Department for Environment Food & Rural Affairs

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Report on measures for 2013 exceedance of the Target Value for B[a]P in Yorkshire and Humberside non-agglomeration zone (UK0034)

November 2015

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1. Introduction

1.1 Context

Under the EU Directive 2004/107/EC[1], the target value for B[a]P is an annual mean concentration of 1 nanogram (one billionth of a gram (10^{-9})) per cubic metre (m^{-3}) of ambient air or lower. The Directive requires that all reasonable measures that do not entail disproportionate cost should be put in place taken to ensure this target is not exceeded. This is the report on measures required for exceedances of the target value for B[a]P within the Yorkshire & Humberside zone (UK0034) identified within the 2013 UK air quality assessment.

1.2 Status of zone

Exceedances within this zone were identified on the basis of measurement data, with model results on a 1 km x 1 km grid resolution providing supplementary information. This exceedance was reported via e-Reporting dataflow G[2] on attainment and Air Pollution in the UK[3].

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 2013 and associated population for zone UK0034

Zone code	Zone Name	Area exceeding TV (km^2)	Population exceeding TV
UK0034	Yorkshire & Humberside	10	5776

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.

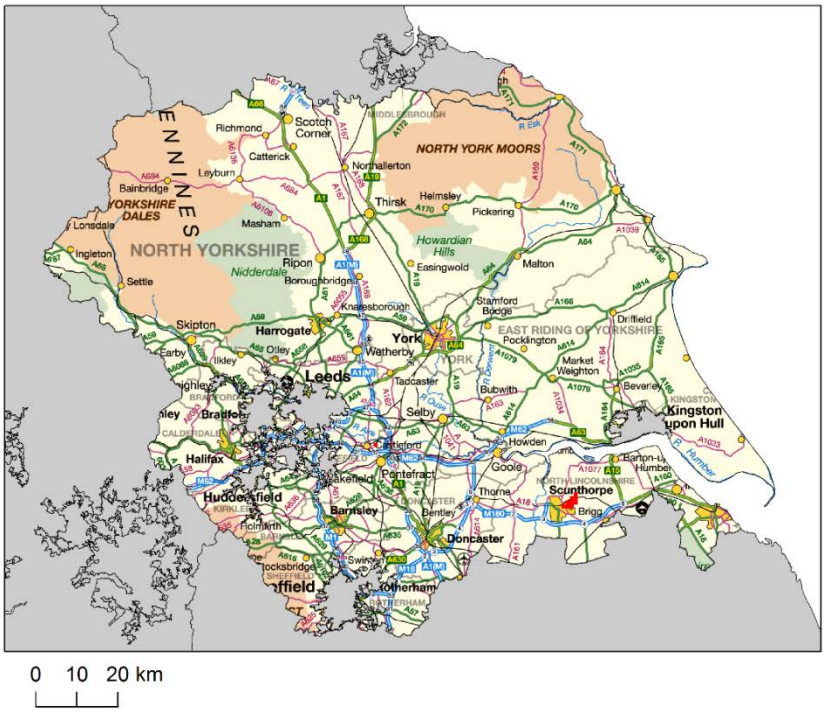
[1] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:023:0003:0016:EN:PDF

[2] http://cdr.eionet.europa.eu/gb/eu/aqd

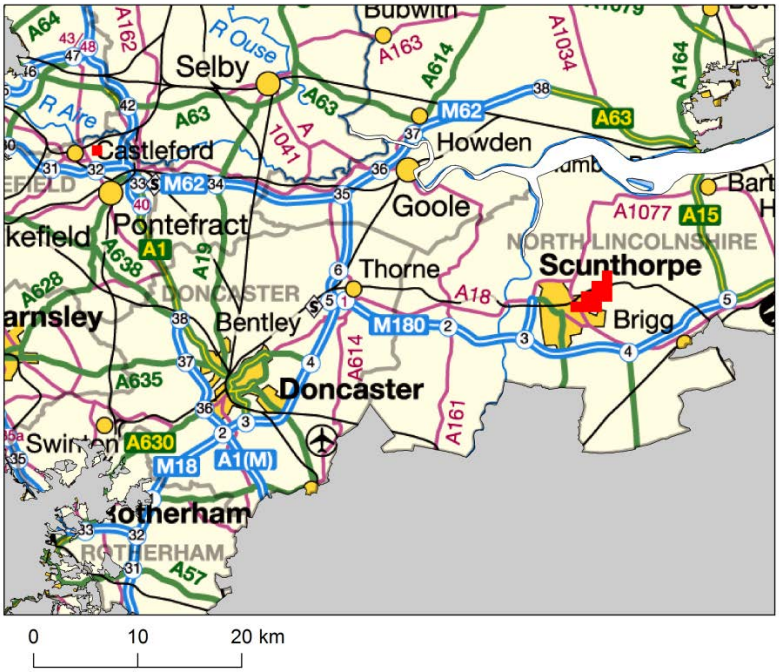
[3] http://uk-air.defra.gov.uk/library/annualreport/index

