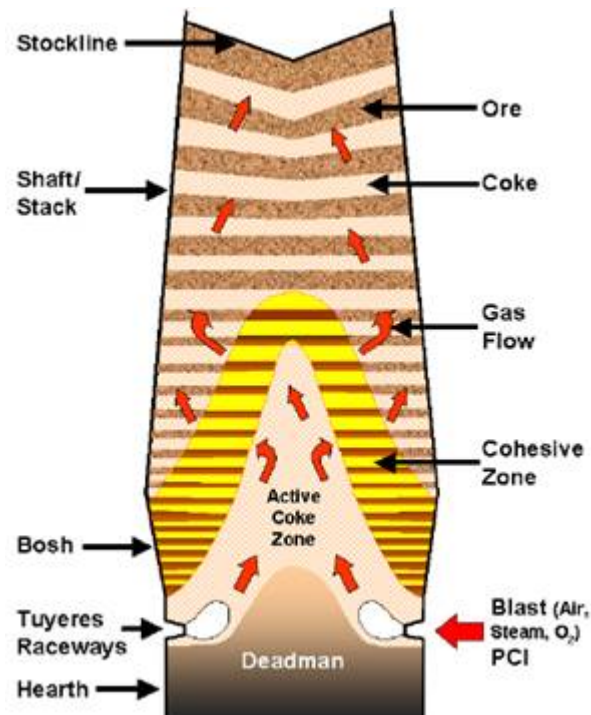
Blast furnace bleeder valve releases

The blast furnace makes iron by reacting iron oxides (ores) with air under reducing conditions at high temperatures. The reaction is a gas-solid one that produces liquid products (and by-products) and gas wastes. The reactions are carried out countercurrently and it takes between 6 and 7 hours for the raw materials that are added to the top of the furnace to be converted into the molten iron and slag that comes out of the bottom. By contrast it only takes seconds for the hot air blown into the middle of the furnace to exit through the top of the furnace.

For good stable blast furnace operations, gas flow should be up the centre of the furnace with minimal gas tracking up the furnace walls. If gas pressure rapidly builds up in the furnace, there are four pressure relief or 'bleeder' valves

that are set to operate at different sequential pressures to protect the integrity of the furnace.

The diagram on the next page shows a cross-section of a typical blast furnace and illustrates the normal gas pathway (red arrows) upwards through the furnace.



When the raw materials are blended, fluxes such as limestone or dolomite are added which help remove impurities from the iron. These fluxes form the slag that is drawn from the bottom of the furnace when molten iron is tapped. The molten slag and iron are separated by a weir with slag diverted one way and iron the other. Different fluxes have different effects on the final slag properties. Various raw materials also have impurities that can affect slag properties. Silica, aluminates and magnesia can make the slags thicker, more viscous and higher melting, whereas materials high in calcium produce thinner, less viscous slag which melts at lower temperatures.

The wider uncertainty affecting Port Talbot steelworks has partly contributed to recent raw material supply problems. The range of 'normal' raw materials have not always been available during May and June 2016, meaning that Ironmaking have used materials with different specifications and properties, often with a higher overall alkalinity. Wet weather during May has also resulted in agglomeration of fines causing feed system blockages and charging problems. The resulting blends of different, alkaline, wet materials have led to slag formation and gas flow problems inside both blast furnaces.

Blast Furnace No. 4

During May and June 2016 there were two main problems with Blast Furnace No. 4 (BF4). The first set of problems arose in late May following a rapid build-up of alkaline, viscous slag that slowed burden movement and impeded gas flow up the centre of the furnace. A dip in injection coal rates (the calcium content of injection coal also makes the slag less viscous) also created conditions more favourable for viscous slag build up. This in turn led to thermal instability, episodes of pressure excursions and bleeder valve openings from BF4.

