Cyfoeth Naturiol Cymru Natural Resources Wales

Compliance Assessment Report

Report ID: CAR_NRW0034618

This form will report compliance with your permit as determined by an NRW officer					
Site	Port Talbot Steel Works	Permit Ref	BL7108IM		
Operator/Permit holder	Tata Steel UK Limited				
Regime	Installations				
Date of assessment	31/03/2019	Time in	N/A	Out	N/A
Assessment type	Check Monitoring/Sampling				
Parts of the permit assessed	3 Emissions and Monitoring; 4 Information				
Lead officer's name	Cowie, Douglas				
Accompanied by					
Recipient's name/position	Claire Grainger/ Environment Manager	Date issued	31/01/2020		

Section 1 – Compliance Assessment Summary

This is based on the requirements of the permit under the Environmental Permitting Regulations or the licence under the Water Resources Act 1991 as amended by the Water Act 2003. 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
A1 - Specified by permit	A	
C2 - General Management - Management system and operating procedures	A	
E1 - Emissions - Air	C3 - Suspended	3.1.2 Emissions to air
	C3 - Suspended	3.1.2 Emissions to air
	C3 - Suspended	3.1.2 Emissions to air
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	**3**	**Total compliance score** (see section 5 for scoring scheme)	0

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

Purpose of visit/assessment

Condition 3.1.2 of Tata Steel's permit requires that the limits given in Schedule 3 of the permit (point source emissions) shall not be exceeded.

Section 4 of Tata Steel's permit contains several conditions in respect of notifications, including notifying breaches of permit conditions and/or emission limits to the regulator.

Schedule 5 of the permit outlines the information that the operator must provide when notifying the regulator and is divided into Part A and Part B. The schedule provides a framework/template for informing and/or notifying NRW in accordance with the requirements of permit condition 4.3.1.

The following operator notifications have been received concerning breaches/exceedances, incidents or accidents which occurred or were notified to us during **Quarter 1 2019** (1 January – 31 March):

QUARTER 1 (January - March) 2019										
Notification reference	Date of event	Date of notification	Emission point	Parameter	Source	Emission limit (including unit)	Reference period	Monitoring frequency	Reported result(s)	Measurement uncertainty
SSN/19/01	31-Jan-19	04-Feb-19	A1	Particulate matter	Sinter Plant Main Stack	40.00mg/m3	Daily mean	Continuous measurement	(see below)	+/- 30%
SSN/19/02	31-Jan-19	01-Feb-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/03	31-Jan-19	01-Feb-19	A54	Visible Emissions (leakage)	Morfa Coke Oven Batteries	Doors 10% (90%) Tops 1% (99%) <30 seconds per charge	Monthly mean	Daily	Doors 96.03% Tops 98.74% 43.22 seconds	Binary assessment (leak/no leak)
SSN/19/04	08-Feb-19	11-Feb-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/05	12-Feb-19	13-Feb-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/06	13-Feb-19	14-Feb-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/07	16-Feb-19	19-Feb-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/08	18-Feb-19	19-Feb-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/09	24-Feb-19	25-Feb-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/10	23-Feb-19	25-Feb-19	A8B	Particulate matter	BF4 Cast House Fume Extraction South	15.00mg/m3	Daily mean	Continuous measurement	16.15mg/m3	+/- 30%
SSN/19/11	28-Feb-19	01-Mar-19	A1	Particulate matter	Sinter Plant Main Stack	40.00mg/m3	Daily mean	Continuous measurement	(see below)	+/- 30%
SSN/19/12	28-Feb-19	04-Mar-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/13	07-Mar-19	07-Mar-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/14	12-Mar-19	12-Mar-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/15	19-Mar-19	20-Mar-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/16	27-Mar-19	27-Mar-19	A5A	N/A	BF5 Bleeder Valves	No limit applies	N/A	N/A	(see below)	N/A
SSN/19/16/5	31-Mar-19	05-Apr-19	A1	Particulate matter	Sinter Plant Main Stack	40.00mg/m3	Daily mean	Continuous measurement	(see below)	+/- 30%

Compliance assessment

A1: SINTER PLANT MAIN STACK

S5N/19/01: Schedule 5 Part A received 04/02/19 (by email)

Multiple notifiable breaches of the permitted limit for particulates in January 2019

S5N/19/11: Schedule 5 Part A received 01/03/19 (by email)

Multiple notifiable breaches of the permitted limit for particulates in February 2019

S5N/19/16/5: Schedule 5 Part A received 05/04/19 (by email)

Multiple notifiable breaches of the permitted limit for particulates in March 2019

A1: Sinter plant main stack

Permitted emission limit value (ELV) is 40.00mg/m3 as a daily mean (+/- 30%)

Schedule 5 Part A operator comment:

January - Single Fan Operation for most of the month apart from 22nd and 23rd when there was duel fan operation details provided in separate sheet.

Regulation 61 actions in progress

Schedule 5 Part B operator comment:

As a result of the Regulation 61 being served on Tata Steel a comprehensive project has been put in place and regular meetings are held with the NRW providing a detailed update on progress to plan.

