



Department
for Environment
Food & Rural Affairs

Report on measures for 2019 exceedance of the Target Value for Benzo[a]pyrene in Yorkshire and Humberside non-agglomeration zone (UK0034)

December 2021



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Any enquiries regarding this publication should be sent to us at

Air Quality and Industrial Emissions
Department for Environment, Food and Rural Affairs
Ground Floor, Seacole Building
2 Marsham Street
London, SW1P 4DF

Email: air.quality@defra.gov.uk

With technical input from Ricardo Energy & Environment

www.gov.uk/defra

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1. Introduction

1.1 Context

Under the Air Quality Standards Regulations 2010¹, the target value (TV) for Benzo[a]pyrene (B[a]P) is an annual mean concentration of 1 nanogram (one billionth of a gram (10^{-9})) per cubic metre (ng.m^{-3}) of ambient air or lower. The regulation requires the UK to report on measures in place to address the exceedance of the TV and that all reasonable measures that do not entail disproportionate cost should be taken to ensure this target is not exceeded.

Emissions of B[a]P fell significantly from 1990 to 2001, after which the reported emissions have either reached a plateau or fallen steadily depending on the location, reflecting the effect of environmental regulation and Best Available Techniques (BAT) for pollution control. In 2019 for the UK, data shows that there is a continuing, downward trend in emissions of B[a]P, which is reflected by ambient-air measurements both nationally and locally (see Table 2 of this report). However, in the Yorkshire and Humberside region, there was a measured exceedance in 2019 at one of the five measurement locations in this zone.

After reviewing the monitoring data, followed by targeted monitoring and modelling to apportion the sources of the exceedances. The Environment Agency identified the processes that were significantly contributing to the target exceedances. These processes were from the Appleby Coke Ovens which produces metallurgical coke with mainly fugitive emissions from the coke producing Batteries. Additionally, the safety pressure relief system has a significant contribution when the flaring system is not initiated. The other plant source is the Sinter plant for agglomerating Iron ore, coke and iron-rich process residues where emissions are highly dispersed by the 107m high stack.

Exceedance of the TV were reported in 2013, 2014, 2015, 2016, 2017 and 2018 in the Yorkshire and Humberside non-agglomeration zone and a report on measures was published detailing the exceedance and the measures in place².

This document reports the progress in reducing emissions, together with any exceedances for 2019, reflecting the more recent assessment and updating the 2013, 2014, 2015, 2016, 2017 and 2018 report on measures.

¹ [The Air Quality Standards Regulations 2010 \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukdsi/2010/12/31/1231201000010001/1)

² <https://uk-air.defra.gov.uk/library/bap-nickel-measures>

1.2 Status of zone

This is the report on measures required for exceedances of the TV for B[a]P within the Yorkshire & Humberside zone identified within the 2019 UK air quality assessment. Exceedances within this zone were identified on the basis of model results providing supplementary information for the assessment in addition to the results from fixed monitoring stations. This exceedance was reported via e-Reporting dataflow G³ on attainment for the compliance assessment in 2019 when the UK was a member state and Air Pollution in the UK⁴.

Table 1 summarises the spatial extent and associated resident population for the exceedances identified in this zone, as reported via e-Reporting.

Table 1. Area exceeding B[a]P target value in 2019 and associated population for zone UK0034

Zone code	Zone Name	Area exceeding TV (km ²)	Population exceeding TV
UK0034	Yorkshire & Humberside	6	2015

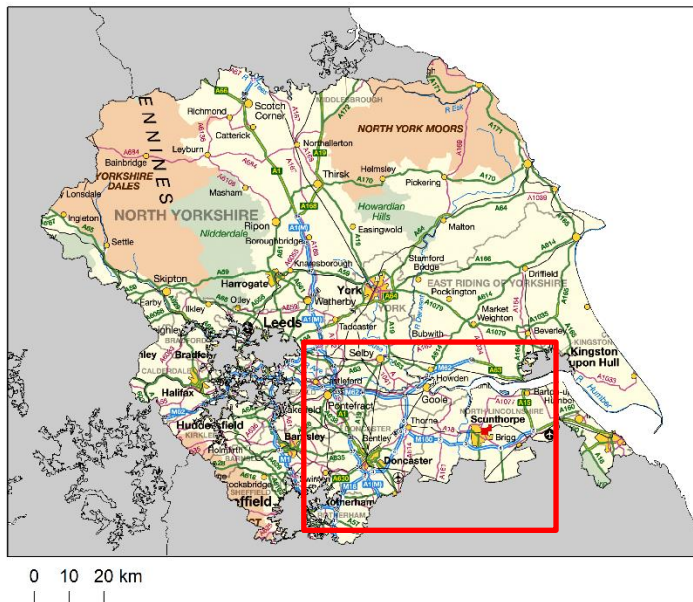
Figure 1a shows the locations of the exceedances in the context of the zone as a whole. Figure 1b shows the part of the zone including the exceedances in more detail.

³ <http://cdr.eionet.europa.eu/gb/eu/aqd>

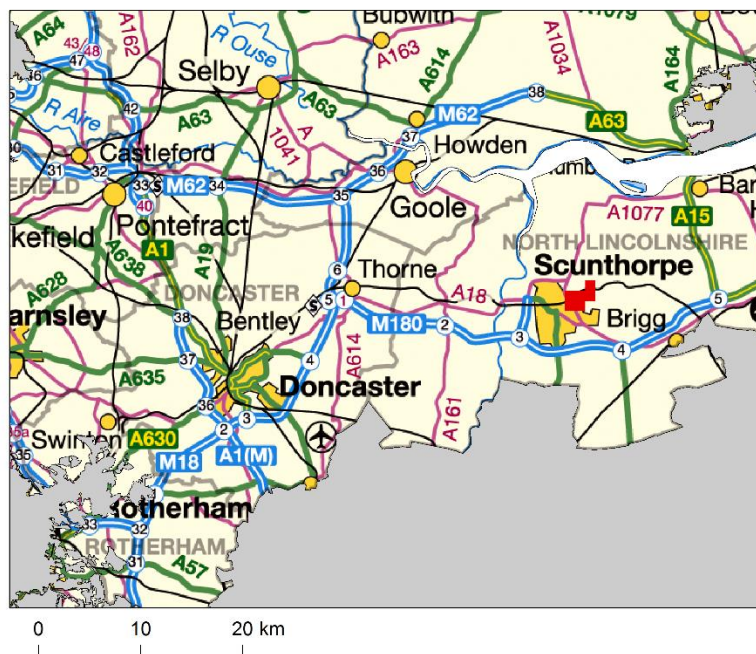
⁴ <http://uk-air.defra.gov.uk/library/annualreport/index>

Figure 1. Location of exceedance of the B[a]P target value during 2019 in zone UK0034 Yorkshire & Humberside. Areas of the zone in exceeding grid squares are marked red.

a) The whole zone



b) The exceedance locations at higher spatial resolution



An initial source apportionment was carried out and this analysis identified one exceedance situation within this zone

- Yorkshire and Humberside [B[a]P_UK0034_2019_1] related to industrial emissions (area of exceedance 6 km²)

This following section details the exceedance situation in the zone including a description of the exceedance situation, maps, information on source apportionment and a list of measures already taken or to be taken.