To overcome these problems, the furnace had to be 'coked up' and extra coal injected to create acidic, hot conditions to move the slag build-ups and re-establish normal gas flows. However as the burden movement slowed, the time taken for the raw material added to the top of the furnace to appear at the tap-hole as molten slag and iron became longer. During this recovery phase the gas flow problems and pressure excursions became prolonged until the viscous slag had been removed.

The second set of problems at BF4 in early June appeared to be similar, but after detailed investigations were found to be due to a microscale problem of raw material distribution inside the furnace. Once again the symptoms were a loss of gas pressure or 'drive' inside the furnace, thermal instability and frequent bleeder valve openings.

Tata's analysis has shown that mainly acidic materials had been added towards BF4's walls while alkaline or basic materials dominated the centre of the burden. The aim should be to maintain an even burden with consistent levels of acidity and basicity throughout. This uneven distribution of raw materials was compounded by stockline losses,

stoppages or enforced changes at the stockhouses leading up to the problems in early June.

At the stockhouses, raw materials are added or 'charged' into the furnace using a number of skips or cars. Two iron-rich charges are normally followed by a coke charge. Cars 1 and 3 are charged towards the furnace walls while Cars 2 and 4 are emptied into the centre of the furnace. Only three different materials can be blended together to make up a charge for each car.

On a macroscale the charging sequence at BF4 appeared to be correct, but on a microscale the problems were not apparent until there was a pause in production and the imbalance of raw materials was revealed. BF4 regained reasonable stability following the problems in late May, but there remained underlying issues with the charging sequence and mix of raw materials which were likely to have been masked by the earlier raw material supply and viscous slag issues discussed above. These underlying charging issues then revealed themselves in early June despite efforts by Tata to apply learning from the first incident and avoid further bleeder valve releases. It is apparent to the inspecting officers that two distinct sets of conditions have contributed to the releases from BF4 in late May and Early June 2016.

Blast Furnace No. 5

Blast Furnace No. 5 (BF5) appeared unaffected by these problems during May and early June, but similar slag viscosity problems then began to develop and in mid-June a spate of bleeder valve releases occurred. NRW officers observed one of these releases happening in real time on 21 June 2016 immediately prior to this compliance intervention. It is thought that the stability problems took longer to manifest themselves in BF5 as the furnace has thicker walls than BF4 and heat losses tend to be lower. Furnace stability therefore deteriorated more slowly.

A temporary delay at the BOS Plant has allowed Ironmaking to take the opportunity to deal with a slag 'scab' which has formed on the wall of BF5. Production levels in this furnace have been lowered in an attempt to move this scab. Initial indications are that there is gas flow behind the scab and some of the slag build-up has gone, but it has not yet been fully removed. BF5 will be 'coked up' and additional coal injected to get better furnace stability in the same way Tata has dealt with the problems at BF4.

Next steps

The Ironmaking works area will hold a major inquiry into the events of May and June 2016. There could be implications for the amount of raw material stocks Tata needs to retain at Port Talbot steelworks to ensure continuity of raw material supply and allow consistent blending. There appear to be improvements Tata can make to better manage the blending and charging of raw materials at the microscale. Tata is issuing a new instruction to ensure skips/cars are loaded in such a way that acidity and basicity is in control and the burden is consistent across the furnace. The furnace thermal control procedure is also being reviewed and a new Environmental Investigation procedure is being trialled.

All the measures described above should allow Tata to achieve better furnace stability, avoid the formation of thick, viscous slag and reduce the number of bleeder openings.

Tata has already formally informed NRW regarding the potential of these blast furnace bleeder valve releases to significantly affect the environment [permit condition 4.3.1(a)]. Although no permit limits have been breached, Tata Steel has used the template in Part A of Schedule 5 to submit relevant information to NRW in relation to these releases. The more accurate information to be submitted under Part B of Schedule 5 will be available once Tata's inquiry has been completed.