Please see a copy of the plan attached to this notification covering 2019 Q1(January, February and March 2019).

Actions proposed to bring particulate emissions from emission point A1 to within 40 mg/Nm³ as a daily mean	Start	Finish	Owner	Status	Progress
Reduction of air ingress					
Wind main repairs and replacement of 18m section	01-Apr-19	12-Jun-19			Order raised for 18m section manufacture. Order being processed for
Windmain Double Cone Valves replacements (5 to be replaced out of 28)	03-Sep-18	12-Jun-19			Complete
ESP Hopper Conveyor repair / sealing	03-Sep-18	12-Jun-19			Planned change June 2019
North & South ESP Structural Repairs	03-Sep-18	12-Jun-19			Complete
ESP North and South Hopper Door Sealing	03-Sep-18	12-Jun-19			All South doors replaced.
North ESP Internal Repairs					
North ESP Field Repairs	03-Sep-18	30-Sep-18			Completed and all fields operational
Improved Instrumentation and ESP Control Optimisation					
Installation of new CEMS instrumentation into North and South ESP ducting systems, (Inlet and Outlet)	11-Jun-18	01-Dec-18			Complete
North and South ESP Control Optimisation	11-Jun-18	31-Aug-19			Control optimisation ongoing , weekly meeting held. Project team investigating ESP Hardware, and Swansea university assisting project team with Process influences.
Waste Gas System Maintenance Strategy					
Double Dome Valve Improved Maintenance Strategy Implementation	03-Sep-18	on-going			Ongoing process of DDV and seal changes
North and South ESP Improved Maintenance Strategy Implementation	03-Sep-18	on-going			Implementation started week 36. Next outage planned May 2019
Reduction of the chloride content of the sinter feed material					
Treatment of Sinter Plant ESP dusts and BF flue dusts – trial 1	01-Sep-18	12-Nov-18			Group environment developing process parameters based on trial results. Torex and CDE engaged, samples to be arranged, previous trial results with CDE to
Treatment of Sinter Plant ESP dusts and BF flue dusts – trial 2	12-Nov-18	01-Sep-21			Combined with trial 1
Subject to outcomes of trial and feasibility study: Full Scale Plant CAPEX Scheme	12-Nov-18	01-Sep-21			Resource risk. TCE engineer now recruited.
Definition	12-Nov-18	30-Jun-19			Plan being developed on way forward
Implementation of project	01-Oct-19	31-Mar-21			Plan being developed on way forward
Commissioning and optimisation	01-Apr-21	30-Jun-21			Plan being developed on way forward
Implementation of scheme and preparation of materials	01-Jul-21	01-Sep-21			Plan being developed on way forward
In the event that the Revert Washing scheme is not viable, alternative options to include fabric bag filter systems will be evaluated, an option selected, developed and installed.	01-Sep-18	01-Sep-21			Ongoing

NRW has agreed to accept a monthly written Schedule 5 notification from Tata in the event of continued breaches of the particulate daily mean ELV at A1.

After applying the appropriate measurement uncertainty factor, the following exceedance recorded at A1 and notified within **S5N/19/01** remains non-compliant with the permit limit and

Condition 3.1.2:

25/01/2019: 62.60mg/m3

One CCS Category 3 score (suspended: see below) has been recorded in response to this non-compliance.

We have assessed and consolidated all subsequent notified exceedances of this emission limit during Quarter 1 2019 under a single CCS3 score for **S5N/19/01** confirmed above, in line with our Compliance Classification Scheme [CCS]. The consolidated notifications are listed below:

S5N/18/11 received on 01/03/19

S5N/18/16/5 received on 05/04/19

Sinter Plant improvement plan

Tata Steel has submitted an improvement plan in response to an EPR Regulation 61 (Statutory) Information Notice issued by NRW. This plan outlines the steps Tata Steel will take to achieve compliance with the relevant ELV for particulates at emission point A1. NRW can suspend CCS scores while an operator is working towards compliance (see Principle 5 and Annex 4 of our Compliance Classification Scheme [CCS] (version 3, 26 March 2013).

We have **suspended** the CCS3 compliance score for the particulates ELV breach at emission point A1 identified above. Compliance with this ELV has since been reviewed at regular intervals by NRW during 2019, and our assessments captured in relevant compliance assessment reports.

The **Summary and actions required** section of this report (below) also discusses Tata Steel's improvement plan.

IRONMAKING

S5N/19/02: Schedule 5 Part A received 01/02/2019 (by email).

Release of particulates and blast furnace gas from No.5 Blast Furnace bleeder valves (emission point A5A)

31/01/2019 20:14hrs

A5A: Blast Furnace 5 bleeders

No emission limit values (ELVs) apply to emissions/releases from A5A

Schedule 5 Part A operator comment:

Semi clean bleeder opened 20:14. Furnace was in stable condition at time with only a small loss of head room just before the bleeder opened.

Blast volume reduced to reduce furnace pressure to allow bleeder valves to close. Snort opened to relieve face pressure.