Figure 1. Location of exceedance of the B[a]P target value in 2013 within the zone UK0034 Yorkshire & Humberside. 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 two distinct exceedance situations within this zone

- Yorkshire and Humberside [B[a]P_UK0034_2013_1] related to industrial emissions (area of exceedance 9 km^2)
- Yorkshire and Humberside [B[a]P_UK0034_2013_2] related to domestic emissions (area of exceedance 1 km^2)

This report has a section for each exceedance situation in the zone. Each section includes a description of the exceedance situation, including maps, information on source apportionment and a list of measures already taken or to be taken. Information on measures is reported within e-Reporting dataflow K[4].

2 Exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2013_1] related to industrial emissions

2.1 Description of exceedance

This exceedance situation is an area of exceedance 9 km^2 to the north east of Scunthorpe in Lincolnshire. The resident population associated with this exceedance situation is 1,805, the majority (1,701) being in the grid square numbered exceeding grid square 7 below, 490500, 410500, which is the exceedance square in the south west of the exceedance situation. It is highlighted as a white square in Figure 2 below. Several of the grid squares have no resident population and are largely or wholly within the Longs Steel UK Ltd steelworks industrial complex area.

Table 2 lists the measured exceedances of the target value for B[a]P associated with this exceedance situation.

Table 2 Exceedances of the target for B[a]P in exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2013_1]