2 Exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2019_1] related to industrial emissions

2.1 Description of exceedance

This exceedance situation is an area of exceedance 6 km² to the north east of Scunthorpe in Lincolnshire. Figure 2 shows the location of the exceedance situation in detail. The exceeding grid squares are numbered in Figure 2 and in subsequent tables for easy reference. The resident population associated with this exceedance situation is 2015. The majority of this population is in the grid cell labelled 5. Half of the grid squares have no resident population and are largely or wholly within the steelworks industrial complex area.

Table 2 lists the measured concentrations of B[a]P in this zone since 2008. The fixed monitoring stations at Scunthorpe Town and Scunthorpe Low Santon are within the exceedance situation. The measured concentrations at Scunthorpe Town were above the TV and Scunthorpe Low Santon was below the TV in 2019.

Table 2. Measured annual mean B[a]P concentrations in Yorkshire and Humberside zone UK0034 from 2008 to 2020 (ngm⁻³). (Percentage data capture is shown in brackets).

Station (Eol code)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
High Muffles (GB0014R)	0.14 (95)	0.09 (62)	0.07 (94)	0.06 (87)	0.07 (91)	0.07 (87)	0.07 (98)	0.07 (98)	0.05 (100)	0.04 (100)	0.04 (99)	0.04 (97)	0.03 (95)
Royston (GB0940A)	2.6 (95)	1.0 (95)	1.1 (84)	0.84 (96)	0.89 (99)	0.85 (100)	0.92 (100)	0.41 (100)	0.52 (100)	0.34 (99)	0.38 (99)	0.38 (98)	0.28 (95)
Scunthorpe Low Santon (GB1004A)	6.0 (95)	2.4 (99)	1.8 (94)	3.0 (91)	2.9 (100)	3.4 (100)	3.6 (92)	3.5 (99)	1.1 (99)	0.83 (100)	0.78 (100)	0.75 (84)	0.84 (99)
Scunthorpe Town (GB0841A)	3.2 (99)	1.8 (99)	1.3 (80)	1.3 (86)	1.4 (98)	3.9 (98)	3.5 (90)	1.3 (92)	1.1 (100)	0.80 (99)	1.7 (100)	1.9 (96)	0.64 (97)
South Hiendley (GB0942A)	1.3 (97)	0.89 (94)	0.63 (91)	0.68 (83)	0.54 (100)	0.35 (91)	0.44 (99)	0.26 (95)	0.31 (100)	0.19 (100)	0.23 (100)	0.31 (94)	0.2 (95)

Figure 2 also shows the locations of the monitoring sites associated with the exceedance situation and the locations of the key industrial sources. Dispersion modelling up to and including 2019 applied site level coordinates derived from the National Atmospheric Emissions Inventory (NAEI) for the sinter plant stack, which is about 850 m distant from the stack. The specific location of the sinter plant stack has been used for the 2017, 2018 and 2019 assessments. The specific location of the sinter plant is shown in Figure 2.

The Scunthorpe Steel works operator has also invested in and operated their own PaH B[a]P ambient monitoring as equivalent to the AURN monitoring network. The same equipment is operated to the same standards with accredited laboratory analysis at an Iron & Steel Research and Technology centre at Rotherham. Following a review of locations (originally 3), this is now reduced to High Santon village location, northeast of the works. British Steel fund this monitoring with typical running costs of ~£80k p.a. In contrast to the Defra AURN network, which measures daily samples to form a monthly composite as a monthly mean data value, their monitor measures 3-day sample composites to report mean data values. British Steel's objective was to provide more dynamic emission trends and higher emissions resolution as an investigational tool for the Operator, downwind (prevailing NW) of the site. Emissions are no longer dominated by the closed Dawes Lane coke oven (March 2016). Using wind sector analysis, plant emission sources and BaP spikes are being assessed.

The exceeding grid squares within this exceedance situation are numbered and the numbers correspond to those in subsequent tables. Table 3 lists the exceeding grid squares and the resident population.

Figure 2. Exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2019_1]. Exceeding grid squares are marked red. Locations of coke works at Appleby and sinter plant at Scunthorpe are also shown as well as the two monitoring sites at Scunthorpe Town and Scunthorpe Low Santon.