Schedule 5 Part B operator comment:

During the night shift of 31st January 2019, the furnace process had been stable with regular burden descent and stable differential pressure. The furnace was recovering from a loss of stock line due to a skip hoist trip from 13:45 for 40 minutes. The stock line was regained quickly after reducing blast volume with thermal compensation added via coal injection.

The burden distribution would have been disrupted due to charging the furnace at a lower stock line level resulting in a poor distribution pattern. As the material that was charged to the furnace during the period of low stock line reached tuyere level the gas passages through the furnace had been disrupted such that the furnace blew through. A relatively significant burden change occurred just after the loss of stock line event with 6% rubble ore added to the ferrous burden replacing pellet. This burden change in combination with low stock line material would result in the disruption to gas passages.

After this process disruption the furnace recovered and the blast volume returned to set-point. The two changes together was enough to disrupt the gas flow through the burden causing a surge of gas up the furnace walls increasing high top pressure to the point where the semi-clean bleeder opened to relieve the pressure. The Semi-clean bleeder opened at 20:15 for 14 seconds. The furnace operators reduced blast volume to reduce the pressure to allow the bleeders to shut again

Conclusions

1. *Blast Furnace 5 furnace top bleeder valve opened at 20:15 during a blow through after a disruption to the furnace process due to a loss of stock line event and altering the ferrous burden to include 6% rubble ore.*
2. *The loss of stock line event was due to a skip hoist trip.*
3. *Blast Furnace 5 semi-clean bleeder valve functioned correctly by opening at the correct limits when the high top pressure deviated from its set-point.*
4. *The process team leader and senior operator opened the cold blast snort valve to reduce furnace pressure and close the furnace top bleeder valves.*
5. *The Davey cone opened in an attempt to control/relieve furnace top pressure.*

Recommendations

Implement linear chute angle compensation for stock line loses. (Complete)
Develop standard for burden changes and include avoiding burden changing with loss of stock line events. (Complete)

Targeted compliance interventions are undertaken periodically by NRW to understand the root cause(s) of any notifiable blast furnace bleeder valve releases.

S5N/19/04: Schedule 5 Part A received 11/02/2019 (by email).

S5N/19/05: Schedule 5 Part A received 13/02/2019 (by email).

S5N/19/06: Schedule 5 Part A received 14/02/2019 (by email).

Release of particulates and blast furnace gas from No.5 Blast Furnace bleeder valves (emission point A5A)

08/02/2019 20:14hrs

12/02/2019 12:22hrs

12/02/2019 22:45hrs

13/02/2019 03:44hrs

A5A: Blast Furnace 5 bleeders

No emission limit values (ELVs) apply to emissions/releases from A5A

Schedule 5 Part A operator comment:

S5N/19/04: Semi, Centre and North Bleeders opened due to sudden blow through. Opened for 16 seconds total. Blowing volume reduced.

S5N/19/05: Blast volume reduced to reduce furnace pressure to allow bleeder valves to close.

S5N/19/06: Semi Clean Bleeder opened. Snort opened to release pressure.

Schedule 5 Part B operator comment:

Any more accurate information on the matters notified under Part A	From the 8th February to the 13th February there were 4 bleeder openings on Blast Furnace No 5. The furnace process instability resulted in gas surging up the furnace walls opening a passage that eventually led to the majority of the gas *short-circuiting* the burden and increasing the top pressure to the point at which the bleeders opened. Additionally, gas plant blockages resulted in an alteration of the Davy cone control on the 7th February to make it more responsive to changes in the furnace top pressure. The blockages were cleared by the 11th February and the Davy cone control was returned to normal on the 13th February after 3 further bleeder openings. The Davy cone control was not completed immediately to understand if it would give an improvement in avoiding further bleeder openings. An increase in the duration the semi-clean bleeder was open due to an interlock set-point between the semi- clean bleeder and the clean gas pressure having been entered incorrectly resulted in difficulty shutting the bleeder after it opened at 03:44am on the 13th February.

Table 1: Bleeder opening times

Date	Time open	Time closed	Bleeders opened	Total time open (secs)	Pressure (bar)
08/02/2019	22:03:07	22:03:22	North, centre & semi-clean	15	1.87 / 1.4
12/02/2019	12:20:33	12:20:50	North, centre, south & semi-clean	17	1.89 / 1.4
12/02/2019	22:32:22	22:32:38	North & semi-clean	16	1.73 / 1.3
13/02/2019	03:44:28	03:46:24	Semi-clean	116	1.87 / 1.5

Blast furnace bleeder valves and furnace top pressure control

Blast furnace bleeder valves are designed to open rapidly to relieve furnace top pressure to protect the integrity of the gas cleaning plant. The bleeder valves automatically open when there is a significant deviation from the furnace high top pressure set point or when the works gas main pressure exceeds a defined limit. These pressure deviations can arise as a result of a surge of gas *short-circuiting* its way through the furnace caused by a burden slip.

There are four bleeder valves on top of blast furnace 5 (i.e. semi-clean, south, centre and north). Each valve has a different pressure deviation set point (see table below), therefore not all bleeder valves open to relieve pressure following an event.