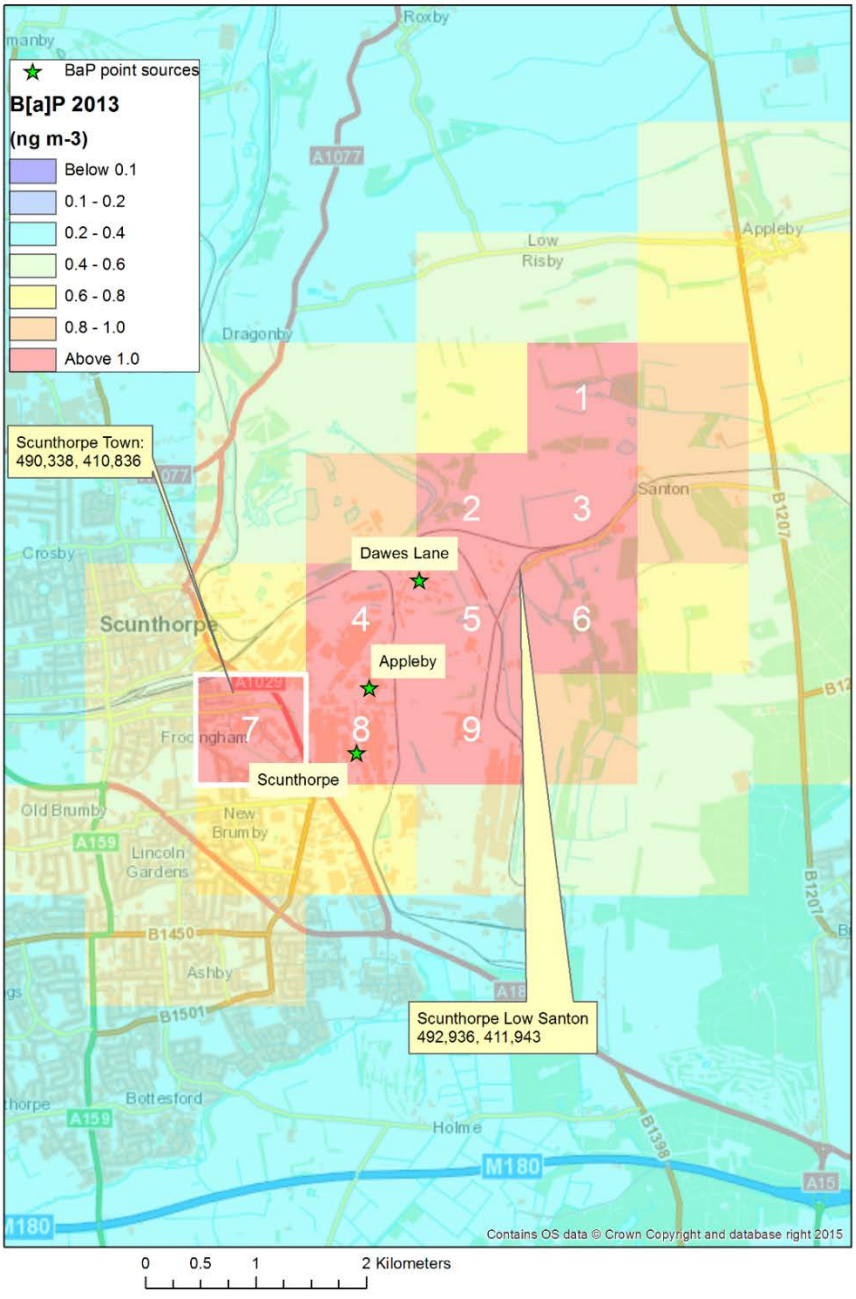
Station (EoI code)	Annual mean concentration (ngm^{-3}) in 2013	Data capture (%)
Scunthorpe Low Santon (GB1004A)	3.4	100
Scunthorpe Town (GB0841A)	3.9	98.1

Figure 2 shows the location of the exceedance situation in detail. This map also shows the locations of the monitoring sites associated with the exceedance situation and the locations of the key industrial sources. The exceeding grid squares within this exceedance situation are numbered and

[4] http://cdr.eionet.europa.eu/gb/eu/aqd

the numbers correspond to those in subsequent tables. Grid squares 1, 2 and 6 have no resident population and are not part of the steelworks industrial complex area. Grid squares 3 and 7 are largely outside of the steelworks industrial complex area and have resident populations of 97 and 1,701 respectively. Grid squares 4 and 9 have no resident population and are wholly within the steelworks industrial complex area. Grid square 5 is largely within the steelworks industrial complex area and have a resident population of 8. Grid square 8 has no resident population is largely within the steelworks industrial complex area.

Figure 2 Exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2013_1] . Exceeding grid squares are marked red. Locations of coke works at Appleby and Dawes Lane and sinter plant at Scunthorpe are also shown.



2.2 Source apportionment

Table 3 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 final 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 4 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 and Dawes Lane are the main sources associated with this exceedance situation, with the relative proportions from these two sources varying by each grid square.

Table 3. Source apportionment for exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2013_1]. Annual mean B[a]P concentration (ngm^{-3})

Grid square number	OS easting (m)	OS Northing (m)	Zone	Regional background: Total	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	Local increment: Total	Local increment: Industry including heat and power production	Total for all emission sources
1	493500	413500	34	n/a	0.115	0.001	0.010	0.045	0.000	0.002	0.056	1.023	1.023	1.1
2	492500	412500	34	n/a	0.109	0.002	0.011	0.043	0.000	0.003	0.051	3.080	3.080	3.2
3	493500	412500	34	n/a	0.115	0.002	0.011	0.046	0.000	0.002	0.054	1.509	1.509	1.6
4	491500	411500	34	n/a	0.089	0.002	0.012	0.035	0.000	0.005	0.035	3.131	3.131	3.2
5	492500	411500	34	n/a	0.083	0.002	0.011	0.033	0.000	0.003	0.035	4.025	4.025	4.1
6	493500	411500	34	n/a	0.108	0.002	0.011	0.041	0.000	0.002	0.053	1.142	1.142	1.3
7	490500	410500	34	n/a	0.115	0.005	0.012	0.046	0.000	0.010	0.043	0.989	0.989	1.1
8	491500	410500	34	n/a	0.092	0.003	0.013	0.037	0.000	0.004	0.036	2.431	2.431	2.5
9	492500	410500	34	n/a	0.084	0.002	0.011	0.033	0.000	0.002	0.035	1.189	1.189	1.3