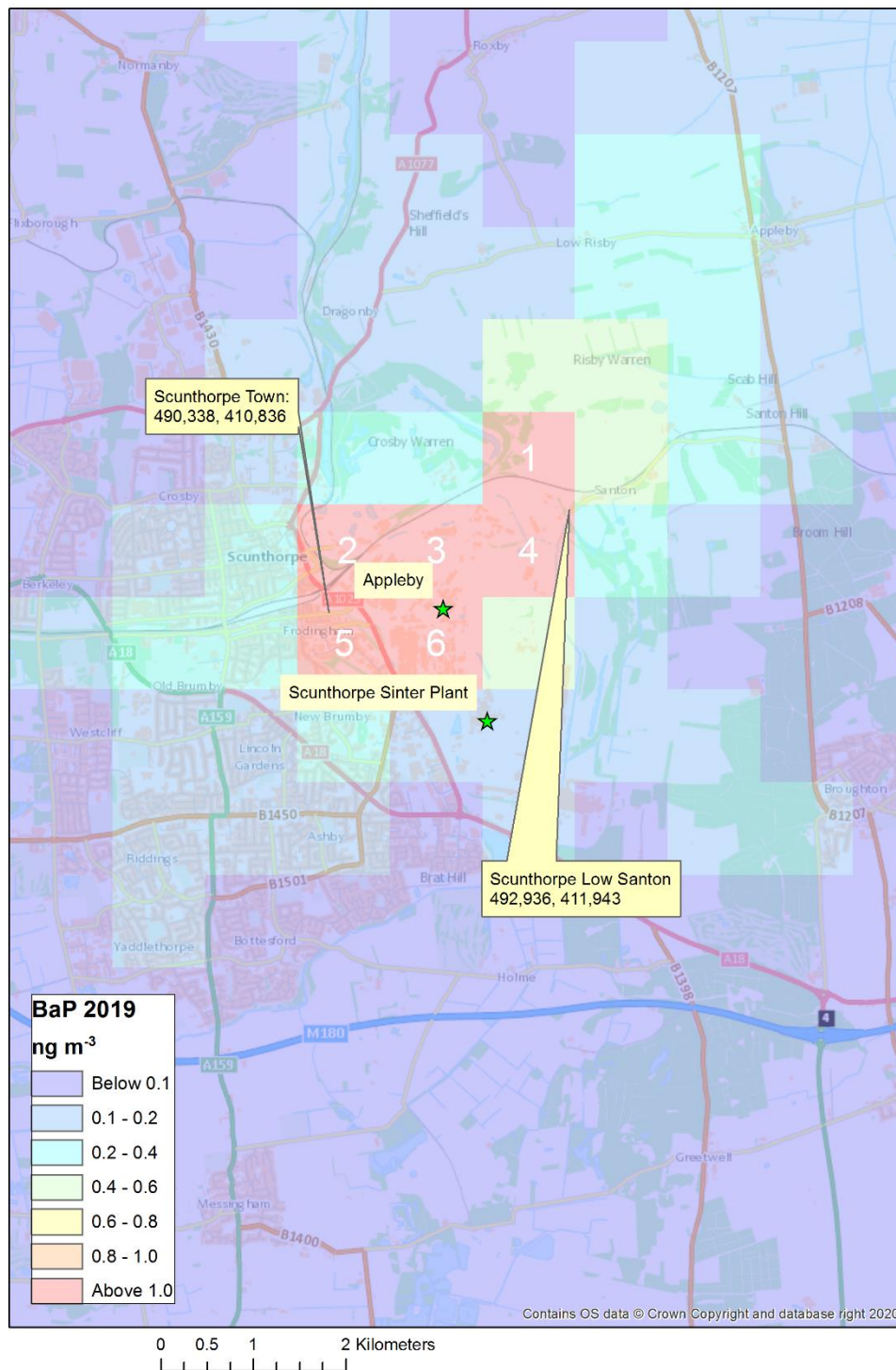


Table 3. Exceeding grid squares for exceedance situation BaP_UK0034_2019_1.

Grid square number	Resident population	Notes
1	0	Woodland and fields
2	319	Scunthorpe Town, industrial estate
3	0	Steelworks industrial complex
4	7	Mostly steelworks industrial complex, 3 houses in Low Santon
5	1688	Scunthorpe Town, industrial estate
6	0	Mostly steelworks industrial complex

2.2 Source apportionment

Table 4 provides a breakdown of the main emission sources (source apportionment) that have contributed to the grid squares in this exceedance situation, highlighting the significant contribution from industrial sources. The penultimate column is the total from all emission sources. The values in this column have been rounded to 1 decimal place for consistency with the values used in the compliance assessment. The values in the other columns have not been rounded. The other shaded columns are the subtotals for the regional, urban background and local contributions. Table 5 gives a more detailed source apportionment indicating how the separate industrial processes contribute to the total industrial figure. This shows that the coke ovens at Appleby is the main source associated with this exceedance situation (note Dawes Lane coke ovens closed in March 2016). As the modelling is getting closer to the monitoring values, there is scope to further investigate refining the source terms for input into the modelling. The Appleby Coke Ovens has a mixture of fugitive emissions and point source emissions. Emission factors and more random process safety pressure relief emissions (point sources) have been used to form the total annual B[a]P emissions.

A specific contribution from releases from bleeders was included in the modelling for 2019 for the first time following the identification of these emissions as the source of a specific spike in measured concentrations at Scunthorpe Town during November 2019. In contrast to the other emission sources associated with the coke ovens, the bleeder release only takes place on very few hours during the year and the detailed timing of the releases has been taken into account in the modelling. The concentration of B[a]P in the unflared bleeder releases of coke oven gas is not known. The concentration in the releases was therefore set in order to provide good agreement with the concentration measured during November 2019. The modelling carried out for 2019 indicates that the bleeder releases made a larger contribution to the annual mean B[a]P concentrations in the exceedance area than the other emissions associated with the coke ovens.

Table 4. Source apportionment for exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2019_1]. Annual mean B[a]P concentration (ngm⁻³)

Grid square number	OS easting (m)	OS Northing (m)	Zone	(a) Regional background: Total	(b) Urban background increment: Total	Urban background increment: Traffic	Urban background increment: Industry including heat and power production	Urban background increment: commercial and residential	Urban background increment: Shipping	Urban background increment: Off road mobile machinery	Urban background increment: Other	(c) Local increment: Total	Local increment: Industry including heat and power production	Total for all emission sources (a+b+c)	Resident population
1	492500	412500	34	n/a	0.028	0.000	0.004	0.015	0.000	0.001	0.009	1.411	1.411	1.4	0
2	490500	411500	34	n/a	0.042	0.000	0.004	0.029	0.000	0.002	0.007	1.419	1.419	1.5	319
3	491500	411500	34	n/a	0.029	0.000	0.003	0.018	0.000	0.001	0.006	5.298	5.298	5.3	0
4	492500	411500	34	n/a	0.026	0.000	0.006	0.014	0.000	0.001	0.006	2.405	2.405	2.4	7
5	490500	410500	34	n/a	0.061	0.000	0.003	0.048	0.000	0.002	0.008	1.833	1.833	1.9	1688
6	491500	410500	34	n/a	0.033	0.000	0.003	0.023	0.000	0.001	0.007	2.783	2.783	2.8	0

Table 5. Detailed source apportionment for industrial sources only, for exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2019_1]. Annual mean B[a]P concentration (ngm⁻³)

Grid square number	OS easting (m)	OS Northing (m)	Zone	Appleby coke ovens	Scunthorpe, other plant	Scunthorpe bleeders	Local increment: Industry including heat and power production
1	492500	412500	34	0.119	0.004	1.288	1.411
2	490500	411500	34	0.100	0.004	1.316	1.419
3	491500	411500	34	0.881	0.003	4.414	5.298
4	492500	411500	34	0.350	0.006	2.049	2.405
5	490500	410500	34	0.487	0.003	1.342	1.833

A revised modelling methodology incorporating a finer spatial scale for dispersion modelling of all coke ovens in the UK and revision to the emissions rate for the coke ovens at Scunthorpe have been adopted for the 2016, 2017, 2018 and 2019 compliance assessment for B[a]P. A specific treatment of bleeder releases was included for the first time for 2019.

2.3 Measures

The main overview report contains more information on how industrial sites are regulated. The Industrial Emissions Directive (IED) (2010/75/EU) sets out control emissions within specific industrial sectors like iron & steel. There are no specific Best Available Techniques (BAT) Conclusions within the Iron and Steel (IS) BAT Reference Document (BREF)⁵ specifically setting out any BAT Associated Emission Limits or direct techniques or measures to prevent or minimise B[a]P emissions. However, there are some narrative and specific BAT Conclusions to indirectly prevent or minimise B[a]P emissions by reducing fugitive or point source particulate

⁵ http://eippcb.jrc.ec.europa.eu/reference/BREF/IS_Adopted_03_2012.pdf

emissions. Following the 2016 sector permit review to adopt the IS BAT Conclusions, permit conditions relevant to Polycyclic Aromatic Hydrocarbons (PAH) emissions, transposed to a focus on the Coke Ovens and the Sinter Plant, that are the main sources and mass release of B[a]P. The IS BREF contains stringent requirements for iron and steel works to significantly reduce their fugitive emissions (especially particulate matter).