The Davy cone in the gas cleaning plant controls furnace top pressure. This cone opens/closes accordingly to achieve and maintain high top pressure set point. The Davy cone can use one of three pressure transmitters to control furnace top pressure.

The alteration to the Davy cone control was made on the 7th February and was in response to variable differential pressure on the Blast Furnace process. Also, blockages in the gas plant from refractory material and excess slurry from the furnace blowing through may have caused some back pressure affecting the control of the cone making it seem as though the cone control needed adjusting. The alteration made the cone more responsive to changes in high top pressure but was not responsible for the gas surges from the furnace process. Although the range on the cone control had increased which may have increased the severity of the bleeder openings. The blockages in the gas plant were cleared by the 11th February and the control on the Davy cone was put back to standard on the 13th February after reviewing the effect of clearing the blockages.

An interlock set-point between the semi-clean bleeder and the clean gas pressure having been entered incorrectly resulted in difficulty shutting the bleeder after it opened at 03:44am on the 13th February. This interlock is in place to protect the gas plant from gas surges when the back pressure valve is in use. This set-point was re-entered correctly and the bleeder shut.

Table 2: Bleeder opening set-points

Bleeder valve location	Semi-clean	South	Centre	North
Furnace top pressure deviation set point (bar)	0.390	0.500	0.450	0.400
Pressure transmitter	North-West	South-East	South-West	North-East

Conclusions

1. The furnace bleeders opened 4 times on blast furnace 5 between the 8th and 13th February. The instability resulted in surging of gas up the furnace walls increasing high top pressure to the limit at which the bleeders opened.
2. The Davy cone control was altered as a result of seeing variable differential pressure on the furnace but was likely the result of blockages in the gas plant. When the blockages were cleared the cone control was put back to standard.
3. An interlock set-point between the semi-clean bleeder and the clean gas pressure having been entered incorrectly resulted in difficulty shutting the bleeder after it opened.
4. The process team leader and senior operator opened the cold blast snort valve to reduce furnace pressure and close the furnace top bleeder valves.
5. Blast Furnace 5 is more sensitive to disturbances to the furnace process since the BF5 repair project. Work is ongoing with burden distribution to develop similar patterns as Blast Furnace 4 to make it as robust.

	Recommendations ➢ Develop and implement stock sinter reclaim plan to purge stock sinter of fines - Complete ➢ Plan to inspect gas plant on next planned stop to understand condition and the source of the material blockage . - Complete ➢ Analyse blockage material to understand the origin of the material - Complete ➢ Add limits to set-point for clean gas pressure / semi-clean interlock - Complete ➢ Develop and implement new distribution patterns on BF5 - Complete ➢ Increase frequency of cleaning gas plant filters to ensure there is no more material left in the system - Complete ➢ Review Davy cone control to ensure correct operation - Complete

Targeted compliance interventions are undertaken periodically by NRW to understand the root cause(s) of any notifiable blast furnace bleeder valve releases.

Additional interventions were carried out in response to this specific period of releases from Blast Furnace No.5 between in February 2019, which NRW understands were attributable to a common set of factors. Our inspection reports **CAR_NRW0034781** and **CAR_NRW0036230** address this topic in more detail.

S5N/19/07: Schedule 5 Part A received 19/02/2019 (by email).

S5N/19/08: Schedule 5 Part A received 19/02/2019 (by email).

S5N/19/09: Schedule 5 Part A received 25/02/2019 (by email).

Release of particulates and blast furnace gas from No.5 Blast Furnace bleeder valves (emission point A5A)

16/02/2019 22:00hrs

18/02/2019 19:50hrs

19/02/2019 03:21hrs

19/02/2019 03:51hrs

24/02/2019 14:56hrs

A5A: Blast Furnace 5 bleeders

No emission limit values (ELVs) apply to emissions/releases from A5A

Schedule 5 Part A operator comment:

S5N/19/07: Semi Clean Bleeder opened. Snort opened to release pressure.

S5N/19/08: Semi Clean Bleeder opened. Snort opened to release pressure.

S5N/19/09: Gas surge resulting in bleeder opening. Snort opened to release pressure.

Schedule 5 Part B operator comment:

Between the 16th to the 24th February 2019, the furnace process had been relatively stable with regular burden descent and stable differential pressure but with regular gas surges. The furnace process was very sensitive to disturbances which would increase the severity of the gas surges with the larger ones resulting in bleeder openings. The furnace gas would surge up the walls of the furnace short circuiting the burden and so increasing high top pressure to the point at which the bleeders opened.

The dates and times of the bleeder openings are in the table below over the period reviewed. On the 16th Feb the bleeder opening occurred during a poor cast from the North taphole resulting in a late slag up time (Slag up time is when the slag level reaches the taphole level and we start getting slag out of the taphole.) so disrupting the process enough to open the North, centre and semi-clean bleeders for 16 seconds.

Several incidents of coal blockages and loss of coveying air resulted in disturbances to process on the night shift of the 18th Feb increasing the severity of the blow throughs with x3 bleeder opening events over this night shift as shown in the table below.