Table 4. Detailed source apportionment for industrial sources only for exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2013_1]. Annual mean B[a]P concentration (ngm^{-3})

Grid square number		OS easting (m)	OS Northing (m)	Zone	Appleby coke ovens	Dawes Lane coke ovens	Scunthorpe sinter plant	Local increment: Industry including heat and power production
1		493500	413500	34	0.356	0.615	0.053	1.023
2		492500	412500	34	0.700	2.320	0.059	3.080
3		493500	412500	34	0.616	0.829	0.064	1.509
4		491500	411500	34	1.524	1.586	0.022	3.131
5		492500	411500	34	2.046	1.909	0.070	4.025
6		493500	411500	34	0.567	0.516	0.060	1.142
7		490500	410500	34	0.697	0.283	0.009	0.989
8		491500	410500	34	2.021	0.411	0.000	2.431
9		492500	410500	34	0.903	0.256	0.031	1.189

2.3 Measures

The main overview report contains more information on how industrial sites are regulated. There are no specific Best Available Techniques (BAT) conclusions designed to reduce B[a]P under the Industrial Emissions Directive (EU Directive 2010/75/EU). However, there are some narrative and specific BAT Conclusions to minimise particulate emissions, indirectly reducing B[a]P emissions. Permit conditions transposing these into the forthcoming IED permit will focus on the coke ovens and sinter plant which are the main sources of this pollutant. BAT Reference Document (BREF)[5] contains stringent requirements for iron and steel works to significantly reduce their fugitive emissions, including Polycyclic Aromatic Hydrocarbons (PAH) (B[a]P is a pollutant from this chemical group).

The Environment Agency is currently conducting a review of the permit at the Longs Steel UK Ltd installation. It is doing this against the BAT conclusions contained in the revised Steel and Iron BREF that was published in March 2012. In addition, the owners of the steelworks announced in October 2015 their intention to close down the coke ovens at Dawes Lane. Once the changes announced by the steelworks owners and the review of this permit are concluded, further actions and timescales, in addition to those described below, will be included in future years' reporting on measures.

A table of measures that are being taken or are to be taken (some subject to the outcome of the review of the permit conditions or affected by the announced closure of the Dawes Lane coke ovens)

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

are set out in table 5. A PAH improvement plan was also formally adopted by the steelworks in March 2013 and measures contained within this plan are included in Table 5.

Table 5. Table of measures taken or to be taken at Scunthorpe industrial site

Measure code	Description	Classification	Implementation dates	Other information		Comment
1	Polycyclic Aromatic Hydrocarbon (PAH) Improvement Plan; The operator shall submit a written plan, to the Environment Agency (the regulator) for approval, of the measures to be taken to minimise PAH emissions (IARC Group 1, 2a & 2b), particularly the marker PAH; Benzo [a] Pyrene (B[a]P) and Volatile Organic Compounds as fugitive releases from existing Appleby and Dawes Lane coke oven battery plants	Permit systems and economic instruments: IPPC permits	Start: 2012 Expected end: 2024 Status: Implementation	Source affected: Spatial scale: Cost: Indicator: Target emissions reduction:	Industry including heat and power production Local Unknown, Operator information Reduction in ambient B[a]P concentration Not available	An improvement condition on the Scunthorpe site permit BL3838IW V007 9 May 2012. The measures described in column 1 of this table (Measure codes); Appleby Coke Ovens 1 -20 and Dawes Lane 1-11 are from the PAH improvement Plan. This PAH Improvement Plan forms part of a wider Coke Oven Battery Recovery Project.
2	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 locations, using pollution rose analysis to identify key sources. Emission factors to be calculated.	Permit systems and economic instruments: IPPC permits	Start: 2012 Expected end: None Status: Implementation	Source affected: Spatial scale: Cost: Indicator: Target emissions reduction:	Industry including heat and power production Local Unknown, Operator information Not available Not available	Measurements and analysis indicate that the coke ovens at Appleby and Dawes Lane are the key sources for this exceedance situation. Emission factors calculated for each plant by reverse modelling methodology (Measure No. 4).
3	Emission measurements; Direct emissions measurements using	Permit systems and economic instruments:	Start: 2007 Expected end: 2008	Source affected:	Industry including heat and power	COMPLETED: Analysis indicates that B[a]P emission dominated by