Before 2016, the two coke ovens at Appleby and Dawes Lane were the main sources (fugitive) associated with the exceedances in this regional zone. Although the Sinter Plant has a point source with a significant mass release, it is highly dispersed by its 107m stack, mitigating any potential impact. The Environment Agency completed the review of the permit in 2016, then named Longs Steel UK Ltd trading as British Steel Ltd. Following an operational strategic review, they announced in October 2015 their intention to close down the Dawes Lane Coke Oven (DLCO). DLCO subsequently closed on the first compliance day for implementing IED requirements (8th of March 2016) with a substantial reduction in B[a]P emissions.

During 2015, the performance of both coke oven plants was poor at the then Longs Steel UK Ltd installation. Following regulatory pressure to improve, the operational strategic review concluded that alongside the closure of DLCO Plant there would be a focused investment in the Appleby Coke Ovens (ACO). During 2016, the steelworks worked through a significant capital and revenue project on ACO since DLCO was closed. The ACO Recovery Project was to improve operational performance by renewing damaged and dated Coke Oven plant infrastructure that would minimise particulate emissions and PAH B[a]P reductions on the coke-producing batteries (4). Initially this work was a rebuild of battery 3, operated on hot idle (no coke production) from December 2015 to August 2016. Refurbishment of Batteries 1, 2 and 4 was planned to follow including the associated by-products plant that affects gas pressure management control.

During 2019, British Steel Ltd entered company liquidation. On 22 May 2019, an Official Receiver (OR) was appointed which led to some projects being prioritised by the Official Receiver and others being delayed. ACO continued to commit to battery and by-products improvements. Work has continued to stabilise coke oven operations and activities during 2019. A comprehensive and substantial investment programme of improvements/refurbishment to Battery 1 was carried out in 2019. Further investments and improvements on the By-products including further replacement of primary coolers, an extra saturator and refurbishment of one of the current saturators is ongoing (process-gas back-pressure improvements). According to British Steel, plant management are always actively looking to improve the plant operating parameters to further improve performance.

Following this company liquidation period, the OR was seeking a new owner. The Environmental Permit EPR-HP3736AW for the operation of the Scunthorpe Integrated Iron and Steel works was transferred to Jingye Steel (UK) Ltd, latterly renamed British Steel Ltd (company number 12303256) on 9 March 2020 as permit EPR-RP3206BE.

The following information has been adopted from the permit *British Steel Scunthorpe Annual Performance Report 2020* plan year.

Appleby Coke Oven

Doors and tops leakage, together with other fugitive releases of crude process coke oven gas, are considered to be important sources of Polycyclic Aromatic Hydrocarbons (PAHs). British Steel continued to monitor benzo(a)pyrene at the NW downwind High Santon Farm location by their own Digital monitoring system as used at the established Scunthorpe Town and Low Santon locations, however these are dynamic 3-day composite samples (verses monthly composites). Section 2.1 Description of exceedance on page 10 of this report explains in more detail.

The 2020 plan year saw an improvement in environmental management performance at Appleby Coke Ovens. There were 12 exceedances during the calendar year 2020 relating to door and top leakage particularly on batteries 3 and 4. In total there were 12 door and top leakage exceedances in 2020 compared with 14 in the 2019 reporting year.

During 2020 work continued to repair battery door repair bays and jetting cleaning equipment and the planned 2019 battery 1 overhaul was completed. Battery 2 was taken offline for planned rebuilds and operated on hot idle (no coke production) towards the end of 2019 to also remove and renew one half of its gas collecting main. The remaining half of the gas collecting main was removed and renewed during 2020.

A scheme of works to deal with emissions from leaking coke oven doors and tops continues apace, with several trials conducted on the batteries and recommendations progressed. This programme remains a core focus for the Coke Ovens team into 2021. Improvements were made to coal charger 6 to bring it back into full operation and allow improvements to be made on chargers 1 and 2.

Figure 3. New Battery 2 gas collector main being lowered in to position



Summary: Battery Doors, Tops and coal charging Emission Limits performance

Door leakages from Battery 3 and Battery 4 had exceedances during the 2020 plan year, however there were no exceedances recorded from September onwards. Battery top leakage remained in compliance throughout the year.