The bleeder opening incident on the 24th February occurred after a loss of stockline event with a severe blow through occurring as the low stockline material reaches the tuyeres altering the gas passages through the burden.

Although each bleeder opening event has been attributed to individual disturbances the sensity of the furnace process with gas surges throughout has been common. Work is ongoing with burden distribution to improve the stability of the blast furnace process to make it more robust to disturbances. This includes running on a more open centre profile to avoid blowing through at the furnace walls, as blow throughs at the furnace walls, as blow throughs at the furnace walls are more likely to result in a bleeder opening.

Also work is ongoing to understand the impact of Morfa coke quality as Blast furnace 4 has seen improved process stability from operating on an imported coke blend. Initial work suggests that a wider size distribution may be resulting in less permeable coke layers. For each of the events the furnace operators reduced blast volume to reduce the pressure to allow the bleeders to shut again.

Conclusions

1. *BF5 furnace top bleeder valves opened on 5 separate occasions during the 16th and 24th February each for separate disturbances to the furnace process but identical results of a blow through increasing high top pressure to the point at which the bleeders open.*
2. *The furnace process has been sensitive to disturbances resulting in instability and increases in the severity of the blow through making bleeder openings more likely. The blow throughs originate from low down in the furnace either casting related, low stockline material reaching the tuyere or coal injection disruption.*
3. *BF5 North, South, Centre and semi-clean bleeder valves functioned correctly by opening at the correct limits when the high top pressure deviated from its set-point.*
4. *The process team leader and senior operator opened the cold blast snort valve to reduce furnace pressure and close the FT bleeder valves.*

Recommendations

1. *Implement new chute angles and distribution patterns to improve stability - Complete*
2. *Plan a pre-screening trial of Morfa coke to improve the size distribution and improve the permeability of the coke layer – Ongoing*
3. *Alter casting practice to ensure a low hearth liquid level at all times – Complete*

Targeted compliance interventions are undertaken periodically by NRW to understand the root cause(s) of any notifiable blast furnace bleeder valve releases.

Additional interventions were carried out in response to this specific period of releases from Blast Furnace No.5 between in February 2019, which NRW understands were attributable to a common set of factors. Our inspection reports **CAR_NRW0034781** and **CAR_NRW0036230** address this topic in more detail.

S5N/19/12: Schedule 5 Part A received 04/03/2019 (by email).

Release of particulates and blast furnace gas from No.5 Blast Furnace bleeder valves (emission point A5A)

28/02/2019 09:20hrs

28/02/2019 16:07hrs

A5A: Blast Furnace 5 bleeders

No emission limit values (ELVs) apply to emissions/releases from A5A

Schedule 5 Part A operator comment:

Gas surge resulting in bleeders opening on two separate occasions. Snort opened to release pressure, bleeders closed asap.

Schedule 5 Part B operator comment:

During the day shift of 28th February 2019, the furnace process had been stable with regular burden descent and stable differential pressure. A failure of the gun and drill hydraulic conditioning pump resulted in a temperature alarm disabling the gun and drill. This caused a significant casting delayed with the shift teams having to lance open the taphole on the North casthouse.

The liquid level in the hearth built up to very high levels and the furnace needed to be cast before it could be shutdown. The East casthouse was out for maintenance so was unavailable.

In an attempt to increase the flow on the taphole the operators increased the blast volume but due to the high liquid levels this caused a surge of gas up the furnaces walls increasing top pressure to the point at which the bleeders opened. The furnace was cast dry and shutdown to carry out work on the stock house hydraulic system but when returning the furnace to blast there was another blow through up the furnace walls resulting in a further bleeder opening.

After this process disruption the furnace recovered and the blast volume returned to set-point. The furnace flood as a result of not sufficiently draining the furnace was the root cause of the bleeder openings. The South, North, Centre and Semi-clean bleeders opened at 09:25 for 20 seconds prior to shutting down and the Centre, North and semi-clean bleeders opened at 16:07 for 15 seconds after the shutdown. The furnace operators reduced blast volume to reduce the pressure to allow the bleeders to shut again.

Targeted compliance interventions are undertaken periodically by NRW to understand the root cause(s) of any notifiable blast furnace bleeder valve releases.

S5N/19/13: Schedule 5 Part A received 07/03/2019 (by email).

Release of particulates and blast furnace gas from No.5 Blast Furnace bleeder valves (emission point A5A)

07/03/2019 01:48hrs

07/03/2019 03:52hrs

A5A: Blast Furnace 5 bleeders

No emission limit values (ELVs) apply to emissions/releases from A5A

Schedule 5 Part A operator comment:

Gas surge resulting in Semi Clean Bleeders opening on two separate occasions. Snort opened to release pressure.

Schedule 5 Part B operator comment:

On the 7th March Blast Furnace 5 semi-clean bleeder opened in response to the high upstream pressure on the back pressure valve. The semi-clean bleeder activated in response to this higher pressure reading as part of the back pressure valve design to avoid the seal pots activating, resulting in a gas release at a lower level. The operator reduced blast volume to reduce the pressure to allow the bleeder to shut. On investigation into the incident it was found that the back pressure valve was moving freely within the gas main and had moved into a closed position creating the higher back pressure. The date and time of the bleeder opening is in the table below. The semi-clean bleeder opened for 59 seconds.