	flameproof blanket fixed over oven doors to create a chimney. Bespoke monitoring to establish improved emission factors.	IPPC permits	Status:	Implementation		production	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 reduction:	Not available	
4	Reverse Dispersion Modelling; To provide an independent estimate of emission rates, based on ambient measurements	Permit systems and economic instruments: IPPC permits	Start: Expected end: Status:	2014 2015 Implementation	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	
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: IPPC permits	Start: Expected end: Status:	2012 Ongoing Implementation	Source affected:	Industry including heat and power production	20 seals changed on No.1/2 batteries, 33 seals changed on No.3/4 batteries. Along with seal changes, 158 doors were repaired and 1 frame has been replaced
					Spatial scale:	Local	
					Cost:	Operator information	
					Indicator:	Not available	
					Target emissions reduction:	Not available	

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: IPPC permits	Start: Expected end: Status:	2013 2016 Implementation	Source affected: Spatial scale: Cost: Indicator: Target emissions reduction:	Industry including heat and power production Local Operator information Not available Not available	New door extractor fitted to 1 Pusher and successful in removing play in seal alignment. Order being progressed for a further two complete extractors assembles for No. 3 and No. 4 Pusher Machines.
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: IPPC permits	Start: Expected end: Status:	2015 2016 Planning	Source affected: Spatial scale: Cost: Indicator: Target emissions reduction:	Industry including heat and power production Local Operator information Not available Not available	Trial complete based on other coke plant system. Scheme is developed, interlock to implement and capital expenditure plan approved. To complete by end 2016.
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: IPPC permits	Start: Expected end: Status:	2012 2016 Implementation	Source affected: Spatial scale: Cost: Indicator: Target emissions reduction:	Industry including heat and power production Local Not available Not available Not available	4 new EZ bonding lines in place. These will allow for quicker access. Trial of new bench handrail not a success. An alternative option and design developed to implement on the Pusher side; a lanyard and running rail system.

Appleby Coke Ovens 05	New Doors and Frames; Where damage to doors and frames is such that repairs cannot be effected 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: IPPC permits	Start: 2015 Expected end: 2024 Status: Planning	Source affected:	Industry including heat and power production	Included in the PAH / coke oven recovery capital expenditure plan. Subject to capital plan.
				Spatial scale:	Local	
				Cost:	Unknown, Operator information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
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: IPPC permits	Start: 2013 Expected end: 2015 Status: Implementation	Source affected:	Industry including heat and power production	132 hatches fitted , all COMPLETED.
				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: IPPC permits	Start: 2013 Expected end: 2014 Status: Implementation	Source affected:	Industry including heat and power production	The replacement spigot compound is now being used. Although it is not as reliable (in terms of deterioration) as the compound used in the past, it is better quality than the previously used compound and it is the best available on the market. No further
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	