Figure 4. Battery Doors leakage results during 2020

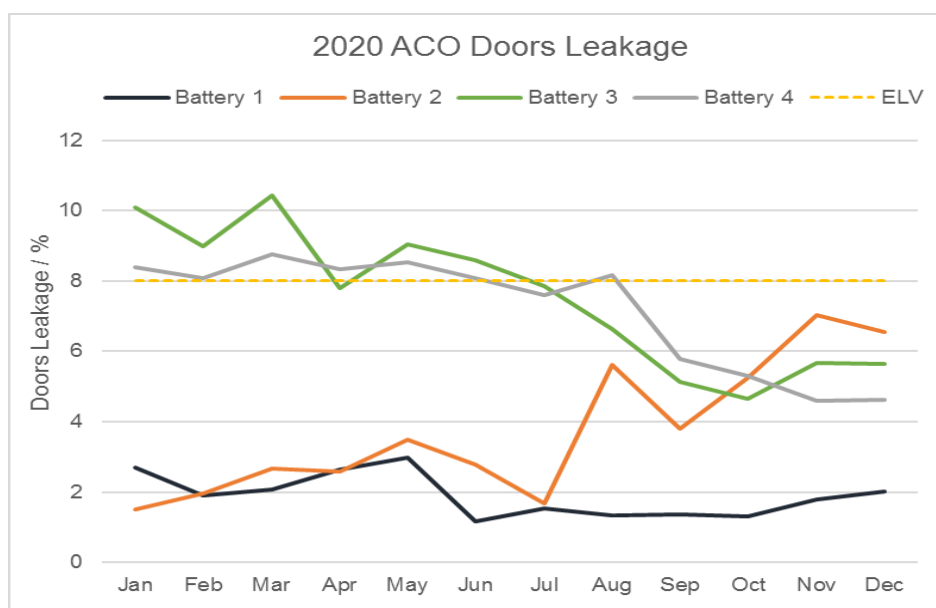
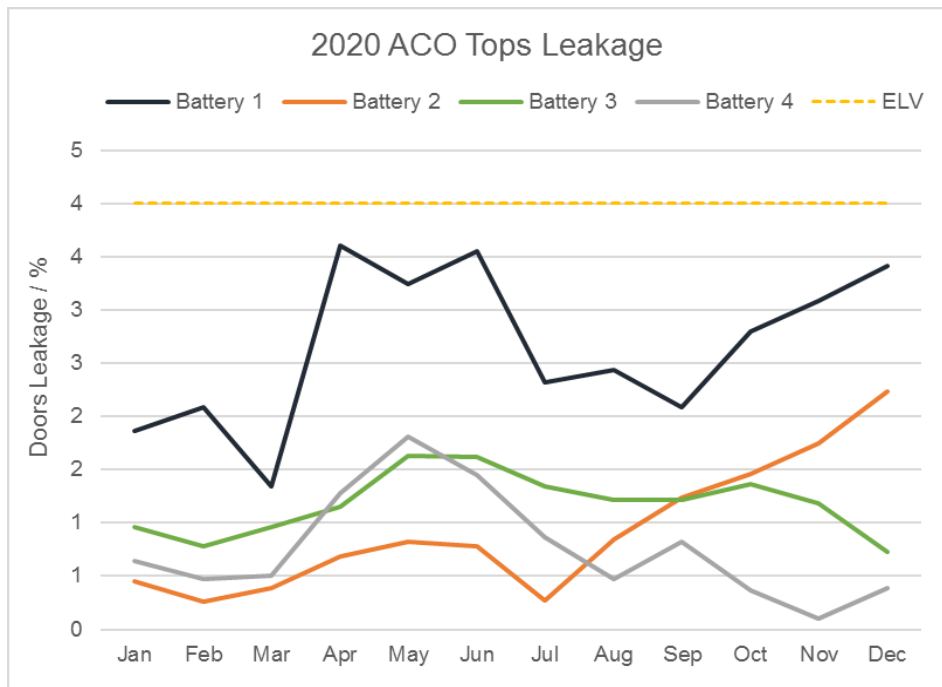
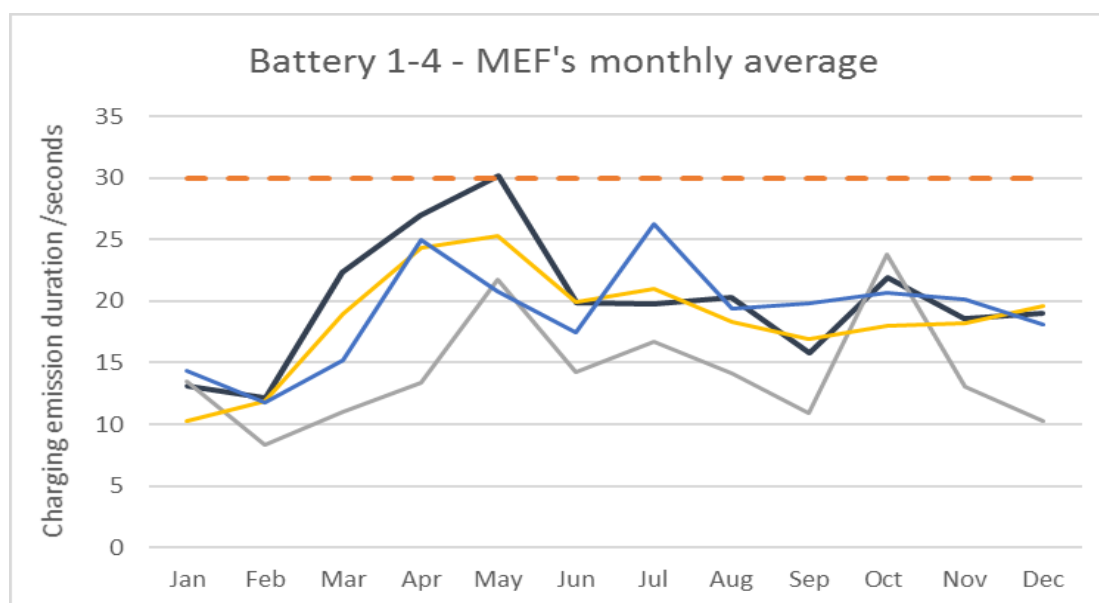


Figure 5. Battery Tops leakage results during 2020



Coal-charging and coke-pushing emission factors (referred to in the permit as MEFs and PEFs) as a measure of fugitive emissions have remained within the compliance limit throughout 2020 with the exception of one exceedance for MEF's during May on Battery 1. This continues a trend of good performance in this area.

Figure 6. Battery coal charging MEFs performance during 2020



Sinter Plant

The Sinter Plant stack has significant annual PAH mass emission and associated B[a]P (~61% contribution in 2020). It is a point source release, though emissions are highly dispersed by the 107m stack over a wide area.

Table 6. Extractive monitoring summary for the sinter plant during 2020 Plan year

Emission point	Substance/parameter	ELV	Result	Unit	Month
Sinter Plant	PAH to air	N/A	48.3	µg/m ³	April
Main Stack A1			163	µg/m ³	November

Some specific Best Available Techniques (BAT) Conclusions apply to meet reduced particulate matter and dioxin/furan emission limits that have some potential to reduce B[a]P and PAH emissions.

For particulate matter, the current Advanced Electrostatic Precipitator technique has significant limitations to meet the lower IED Emission Limits in the permit. British Steel has committed to the installation of a fabric filter bag filter by September 2023 that would significantly reduce the emissions of particulate matter, and consequently reduce B[a]P emissions.

Lignite injection as a carbonaceous material absorbent has the potential to also reduce B[a]P emissions as an abatement technique for Dioxin/furan emissions. Emissions are normally minimised by monitoring to evaluate process inputs, limiting air ingress and controlling chloride content of raw material. Lignite injections are to minimise the formation of dioxins/furans, and the effectiveness of this approach is assessed against the measured concentrations of dioxins/furans. Process safety considerations currently prevent implementation of injection due to the potential to create glow fires and an explosive environment, so air ingress management is critical in addressing these emissions. However, as a contingency measure to reduce elevated concentrations of dioxins/furans, the lignite injection system may indirectly reduce any emissions of B[a]P in combination with a fabric bag filter. Monitoring will provide evidence of this technique.

Table 7 sets out measures that are being taken or are to be taken, some of which are subject to the outcome of the review of the permit conditions and ACO Recovery project or affected by the closure of the DLCO. As such the measures in previous annual reports on “Measures for Dawes Lane Coke Ovens” can now be discounted.

Table 7. Table of measures taken or to be taken at Scunthorpe industrial site

Measure code	Description	Classification	Implementation dates	Other information		Comment
01 UPDATE	<p>The Environment Agency originally set a permit condition on the 8 Feb 2016 issued EPR IED permit HP3736AW to review and report on measures to prevent and minimise PAH emissions and provide a PAH AQ Management plan.</p> <p>Now superseded by AQMP Condition 3.7 in the 8 Feb 2016 issued EPR permit HP3736AW variation for IED, summarised as:</p> <p>Condition 3.7.1: The Operator shall submit a written Air Quality Management Plan (AQMP) to the Environment Agency. The plan must contain appropriate measures aimed at addressing emissions of Particulate Matter (PM10) and Polycyclic Aromatic</p>	Permit systems and economic instruments: IED permits	<p>Start: 2016</p> <p>Expected end: Ongoing</p> <p>Status: Implementation</p>	Source affected:	Industry including heat and power production	<p>ON-GOING: 2019 Updated</p> <p>During 2019, British Steel Ltd entered company liquidation. On the 22 May 2019 an Official Receiver was appointed.</p> <p>On 30 January 2020, British Steel Ltd, company number 09438207, submitted the Air Quality Management Plan (AQMP) for Scunthorpe for the financial year 2019/20 under the Environmental Permit EPR-HP3736AW. The permit was transferred to Jingye Steel (UK) Ltd, latterly renamed British Steel Ltd (company number 12303256) on 9 March 2020.</p> <p>As a new company, this was treated as transitional</p>
				Spatial scale:	Local	
				Cost:	Unknown, Operator information	
				Indicator:	Reduction in ambient B[a]P concentration	
				Target emissions reduction :	Not available	