The back pressure valve moving freely within the gas main and ultimately moving to a closed position resulted in the increase in back pressure above the limited set point to open the semi-clean bleeder valve. The back pressure valve was secured in the open position and taken out of service until the next planned stop to avoid it closing again and the semi-clean bleeder activating.

On further inspection of the back pressure valve it was found that the two securing nuts to the hydraulic unit piston that controls the movement of the valve in the main had worked loose. Before the back pressure valve was put back into use the hydraulic unit was changed and the nuts holding the piston were re-designed to ensure they could not work loose again leading to a repeat of this incident.

Conclusions

1. *Blast Furnace 5 semi-clean bleeder valve opened on the 7th March due to the back pressure valve moving freely within the gas main resulting in an uncontrolled closing of the valve and an increase in clean gas pressure triggering the opening of the semi-clean bleeder.*
2. *The semi-clean bleeder has been designed to open for high clean gas pressure to avoid the seal pots activating.*
3. *The root cause were a set of nuts connecting the hydraulic unit piston to the back pressure valve which had worked loose leaving the back pressure valve free to move on its own.*
4. *The process team leader and senior operator opened the cold blast snort valve to reduce the clean gas pressure and close the semi-clean bleeder valve.*

Targeted compliance interventions are undertaken periodically by NRW to understand the root cause(s) of any notifiable blast furnace bleeder valve releases.

S5N/19/14: Schedule 5 Part A received 12/03/2019 (by email).

S5N/19/15: Schedule 5 Part A received 20/03/2019 (by email).

S5N/19/16: Schedule 5 Part A received 27/03/2019 (by email).

Release of particulates and blast furnace gas from No.5 Blast Furnace bleeder valves (emission point A5A)

12/03/2019 00:20hrs

19/03/2019 16:45hrs

27/03/2019 04:22hrs

A5A: Blast Furnace 5 bleeders

No emission limit values (ELVs) apply to emissions/releases from A5A

Schedule 5 Part A operator comment:

S5N/19/14: Gas surge resulting in Semi Clean Bleeder and North Bleeder opened briefly @ 12.20am. Snort opened to release pressure.

S5N/19/15: Gas surge resulting in Bleeder opening @ 16.45pm. Snort opened to release pressure.

S5N/19/16: Sudden blow through resulting in Bleeder opening @ 04:22am. Snort opened to release pressure.

Schedule 5 Part B operator comment:

Process overview

Between the 12th and the 27th March 2019, the Blast Furnace 5 process had been relatively stable with regular burden descent and stable differential pressure but with regular gas surges. On the 12th March a bleeder opening occurred during a poor cast from the East taphole resulting in a late slag up time (Late slag up time is when the furnace is drained of liquid and as the level inside the furnace drops the slag level reaches the taphole and then comes out of the taphole) whilst on single casthouse operation so disrupting the process enough to open the north and semi-clean bleeders for 15 seconds.

On the 19th March there was a loss of burden descent, which resulted in low stockline material coming through the furnace process 7 hours later. This led to a severe blow through occurring at 16:45pm which led to the north and semi-clean bleeders opening for 15 seconds.

The bleeder opening incident on the 27th March occurred whilst again on single casthouse operation during a poor flow cast. Also extra coke reached the Tuyere level which disrupted the gas flow through the burden resulting in a further blow through with all four bleeders opening for 15 seconds.

Conclusions

1. *Blast Furnace 5 top bleeder valves opened on 3 separate occasions during the period between 12th and 27th March each for separate disturbances to the furnace process but identical results of a blow through increasing high top pressure to the point at which the bleeders opened.*
2. *The furnace process has been sensitive to disturbances resulting in instability and*

increases in the severity of the blow through making bleeder openings more likely. The blow throughs originate from low down in the furnace either casting related, low stockline material or extra iron cokes reaching the tuyere level or causing coal injection disruption.

3. *Blast Furnace 5 north, south, centre and semi-clean bleeder valves functioned correctly by opening at the correct limits when the high top pressure deviated from its set-point.*
4. *The process team leader and senior operator opened the cold blast snort valve to reduce furnace pressure and close the furnace top bleeder valves.*
5. *The Davey cone opened in an attempt to control/relieve furnace top pressure.*

Recommendations

1. *Implement new chute angles and distribution patterns to improve the process stability – Technical team – Complete*
2. *Plan a pre-screening trial of Morfa coke to improve the size distribution and improve the permeability of the coke layer – Complete*
3. *Alter extra coke charged for low thermal level to extra coke base to avoid potential disturbances – Complete*
4. *Alter casting practice to ensure a low hearth liquid level at all times – Complete*

Targeted compliance interventions are undertaken periodically by NRW to understand the root cause(s) of any notifiable blast furnace bleeder valve releases.

S5N/19/10: Schedule 5 Part A received 25/02/2019 (by email).