				Target emissions reduction:	Not available	options. Action COMPLETED.
Appleby Coke Ovens 08	Pullman valve replacements; A programme of valve replacements, to combat a design issue, is ongoing.	Permit systems and economic instruments: IPPC permits	Start: 2009 Expected end: 2015 Status: Implementation	Source affected:	Industry including heat and power production	No, 88, 131, 59 & 46 Pullman Valves replaced this period (Q1 2015). Ongoing replacement.
				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 programme of replacement has commenced and is expected to continue until 2015	Permit systems and economic instruments: IPPC permits	Start: 2013 Expected end: Ongoing Status: Implementation	Source affected:	Industry including heat and power production	Tie rod surveys, maintenance and subsequent replacements are carried out on a regular frequency throughout the year.
				Spatial scale:	Local	
				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 instruments: IPPC permits	Start: 2013 Expected end: 2024 Status: Implementation	Source affected:	Industry including heat and power production	This is part of the Battery Recovery Programme and PAH capital expenditure plans. Ongoing.
				Spatial scale:	Local	
				Cost:	Operator information.	
				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: IPPC permits	Start: 2013 Expected end: 2024 Status: Planning	Source affected:	Industry including heat and power production	A significant Battery Recovery Programme has initiated during 2014 and subject to a capital plan proposal put forward. Mainly end wall and flue repairs.
				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: IPPC permits	Start: 2012 Expected end: 2013 Status: Implementation	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: IPPC permits	Start: 2015 Expected end: 2017 Status: Planning	Source affected:	Industry including heat and power production	A scheme to demolish and clear the obsolete gas holder site has been completed. A further capital expenditure scheme for the construction is
				Spatial scale:	Local	
				Cost:	Operator Information	

				Indicator:	Not available	being developed.
				Target emissions reduction:	Not available	
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: IPPC permits	Start: 2013 Expected end: 2013 Status: Implementation	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	New benzole plant; The benzole plant will be replaced. This will minimise pressure increase at the batteries, and secondly, the prevent naphthalene in burner flues and leading to cold spots on oven walls, and eventual refractory damage caused by inconsistent heating.	Permit systems and economic instruments: IPPC permits	Start: 2014 Expected end: 2016 Status: Implementation	Source affected:	Industry including heat and power production	Capital plan approved in 2014. Project is progressing well. Excavations and work on base completed. Construction well underway.
				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 instruments: IPPC permits	Start: 2015 Expected end: 2016 Status: Implementation	Source affected:	Industry including heat and power production	New operator panels fitted to all three pushing machines. Systems fitted to four of the six machines.
				Spatial scale:	Local	
				Cost:	Operator information	

				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: IPPC permits	Start: 2015 Expected end: 2018 Status: Planning	Source affected:	Industry including heat and power production	Semi-auto system to be trialled and results of trial ongoing. Can only be fully automated with PLC controls, which is not possible at this time.
				Spatial scale:	Local	
				Cost:	Not available	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Appleby Coke Ovens 18	New venting lids; 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: IPPC permits	Start: 2013 Expected end: 2013 Status: Implementation	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: IPPC permits	Start: 2013 Expected end: 2016 Status: Implementation	Source affected:	Industry including heat and power production	All coolers have been replaced in recent years on the by-product plants. COMPLETED.
				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 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: IPPC permits	Start: 2013 Expected end: 2024 Status: Implementation	Source affected:	Industry including heat and power production	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.
				Spatial scale:	Local	
				Cost:	Not available	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane 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: IPPC permits	Start: 2012 Expected end: ongoing Status: Implementation	Source affected:	Industry including heat and power production	The number of seals replaced between April and September 2015 is about 54; some door seals are replaced when needed.
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 02	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: IPPC permits	Start: 2015 Expected end: 2017 Status: Planning	Source affected:	Industry including heat and power production	Subject to successful implementation at Appleby coke ovens. Subject to funding for Dawes Lane coke ovens and capital plan.
				Spatial scale:	Local	
				Cost:	Unknown, Operator info	

				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 03	New Doors and Frames; Where damage to doors and frames is such that repairs cannot be effected in-situ then a programme of replacement is required. Develop a schedule for door and frame replacement as required at Dawes Lane, subject to the outcome of the capital expenditure plan.	Permit systems and economic instruments: IPPC permits	Start: 2013 Expected end: 2024 Status: Implementation	Source affected:	Industry including heat and power production	Number of buckstays and frames changed; in the order of 26 frames and buckstays steelwork fitted during 2015, Jan to September representing substantial resources to implement measure.
				Spatial scale:	Local	
				Cost:	Subject to capital plan	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 04	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: IPPC permits	Start: 2013 Expected end: 2014 Status: Implementation	Source affected:	Industry including heat and power production	The replacement spigot compound is now being used. Although it is not as reliable (in terms of deterioration) as the compound used in the past, it is better quality than the previously used compound and it is the best available on the market. No further options. Action COMPLETED.
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 05	Repairs to battery fabric; Good metalwork integrity is crucial in maintaining the structure of the battery, ensuring that oven walls are not allowed to move	Permit systems and economic instruments: IPPC permits	Start: 2012 Expected end: 2024 Status: Implementation	Source affected:	Industry including heat and power production	This is part of the Battery Recovery Programme and PAH capital expenditure plans.
				Spatial scale:	Local	