In conclusion, NRW requires further information from Tata Steel to allow us to fully assess permit compliance in respect of the bleeder valve openings at BF4 and BF5 during May and June 2016. It has been agreed that NRW will re-inspect the steelworks when the conclusions from Ironmaking's inquiry are available. Our final compliance assessment will be recorded in a separate CAR form.

Sinter plant start-up and shutdown criteria

The published Best Available Technique – Associated Emission Levels (BAT-AELs) for sinter plants are set based on normal operating conditions. The limits outlined in Chapter 3 Annex V of the Industrial Emissions Directive (IED) are also based on 'normal operating conditions'. There are clear guidelines on using these types of criteria for combustion plant in EC Document 2012/249/EU:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:123:0044:0047:en:PDF>

Tata have used this type of approach to exclude particulates data for the sinter plant main stack using identified parameters. The sinter plant team has developed a spreadsheet which automatically decides on the inclusion/exclusion of each hourly mean value measured using a Continuous Emissions Monitor (CEM). The criteria for exclusion include Electrostatic Precipitator (ESP) gas temperature, sinter strand depth and other similar criteria

but not sinter strand speed.

In the spreadsheet, each day has a raw data daily mean value and then an assessed/calculated daily mean value which is compared with the permitted Emission Limit Value (ELV) of 40mg/m^3 . This is a very good start but NRW believes the spreadsheet still needs a few tweaks: for example, the reason for data exclusion (for each hour) needs to be built into the spreadsheet as does a minimum daily data capture figure (%) to accurately calculate the daily mean. These tweaks will make any data review of the reasons for exclusion clear and auditable.

Tata have also looked at the interdependency of sinter plant stop duration with getting the system back to normal operating conditions. Essentially the longer the stop, the longer it takes to get the systems (ESPs etc.) back to normality and operating at optimum sintering temperature and performance. As a rule of thumb, if the sinter plant stops for x hours then it will take x+1 hours to get back to normal operating conditions. This effect of stop duration should be able to be incorporated into Tata's spreadsheet.

Tata could look at historic data for the sinter plant main stack emissions to show the effect of applying data exclusion criteria on ELV compliance. Conditional formatting within the spreadsheet could be used to conduct this exercise. Annual reporting of monitoring data to NRW needs to include a measure of the 'amount' of data excluded and also a breakdown of the reasons for exclusion. Interestingly the effect of data exclusion is not always to reduce the main stack daily mean levels but has in some cases increased the daily mean concentrations.

This type of approach could be applied elsewhere within the sinter plant e.g. secondary de-dust system & bag filters, where the criteria could be: fan speed, ESP potential or differential gas pressures and other criteria to decide if the plant is operating within a time delay for start-up/shut down after maintenance.

On a general note, the ongoing CAPEX work to refurbish the wind mains and ESPs for the main stack appears to have improved emissions performance. This is reflected by the reduced number of daily mean particulates exceedances being reported to NRW.

NRW will return to the sinter plant during the second half of 2016 to review its environmental performance and assess progress with defining appropriate data exclusion criteria.

Conclusions

Tata Steel has encountered a number of blast furnace stability problems during May and June 2016 which has resulted in spates of bleeder valve releases. The contributing factors and conditions leading to these bleeder valve releases are being better understood as Tata investigates these problems. Tata has changed the blend of raw materials it uses and the sequence in which this blend is added to the furnace to minimise the risk of further stability problems. An inquiry has been initiated by the Ironmaking works area to look at these issues in more detail.

NRW requires further information from Tata Steel to allow us to fully assess permit compliance in respect of the bleeder valve openings at BF4 and BF5 during May and June 2016. NRW will re-inspect the steelworks when the conclusions from Ironmaking's inquiry are available. Our final compliance assessment will be recorded in a separate CAR form.

Good progress has been made at the sinter plant to define start-up and shutdown criteria which will assist Tata when it decides to exclude monitoring data outside normal operating conditions. The number of reportable particulate exceedances at the sinter plant main stack is reducing as improvements and refurbishments are completed. NRW will return to the sinter plant during the second half of 2016 to review progress with this work.