Daily mean (average) for particulates recorded at emission point A8B:

23/02/2019: 16.15mg/m3

A8B: BF4 Cast House Fume Extraction Stack South

Permitted emission limit value (ELV) is 15.00mg/m3 as a daily mean (+/- 30%)

Schedule 5 Part A operator comment:

Investigation ongoing

Schedule 5 Part B operator comment:

On investigation into the incident it was found that two compartments within the fume extraction plant had failed. There are twenty compartments in total, the two failed compartments were repaired during the maintenance period.

Conclusions

1. *A structured Preventative maintenance regime has been implemented, and further discussions have been held with the OEM whereby improved filter design bagging's have been installed.*

After applying the appropriate measurement uncertainty factor, this exceedance remains within the permitted limit of 15.00mg/m3. No non-compliance (CCS) score has been applied to this event.

COKE OVENS

S5N/19/03: Schedule 5 Part A received 01/02/2019 (by email)

Monthly mean (average) Door Leakage Control Factor (DLCF), Top Leakage Control Factor (TLCF) and visible emissions from coke oven charging recorded at emission point A54:

January 2019: 96.03% (Doors)*

January 2019: 98.74% (Tops)

January 2019: 43.22 seconds (Charging)

A54: Morfa Coke Oven Batteries

Permitted limit for DLCF is at least 90% of coke oven doors with no leaks as a monthly mean (BAT-AEPL percentage of visible emissions is <10%)

Permitted limit for TLCF is at least 99% of coke oven tops with no leaks as a monthly mean (BAT-AEPL percentage of visible emissions is <1%)

Permitted limit (BAT-AEPL) for coke oven charging emissions is <30 seconds visible emissions per charge expressed as a monthly mean

*The notified result for doors (DLCF) is compliant with the permitted limit.

The current DLCF and TLCF method employed by Tata and agreed with NRW is a simple binary assessment i.e. leak/no leak which does not involve grading individual emissions. The scope for error is therefore minimised and it is not necessary for the operator to specify monitoring uncertainty when reporting these parameters.

The current method for assessing visible emissions from charging employed by Tata and agreed with NRW is a modified version of the *US EPA Method 303*. Under *Method 303*, measured charging emissions are recorded to the nearest 0.5 seconds. Incomplete charges (visual interference) should be excluded from the assessment. For compliance purposes, we have rounded up the reported results to the nearest 0.5 seconds before assessing them against the BAT-AEPL (ELV).

Schedule 5 Part A operator comment:

During this reporting period Doors percentage limit have been met.

As a result of Regulation 61 being served on TATA Steel significant improvements have been made, whereby NRW are regularly updated with the project improvements.

Schedule 5 Part B operator comment:

As a result of Regulation 61 being served on TATA Steel a comprehensive project has been put in place. Regular meetings are held with NRW providing a detailed update on progress to plan.

Please see a copy of the plan attached to this notification covering CY19 Q1 (January,February,March)

Quarter 1 Part B Response

Morta Coke Ovens Regulation 61 Action Plan							
Actions proposed to bring Battery Top emissions to within 1% and compliant with emission point A54	Start	Finish	Owner	Status	Progress	Actions	Comments
Complete change out of remaining ascension pipes	01-Feb-17	01-Feb-20				107/168	Completed
Campaign spigot repair programme	01-Jun-18	01-Aug-19					Completed
Battery Top Collector main control						Worked on extra I closing, fitted positing correctly. More of a control of the system	85%
Forward view system. Upgrade of transmitters to provide quicker response during charging							
Upgrade Controllers (Kent / Askania equipment)	01-Feb-17	01-Jun-20				Fitted position idication if successful will be rolled out	Ongoing
Improve Exhauster control parameters	01-Feb-17	01-Jun-20					Ongoing
Collector Main Configuration							
Feasibility study on operating with single collector main	01-Jul-18	01-Feb-20				Feasibility underway with TCE. Discussion made with suppliers three different companies	Ongoing
Execute transition to single collector main if applicable post survey	01-May-20	01-May-23					After feasibility
Sustained Compliance with Limit Value. If is envisaged Battery Top emissions will be compliant with emission point A54 periodically from January 2020 onwards, but not sustained until full understanding of transition towards single collector main operation. May 2023							
Actions proposed to sustain Battery Door emissions to within 10% & compliant with emission point A54.							
Upgrade and Improve Reliability of door cleaning equipment on machines	01-Aug-18	01-Feb-20					Ongoing
Purchase and Install Automatic small door cleaning device for RAM machines	01-Jun-18	01-Feb-20				Had design and waiting for Capex prices have been given	Ongoing
Door Design						Currently with TCE	Ongoing
Purchase and trial x10 blue sky doors (spring sealing).	01-Nov-18	01-May-19					Ongoing
Run 12 months to assess effectiveness of new doors and emission levels	01-May-19	01-May-20					Ongoing
If trial successful convert battery to new doors	01-Jul-20	01-Jul-23					Ongoing
Sustained Compliance with Limit Value. If is envisaged Battery Door emissions will periodically be compliant with emission point A54, but not sustained until transition to new spring sealed door arrangement . July 2023							
Actions proposed to sustain Visible Charging emissions to within agreed levels outlined in emission point A54							
Correct all charge hole frames identified with misalignment	01-Aug-18	01-Feb-20					Complete
Charging Machine							
Change machine Telescopes (x6), seals and inspection covers	01-Aug-18	01-Aug-19					90% Complete
Refurbishment of all charge oscillators (x4)	01-Aug-18	01-Aug-19					100% Complete
Auto charge hole lid sealing system on charger	01-Sep-18	01-Sep-20					Ongoing
Auto charge hole carbon cleaning on charge machine	01-Sep-18	01-Sep-20				Drawings for Carbon scraper in principle	Ongoing
Sustained Compliance with Limit Value. Battery charging emissions will be compliant with emission point A54 September 2020							