	and that filling and pushing of the ovens is done in a consistent manner			Cost:	Operator information	Ongoing.
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 06	Tie Rod Replacements; Periodical surveys are carried out to inspect tie rod integrity and a programme of replacement has commenced and is expected to continue until 2015	Permit systems and economic instruments: IPPC permits	Start: 2012 Expected end: 2015 Status: Implementation	Source affected:	Industry including heat and power production	Tie rod surveys, maintenance and subsequent replacements are carried out on a regular frequency throughout the year.
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 07	Repairs to battery refractories; Work to repair the battery top paving at Dawes Lane commenced in 2011. Focus moved to battery fabric improvements and end wall rebuilds.	Permit systems and economic instruments: IPPC permits	Start: 2011 Expected end: 2024 Status: Implementation	Source affected:	Industry including heat and power production	This is part of the Battery Recovery Programme and PAH capital expenditure plans. Ongoing.
				Spatial scale:	Local	
				Cost:	Operator information	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 08	Replacement of battery refractories; Where repairs to battery refractories are ineffectual or not practically	Permit systems and economic instruments: IPPC permits	Start: 2013 Expected end: 2024 Status: Other	Source affected:	Industry including heat and power production	A significant Battery Recovery Programme has initiated during 2014 and subject to a

	possible, and where the continued operation of the oven will cause excessive emissions, the oven in question is taken out of operation minimising pollution.			Spatial scale:	Local	capital plan proposal put forward. Mainly end wall and flue repairs.
				Cost:	Subject to Capital plan proposal	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 09	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: IPPC permits	Start: 2013 Expected end: 2013 Status: Implementation	Source affected:	Industry including heat and power production	COMPLETED.
				Spatial scale:	Local	
				Cost:	Not available	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 10	New venting lids; 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: IPPC permits	Start: 2013 Expected end: 2013 Status: Implementation	Source affected:	Industry including heat and power production	COMPLETED.
				Spatial scale:	Local	
				Cost:	Not available	
				Indicator:	Not available	
				Target emissions reduction:	Not available	
Dawes Lane Coke Ovens 11	Heating system inspection and assessment carried out by external consultant. The	Permit systems and economic instruments:	Start: 2013 Expected end: 2024	Source affected:	Industry including heat and power	External consultants have completed a heating survey and

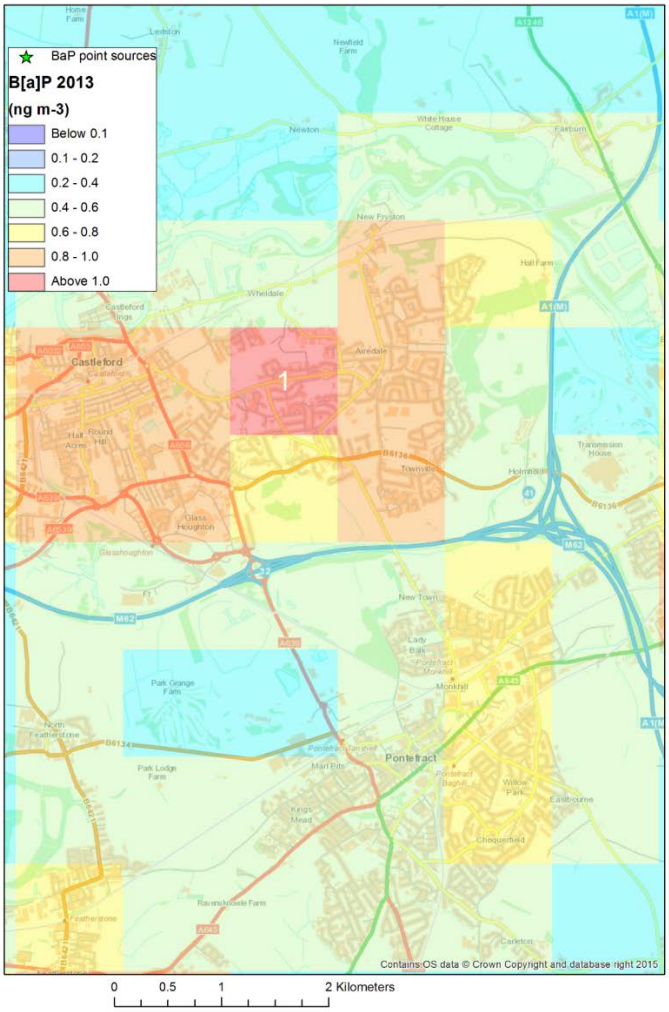
	original analysis of waste gas emissions from individual oven flues was completed. This was to provide information on the operation of each individual oven in terms of heating uniformity and emissions. No benefit from the trial and engaged an external company.	IPPC permits	Status: Implementation		production	report. Meetings have taken place to discuss, plan and carry out the recommendations of this survey. Reviewed 6 monthly.
				Spatial scale:	Local	
				Cost:	Not available	
				Indicator:	Not available	
				Target emissions reduction:	Not available	