[ENDS]

EPR Compliance Assessment Report

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Site	Port Talbot Steel Works EPR/BL7108IM	Permit Ref	BL7108IM
Operator/Permit holder	Tata Steel UK Limited	Date	21/06/2016

Section 3 – Enforcement Response

You must take immediate action to rectify any non-compliance and prevent repetition.

Non-compliance with your permit conditions constitutes an offence and can result in criminal prosecutions and/or suspension or revocation of a permit. Please read the detailed assessment in Section 2 and the steps you need to take in Section 4 below.

Section 4 – Action(s)

This section summarises the actions identified during the assessment along with the timescales for when they will need to be completed.

Criteria Ref.	CCS Category	Action required/advised	Due Date
See Section 1 above			

Section 5 – Compliance notes for the Operator

To ensure you correct actual or potential non-compliance we may

- Advise on corrective actions verbally or in writing
- Require you to take specific actions verbally or in writing
- Issue a notice
- Require you to review your procedures or management system
- Change some of the conditions of your permit
- Decide to undertake a full review of your permit

Any breach of a permit condition is an offence and we may take legal action against you

- We will normally provide advice and guidance to assist you to come back into compliance either after an offence is committed or where we consider that an offence is likely to be committed. This is without prejudice to any other enforcement response that we consider may be required.
- Enforcement action can include the issue of a formal caution, prosecution, the service of a notice and/or suspension or revocation of the permit.

See our Enforcement and Civil Sanctions guidance for further information

This report does not relieve the site operator of the responsibility to

- Ensure you comply with the conditions of the permit at all times and prevent pollution of the environment
- Ensure you comply with other legislative provisions which may apply

Non-compliance scores and categories

CCS category	Description	Score
C1	A non-compliance that could have a major environmental effect	60
C2	A non-compliance which could have a significant environmental effect	31
C3	A non-compliance which could have a minor environmental effect	4
C4	A non-compliance which has no potential environmental effect	0.1

Operational Risk Appraisal (Opra) - Compliance assessment findings may affect your Opra score and/or your charges. This score influences the resource we use to assess permit compliance.

Section 6 – General information

Data protection notice

The information on this form will be processed by the Natural Resources Wales (NRW) to fulfil its regulatory and monitoring functions and to maintain the relevant public register(s). The NRW may also use and/or disclose it in connection with:

- Offering/providing you with its literature/services relating to environmental matters
- Consulting with the public, public bodies and other organisations (eg. Health and Safety Executive, local authorities) on environmental issues
- Carrying out statistical analysis, research and development on environmental issues
- Providing public register information to enquirers
- Investigating possible breaches of environmental law
- Assessing customer service satisfaction and improving its service
- Freedom of Information Act/Environmental Regulations request

The NRW may pass it on to its agents/representatives to do these things on its behalf. You should ensure that any persons named on this form are informed of the contents of this data protection notice.

Disclosure of information

The NRW will provide a copy of this report to the public register(s). However, if you consider that any information contained in this reports should not be released to the public register(s) on the grounds of commercial confidentiality, you must write to your local area office within twenty working days of receipt of this form indicating which information it concerns and why it should not be released, giving your reasons in full.

Customer charter

What can I do if I disagree with this compliance assessment report?

If you are unable to resolve the issue with your site officer, you should firstly discuss the matter with officer's line managers using the informal appeals procedure. If you wish to raise your dispute further through our official Complaints and Commendations procedure, phone our general enquiry number 0300 065 3000 (Mon to Fri 08.00 – 18.00) and ask for the Customer Contact team or send an email to enquiries@naturalresourceswales.gov.uk. If you are still dissatisfied you can make a complaint to the Public Services Ombudsman for Wales. For advice on how to complain to the Ombudsman phone their helpline on 0845 607 0987.

Welsh Language

If you would like this form in Welsh please contact your Regulatory Officer.