	<p>Hydrocarbons (PAHs) from both significant point sources and diffuse sources on site.</p> <p>Condition 3.7.2: The AQMP should be updated and reported annually in writing on the first anniversary of the approval taking account of any new knowledge, evidence and information.</p> <p>3.7.3: Any revised AQMP should be implemented in place of the original in accordance with the Environment Agency's written approval unless otherwise agreed in writing.</p>					<p>reporting as a new legal entity. On this regulatory basis, no permit breaches could be given for non-compliance. On 12 Dec 2020, the Agency issued a Compliance Assessment Report following a detailed assessment that had found several deficiencies.</p> <p>However, this PAH Improvement Plan forms part of a wider Coke Oven Battery Recovery Project.</p>
02	PAH measurement and analysis; The operator undertakes B[a]P monitoring to AURN monitoring location standards with time resolution as low as 1 day. PAH measurements at two	Permit systems and economic instruments: IED permits	<p>Start: 2012</p> <p>Expected end: Monitoring ongoing</p> <p>Status: Implementation</p>	Source affected:	Industry including heat and power production	<p>ON-GOING: Monitoring</p> <p>2019 Update</p> <p>Implementation completed 2012</p>

	locations, using pollution rose analysis to identify key sources. Emission factors to be calculated.			<table><tr><td>Spatial scale:</td><td>Local</td><td rowspan="4">2017 – 2019 Update - Moved to measuring ambient PAH as B[a]P at one location (High Santon area), with time resolution now at 3 day composite analysis (averaging period). Measurements and analysis indicate that the coke ovens at Appleby and previously Dawes Lane, are the key sources for this exceedance situation. Emission factors calculated for each plant by reverse modelling methodology (Measure No. 4). DLCO closed in March 16. Coke production has reduced which has impacted emission levels. 2020 Plan British steel will continue to monitor PAH B[a]P at high</td></tr><tr><td>Cost:</td><td>Unknown, Operator information</td></tr><tr><td>Indicator:</td><td>Not available</td></tr><tr><td>Target emissions reduction :</td><td>Not available</td></tr></table>	Spatial scale:	Local	2017 – 2019 Update - Moved to measuring ambient PAH as B[a]P at one location (High Santon area), with time resolution now at 3 day composite analysis (averaging period). Measurements and analysis indicate that the coke ovens at Appleby and previously Dawes Lane, are the key sources for this exceedance situation. Emission factors calculated for each plant by reverse modelling methodology (Measure No. 4). DLCO closed in March 16. Coke production has reduced which has impacted emission levels. 2020 Plan British steel will continue to monitor PAH B[a]P at high	Cost:	Unknown, Operator information	Indicator:	Not available	Target emissions reduction :	Not available
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Cost:	Unknown, Operator information												
Indicator:	Not available												
Target emissions reduction :	Not available												

						Santon Farm and review the data with coke oven management and the EA during BS/EA biannual ironworks meeting.
03	Emission measurements; Direct emissions measurements using flameproof blanket fixed over oven doors to create a chimney. Bespoke monitoring to establish improved emission factors.	Permit systems and economic instruments: IED permits	Start: 2007 Expected end: 2008 Status: Complete	Source affected:	Industry including heat and power production	COMPLETED: Analysis indicates that B[a]P emission dominated by door leakage (>98% of total). Emission rates consistent with estimates at other similar plants across Europe
				Spatial scale:	Local	
				Cost:	Unknown, Operator information	
				Indicator:	Not available	
				Target emissions	Not available	

				reduction :		
04	Reverse Dispersion Modelling; To provide an independent estimate of emission rates, based on ambient measurements	Permit systems and economic instruments: IED permits	Start: 2014 Expected end: 2015 Status: Complete	Source affected:	Industry including heat and power production	COMPLETED: Results reasonably consistent with emissions estimates from direct measurements. Indicates that coke ovens are the main source.
				Spatial scale:	Local	
				Cost:	Unknown, Operator information	
				Indicator:	Not available	
				Target emissions reduction :	Not available	

05 NEW	Environment Agency Regulation Annual programme of compliance audits and inspections, with Biannual Iron works meetings with Senior Operations Managers.	Permit systems and economic instruments: IED permits	Start: 2016 Expected end: Ongoing Status: Implementation	Source affected:	Industry including heat and power production	ON-GOING: 2019 Update An annual programme of compliance audits and inspections. Biannual Iron works meetings with Senior Operations Managers, undertaken at British Steel Ltd's Appleby Coke Ovens and Sinter Plant, to assess the company's compliance with their permit. This is including Emission Limits, the application of BAT and to confirm the implementation of the improvement measures described in this document. 2020 Plan Continue with an annual programme of compliance audits and inspections, with Biannual Iron works
				Spatial scale:	Local	
				Cost:	Unknown	
				Indicator:	Reduction in ambient B[a]P concentration	
				Target emissions reduction:	Not available	

						meetings with Senior Operations Managers.
06 NEW	<p>Environment Agency Regulation - permitting</p> <p>The permit was transferred to Jingye Steel (UK) Ltd, latterly renamed British Steel Ltd (company number 12303256) on 9 March 2020.</p> <p>A substantial environmental permitting variation application was submitted on 10 February 2021 and now is duly made.</p> <p>Application reference: EPR/RP3206BE/V004</p>	Permit systems and economic instruments: IED permits	<p>Start: 2021</p> <p>Expected end: 2022</p> <p>Status: Implementation</p>	Source affected:	Industry including heat and power production	<p>NEW:</p> <p>2019 Update</p> <p>Pre-application work but constrained as the company was in liquidation.</p> <p>2020 Plan</p> <p>Pre-application work ongoing. Expected variation application in Q4 2019, however submitted 10 Feb 2021.</p>
				Spatial scale:	Local	
				Cost:	Unknown	
				Indicator:	Reduction in ambient B[a]P concentration	

	<p>Applicant: British Steel Limited</p> <p>Facility: Scunthorpe Integrated Iron & Steel Works</p> <p>The application was duly made as of 28 May 2021. 'Duly made' means that we have all the information we need to start determination. Determination is where we assess and make a decision on your application.</p>			Target emissions reduction:	Not available	As part of the determination, the Agency to review parts of the permit and assess if permit conditions are fit for purpose in regulating PAH and B[a]P emissions and reporting requirements to support measures to prevent and minimise pollution.
Appleby Coke Ovens 01	Replacement of Door seals; Regular door maintenance is necessary to ensure the maintenance of good seals and a programme to overhaul doors on a daily basis is ongoing.	Permit systems and economic instruments: IED permits	Start: 2012 Expected end: Ongoing Status: Implementation	Source affected:	Industry including heat and power production	ON-GOING: 2019 Update - Battery 1 was refurbished during 2019 coming back on line on 01.10.19.
				Spatial scale:	Local	