3 Exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2013_2] related to domestic emissions

3.1 Description of exceedance

This exceedance situation is area of exceedance 1 km^2 in Castleford in West Yorkshire. The resident population is 3,971. There are no measured concentrations associated with this exceedance situation. Figure 3 shows the location of the exceedance situation in detail.

Figure 3 Exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2013_2]. Exceeding grid squares are marked red.



3.2 Source apportionment

Table 6 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 commercial and residential sources. The final 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. Detailed source apportionment analysis shows that domestic coal and domestic wood combustion are the main sources contributing. More information regarding this is provided below in the Measures section.

3.3 Measures

The town of Castleford is covered by the unitary authority of Wakefield Council. The area identified in the compliance report Air Pollution in the UK 2013as showing an exceedance is covered by a smoke control area (SCA). As set out in the B[a]P overview report (section 3.1), SCAs are designated as such by local authorities under the Clean Air Act (1993) and within these areas it is an offence to burn unauthorised fuels unless using an appliance that has been legally exempted for use with these fuels within an SCA. These appliances have been tested to show that they emit none or very little smoke. Those found in breach of SCA requirements can face financial criminal penalties, the level of these fines can vary depending on the extent and length of the breach.

Details of the Castleford SCA are available on Wakefield Council's web site[6][7]. This SCA was not included in the emission inventory that was used in the model that was used for the assessment of compliance in 2013. However, as part of the improvements indicated in the B[a]P overview report (section 3.1, improvements to modelling), this SCA will form part of the assessment in future years. As such a measure is already in place that mitigates the emissions of B[a]P from domestic coal and wood burning in this area and compliance reporting in future years will be expected to show no exceedance in this area. Revised information on smoke control within Wakefield Council was incorporated in the emission inventory used for the compliance assessment modelling for 2014 that was reported in September 2015. This assessment did not show any exceedance in Castleford.

[6] http://www.wakefield.gov.uk/residents/bins-and-environment/environmental-health/pollution/air-pollution

[7] http://data.gov.uk/data/map-preview?url=http%3A%2F%2Finspire.misoportal.com%2Fgeoserver%2Fwakefield_metropolitan_district_council_smoke_control_zones_polygon%2Fwms%3Frequest%3DgetCapabilities&n=53.74308628&w=-1.62614719&e=-1.19816909&s=53.

Table 6. Source apportionment for exceedance situation Yorkshire and Humberside [B[a]P_UK0034_2013_2]. Annual mean B[a]P concentration (ngm^{-3})

Grid square number	OS easting (m)	OS Northing (m)	Zone	Regional background: Total	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	Local increment: Total	Local increment: Industry including heat and power production	Total for all emission sources
1	444500	425500	34	n/a	1.075	0.007	0.011	1.000	0.000	0.003	0.055	0.002	0.002	1.1