The exceedances for TLCF (tops) and Charging recorded at A54 during October 2018 are non-compliant with the permit limits and Condition 3.1.2.

Two CCS Category 3 scores (suspended: see below) have been recorded in response to these non-compliances.

Coke Ovens improvement plan

Tata Steel has submitted an improvement plan in response to an EPR Regulation 61 (Statutory) Information Notice issued by NRW. This plan outlines the steps Tata Steel will take to achieve compliance with the relevant ELVs for visible emissions (doors, tops & charging) at emission point A54. NRW can suspend CCS scores while an operator is working towards compliance (see Principle 5 and Annex 4 of our Compliance Classification Scheme [CCS] (version 3, 26 March 2013).

We have **suspended** the CCS3 compliance scores for the TLCF and Charging ELV breaches at emission point A54 identified above. Compliance with these ELVs has since been reviewed at regular intervals by NRW during 2019, and our assessments captured in relevant compliance assessment reports.

From February 2019 onwards, Tata Steel achieved compliance with all three ELVs for coke ovens visible emissions. It has therefore not been necessary to consolidate any further permit breaches during Quarter 1. Compliance with these limits has subsequently been sustained during 2019.

The **Summary and actions required** section of this report (below) also discusses Tata Steel's improvement plan.

Summary and actions required

Permit compliance

Natural Resources Wales (NRW) has consolidated permit compliance scores within this calendar quarter where appropriate and in line with our Compliance Classification Scheme (CCS).

Our assessment of notifications received during Quarter 1 2019 has concluded **three CCS Category 3 breaches** of the operator's permit conditions have occurred in response to notified exceedances of permitted emission limit values (ELVs) at the following emission points:

- A1 Sinter Plant Main Stack (particulates)
- A54 Morfa Coke Oven Batteries (TLCF & Charging)

All three CCS3 scores have been suspended (see A1 & A54 below).

The EC Industrial Emissions Directive (IED) introduces a stricter environmental compliance regime for Tata Steel's operations at Port Talbot and reflects a wider effort to improve the environmental performance of industry across Europe. NRW has a duty to enforce these new emission limits (BAT-AELs and BAT-AEPLs) in Wales, but we remain committed to working with Tata Steel to improve the environmental performance of Port Talbot steelworks.

Emission points A1 & A54

Tata Steel currently has agreed improvement plans in place in relation to ongoing breaches of the permitted emission limits (ELVs) at A1 and A54. These plans outline a pathway towards sustained compliance with the limits. Progress against both plans has been captured and recorded in subsequent inspection reports during 2018-19.

We have **suspended** all three CCS3 scores identified in this report while the operator's improvement plans are active.

If there is slippage or unjustified deviation from these plans, or we detect any sustained deterioration in emissions at A1 or A54, existing CCS scores will be unsuspended, and further CCS scores may be applied. We will also consider enforcement action in line with NRW's published Enforcement & Prosecution Policy.

NOTE: It is recognised that Tata Steel has subsequently achieved sustained compliance with all three ELVs for coke ovens visible emissions since Quarter 1 2019.

Emission point A5A

Targeted compliance interventions are undertaken periodically by NRW to understand the root cause(s) of any notifiable blast furnace bleeder valve releases. The outcomes from these interventions are confirmed separately.

Additional interventions were carried out in response to a specific period of releases from Blast Furnace No.5 between in February 2019, which NRW understands were attributable to a common set of factors. Our inspection reports **CAR_NRW0034781** and **CAR_NRW0036230** address this topic in more detail.

[END OF SECTION 2]

Cyfoeth Naturiol Cymru Natural Resources Wales	**EPR Compliance Assessment Report**	**Report ID: CAR_NRW0034618**

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

Site	Port Talbot Steel Works	Permit Ref	BL7108IM
Operator/Permit holder	Tata Steel UK Limited	Date	31/03/2019

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			
E1	C3	Compliance plan submitted and agreed. SCORE SUSPENDED. IGNORE ACTION DATE - not applicable.	31/03/2020
E1	C3	Compliance plan submitted and agreed. SCORE SUSPENDED. IGNORE ACTION DATE - not applicable.	31/03/2020
E1	C3	Compliance plan submitted and agreed. SCORE SUSPENDED. IGNORE ACTION DATE - not applicable.	31/03/2020

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 report should not be released to the public register(s) on the grounds of commercial confidentiality, you must write to your local area office within fifteen 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.