				<div>Cost:</div> <div>Operator information</div>	Part of the work included refurbishment of all the doors, replacing all 66 frames, tie bars and all pullman valves 2020 Plan ACO to continue to replace and repair doors as and when necessary under the maintenance regime.
				<div>Indicator:</div> <div>Not available</div>	
				<div>Target emissions reduction:</div> <div>Not available</div>	
Appleby Coke Ovens 02	Door extractor adjustments; New door extractor as a trial to increase flexibility in door adjustments. Once the optimum position for each door has been ascertained then sealing each individual door will become easier and more consistent	Permit systems and economic instruments: IED permits	<div>Start:</div> <div>2013</div> <div>Expected end:</div> <div>2018</div> <div>Status:</div> <div>Implementation</div>	<div>Source affected:</div> <div>Industry including heat and power production</div>	2019 Update Carried out major maintenance work on pusher machines. Including structural repairs to No 4 and No 3 pusher and modular changes. 2020 Plan
				<div>Spatial scale:</div> <div>Local</div>	

				Cost:	Operator information	Carry out structural repairs to all 3 pusher long travel bogies.
				Indicator:	Not available	Environment Agency comment: The Alignment projects continue beyond 2018 as a key technique to seal battery doors
				Target emissions reduction:	Not available	
Appleby Coke Ovens 03	Machine alignments; The development of a cross-battery interlock system, using lasers to accurately line up pusher and coke machines, is under consideration.	Permit systems and economic instruments: IED permits	Start: 2015 Expected end: 2018 Status: Implementation	Source affected:	Industry including heat and power production	ON-GOING: Update All pusher hardware and coke car hardware has been completed. Issues to address the guide software is proving difficult to resolve.
				Spatial scale:	Local	
				Cost:	Operator information	Plant are now looking at alternative technology to

				Indicator:	Not available	overcome the current issue.
				Target emissions reduction:	Not available	Environment Agency comment: The Alignment projects continue beyond 2018 as a key technique to seal battery doors
Appleby Coke Ovens 04	Access to carry out door maintenance; There are issues with working at height on the battery bench level to manually plug leaks. Very constrained in meeting Health and Safety requirements as the design is a shallow concrete foundation bench.	Permit systems and economic instruments: IED permits	Start: 2012 Expected end: 2018 Status: Complete	Source affected:	Industry including heat and power production	COMPLETED: EZ line installed of B4. New Heras fencing installed in floors on all batteries to enable safe access.
				Spatial scale:	Local	This issue has now been resolved and will not be progressed further.
				Cost:	Not available	
				Indicator:	Not available	

					Target emissions reduction:	Not available	
Appleby Coke Ovens 05	New Doors and Frames; Where damage to doors and frames is such that repairs cannot be affected in-situ then a programme of replacement is required. Develop a schedule for door and frame replacement as required at Appleby, subject to the outcome of the capital expenditure plan.	Permit systems and economic instruments: IED permits	Start:	2015	Source affected:	Industry including heat and power production	ON-GOING: Included in the PAH / coke oven recovery capital expenditure plan. Recovery plan is ongoing and will continue through 2019/20. 2019 Update: Refurbishment of battery 1 in 2019 complete. Include refurbished doors, new door seals, frames, gas collecting main and services, coke side v rails changed, air and water supply to coke side
			Expected end:	Ongoing			
			Status:	Implementation	Spatial scale:	Local	
					Cost:	Unknown, Operator information	
					Indicator:	Not available	

					Target emissions reduction:	Not available	improved, full new set of tie rods, new coke side bench and all coke side buckstays (structural steelwork) replaced. 2020 Plan: Look to produce and execute plan to refurbish battery 4 during 2021.
Appleby Coke Ovens 06	New inspection hatch door seals; Inspection hatches are provided in the oven top to allow temperature and visual checks to be made. The hatch seals can become degraded owing to repeated movement and require replacement. A programme of replacements is ongoing, 132 seals are to be replaced.	Permit systems and economic instruments: IED permits	Start:	2013	Source affected:	Industry including heat and power production	132 hatches fitted, all COMPLETED.
			Expected end:	2015			
			Status:	Complete			
					Spatial scale:	Local	
					Cost:	Operator information	
					Indicator:	Not available	

				Target emissions reduction:	Not available	
Appleby Coke Ovens 07	Replacement spigot jointing compound; A seal is provided around the ascension pipe spigot to allow emission-free collection of coke oven gas from each oven.	Permit systems and economic instruments: IED permits	Start: 2013	Source affected:	Industry including heat and power production	COMPLETED. The replacement spigot compound is now being used. Although it is not as reliable as the previously used compound (in terms of deterioration), it is better quality, and it is the best available on the market. No further options.
			Expected end: 2014			
			Status: Complete			
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	

Appleby Coke Ovens 08	Pullman valve replacements; A programme of valve replacements, to combat a design issue, is ongoing.	Permit systems and economic instruments: IED permits	Start: 2009 Expected end: Ongoing Status: Implementation	Source affected:	Industry including heat and power production	2019 Update During 2019, 37 pullman valves and 33 Ascension pipes were changed. 2020 Plan Routine maintenance of the Pullman valves is ongoing. This will continue as "Business as Usual". There is no longer a significant issue related to these valves.
				Spatial scale:	Local	
				Cost:	Operation information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Appleby Coke Ovens 09	Tie-rod replacements; Periodical surveys are carried out to inspect tie-rod integrity and a	Permit systems and economic	Start: 2013 Expected end: Ongoing	Source affected:	Industry including heat and	ON-GOING: 2019 Update

	programme of replacement has commenced and is expected to continue until 2015	instrument s: IED permits	Status: Implementation		power production	85 ties rods were changed during 2019
				Spatial scale:	Local	2020 Plan Continue to replace tie rods where necessary for structural stability of the coke ovens/batteries.
				Cost:	Operator Information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Appleby Coke Ovens 10	Repairs to battery refractories; A programme of silica welding and end flue repairs to seal oven wall cracks has begun and is expected to continue throughout the remaining operational lifetime of the coke oven plant	Permit systems and economic instrument s: IED permits	Start: 2013 Expected end: 2024 Status: Implementation	Source affected:	Industry including heat and power production	ON-GOING: 2019 Update Battery 1 - All pusher side-end flue repairs, all coke side-end flue repairs completed
				Spatial scale:	Local	

					Cost:	Operator information.	2020 Plan Business as usual maintenance ongoing on all other batteries.
					Indicator:	Not available	
					Target emissions reduction:	Not available	
Appleby Coke Ovens 11	Replacement of battery refractories; Where repairs to battery refractories are ineffectual or not practically possible, and where the continued operation of the oven will cause excessive emissions, the oven in question is taken out of operation, minimising pollution.	Permit systems and economic instruments: IED permits	Start:	2013	Source affected:	Industry including heat and power production	ON-GOING: 2019 Update 128 silica welding repairs have been made to oven walls. 2020 Plan Business as usual maintenance ongoing on all other batteries.
			Expected end:	2024			
			Status:	Implementation	Spatial scale:	Local	
					Cost:	Subject to Capital plan proposal	

				Indicator:	Not available	
				Target emissions reduction:	Not available	
Appleby Coke Ovens 12	Pressure stabilisation system; A linkage pipe has been placed on either side of the gas booster station, providing a pressure feedback loop.	Permit systems and economic instruments: IED permits	Start: 2012 Expected end: 2013 Status: Complete	Source affected:	Industry including heat and power production	COMPLETED.
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	

				Target emissions reduction:	Not available	
Appleby Coke Ovens 13	New Gas Holder to improve pressure control. Beneficial effects in reducing pressure fluctuations and hence emissions from the batteries caused by high positive pressure.	Permit systems and economic instruments: IED permits	Start: 2015 Expected end: 2017 Status: Complete	Source affected: Spatial scale: Cost: Indicator: Target emissions reduction:	Industry including heat and power production Local Operator Information Not available Not available	COMPLETED. The new gas holder was commissioned in September 2018.

Appleby Coke Ovens 14	Underfiring Changeover Timings; Reversal of the heating cycle in the coke ovens at Appleby and Dawes Lane now timed not to coincide	Permit systems and economic instruments: IED permits	Start: 2013 Expected end: 2013 Status: Complete	Source affected:	Industry including heat and power production	COMPLETED.
				Spatial scale:	Local	
				Cost:	Not available	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Appleby Coke Ovens 15	Benzole plant replacement. This will minimise pressure increase at the batteries,	Permit systems and economic	Start: 2014 Expected end: 2017	Source affected:	Industry including heat and	COMPLETED The new benzole plant was successfully

	and secondly, prevent naphthalene in burner flues which leads to cold spots on oven walls, and eventual refractory damage caused by inconsistent heating.	instrument s: IED permits	Status: Complete		power production	commissioned in 2017 and is now running a stable operation.
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Appleby Coke Ovens 16	Coke machine 'inching' facility; The facility to 'inch' the position of the machines will allow better alignment and less damage to the battery metalwork and fabric	Permit systems and economic instrument s: IED permits	Start: 2015 Expected end: 2016 Status: Complete	Source affected:	Industry including heat and power production	COMPLETED. New operator panels fitted to all three pushing machines. Systems fitted to four of the six machines.
				Spatial scale:	Local	Trial unsuccessful on pusher machines,

					Cost:	Operator information	implemented on all 3 guide machines in use.
					Indicator:	Not available	
					Target emissions reduction:	Not available	
Appleby Coke Ovens 17	Automated leveller control; An automated leveller control system is currently being considered as part of a management of change exercise.	Permit systems and economic instruments: IED permits	Start: 2015 Expected end: 2018 Status: Planning		Source affected:	Industry including heat and power production	2019 Update See action Appleby Coke Ovens 03. This work will follow interlock system installation, which will be progressed over the coming years.
					Spatial scale:	Local	
					Cost:	Not available	

				Indicator:	Not available	
				Target emissions reduction:	Not available	
Appleby Coke Ovens 18	A new 'venting lid' has been developed to allow burn off of carbon deposits. The build-up of carbon deposits on the roof of the oven can also cause pressure issues within the oven by blocking the free passage of coke oven gas leading to door / tops leakage.	Permit systems and economic instruments: IED permits	Start: 2013 Expected end: 2013 Status: Complete	Source affected:	Industry including heat and power production	COMPLETED.
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	

				Target emissions reduction:	Not available	
Appleby Coke Ovens 19	Primary cooler replacement; When primary coolers are not effective, the pressure of the by-products plant is increased, and this is translated to the batteries and door / tops leakage.	Permit systems and economic instruments: IED permits	Start: 2013	Source affected:	Industry including heat and power production	ON-GOING: 2019 Update During 2019 British Steel went into liquidation and these projects were put on hold. 2020 Plan: Complete the refurbishment of No2 primary cooler and No3 saturator. Replacement of benzole storage tank. .
			Expected end: 2019			
			Status: Implementation			
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	

Appleby Coke Ovens 20	Heating system checks; The original analysis of waste gas emissions from individual oven flues was completed. This was to provide information on the operation of each individual oven in terms of heating uniformity and emissions. No benefit from the trial and engaged an external company.	Permit systems and economic instruments: IED permits	Start:	2013	Source affected:	Industry including heat and power production	COMPLETED. External consultants have completed a heating survey since the initial trials. Additional resources put in place to carry out the recommendations of this survey. Reviewed 6 monthly. This is now business as usual.
			Expected end:	Ongoing	Spatial scale:	Local	
			Status:	Complete	Cost:	Not available	
					Indicator:	Not available	
					Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 01	Closure of Dawes Lane Coke Ovens	Permit systems and economic	Start:	2016	Source affected:	Industry including heat and	Dawes Lane Coke Ovens closed 8 March 2016
			Expected end:	2016			

		instrument s: other	Status: Complete		power production	
				Spatial scale:	Local	
				Cost:		
				Indicator:		
				Target emissions reduction:		
Sinter Plant 01 New	Installation of a fabric bag filter plant	Permit systems and economic instrument s: other	Start: 2020 Expected end: 2023 Status: Planning	Source affected:	Industry including heat and power production	2020 Plan: The environmental permit issued to British Steel's Scunthorpe Works includes an emission limit of 40 mg/Nm ³ in respect of the daily average concentration of particulate matter from the
				Spatial scale:	Local	

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Cost:	Not available	main stack at the sinter plant. This limit came into force on 8th March 2016 but although schemes to improve the performance of the abatement plant (electrostatic precipitators) have been undertaken, it has not been possible to consistently achieve the limit. As a result, British Steel has now committed to the installation of a fabric filter. The fabric filter will not be commissioned until 2023 and in the interim a temporary increase in the emission limit value (ELV) for dust is requested (by permit variation) to return to the previous IPPC permit limit 115 mg/Nm ³ . Because the ELV is already at the top of the range of relevant BAT-associated emission levels (BAT-AELs), increasing it has required
Indicator:	Not available	
Target emissions reduction:	Not available	

						a formal derogation under Article 15(4) of the Industrial Emissions Directive as part of Measure 06 Permitting.
Sinter Plant 02 New	Review B[a]P emissions, post installation of bag filter, to assess the new abatement system's effect on reducing the emissions of B[a]P	Permit systems and economic instruments: other	Start: 2023 Expected end: 2024 Status: Planning	Source affected:	Industry including heat and power production	2020 Plan: Use of the pre-installed lignite injection system is a contingency should failings in air ingress management lead to an increase in dioxin/furans formation at concentrations that would require this additional measure to be taken. However, in combination with a bag filter, this may also reduce B[a]P emissions. British Steel will review the B[a]P emissions data post commissioning of the bag filter system to determine the mass contribution of B[a]P emissions from the sinter plant.
				Spatial scale:	Local	
				Cost:	Not available	
				Indicator:	Not available	
				Target emissions reduction:	Not available	