



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 Teesside Urban Area agglomeration zone (UK0013)

November 2015

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1. Introduction

1.1 Context

Under the EU Directive 2004/107/EC¹, 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 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 Teesside Urban Area zone (UK0013) identified within the 2013 UK air quality assessment.

1.2 Status of zone

Exceedances within this zone were identified on the basis of model results on a 1 km x 1 km grid resolution providing supplementary information for the assessment in addition to the results from fixed monitoring stations. This exceedance was reported via e-Reporting dataflow G² on attainment and Air Pollution in the UK³.

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 Teesside urban Area zone UK0013

Zone code	Zone Name	Area exceeding TV (km^2)	Population exceeding TV
UK0013	Teesside Urban Area	4	0

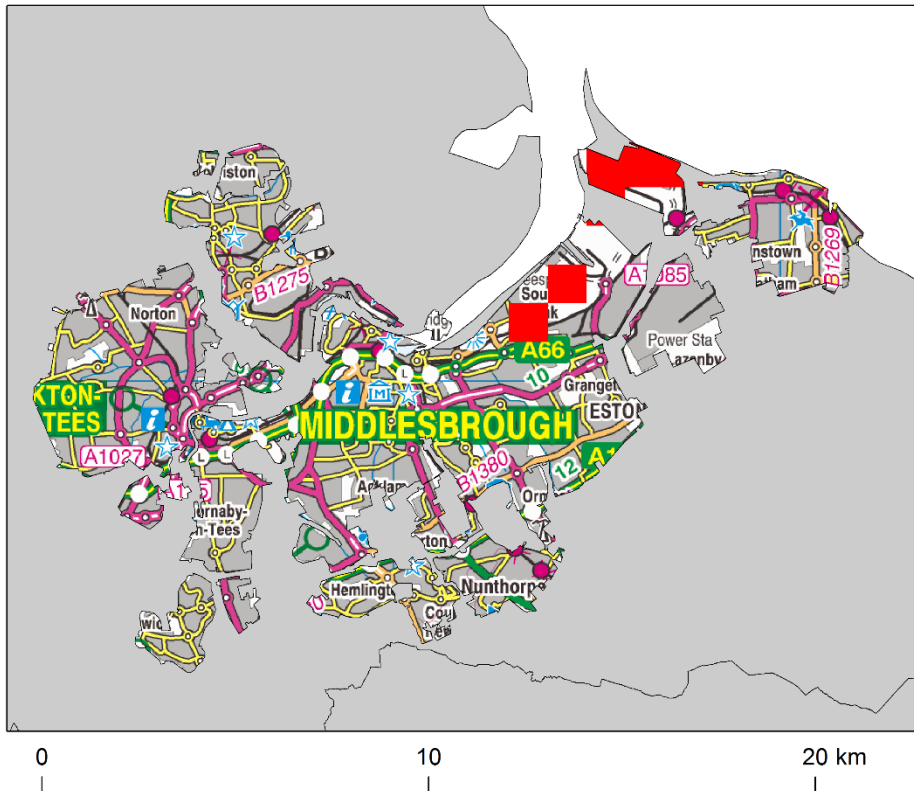
Figure 1 shows the locations of the exceedances in the context of the zone as a whole.

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 Teesside Urban Area zone UK0013. Exceeding grid squares are marked red.



An initial source apportionment was carried out and this analysis has identified a single exceedance situation in this zone related to two industrial locations (see section 2 below):

- Teesside Urban Area [B[a]P_UK0013_2013_1] related to industrial emissions (area of exceedance 4 km²)

This report 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 K⁴.

⁴ <http://cdr.eionet.europa.eu/gb/eu/aqd>

2 Exceedance situation Teesside Urban Area [B[a]P_UK0013_2013_1] related to industrial emissions

2.1 Description of exceedance

This exceedance situation has an area of exceedance of 4 km². Two of the grid squares are close to Redcar and two are close to South Bank in Redcar and Cleveland. There is no resident population in any of the grid squares. Most of the grid squares are largely or wholly within the “SSI Redcar” steelworks industrial complex area. Shops, other businesses and a railway station are, however, present in the grid square located at 453500, 521500 at South Bank. This grid square is numbered as exceeding grid square 4 below. This exceedance situation is adjacent to and shares common sources with the exceedance situation North East [B[a]P_UK0036_2013_1].

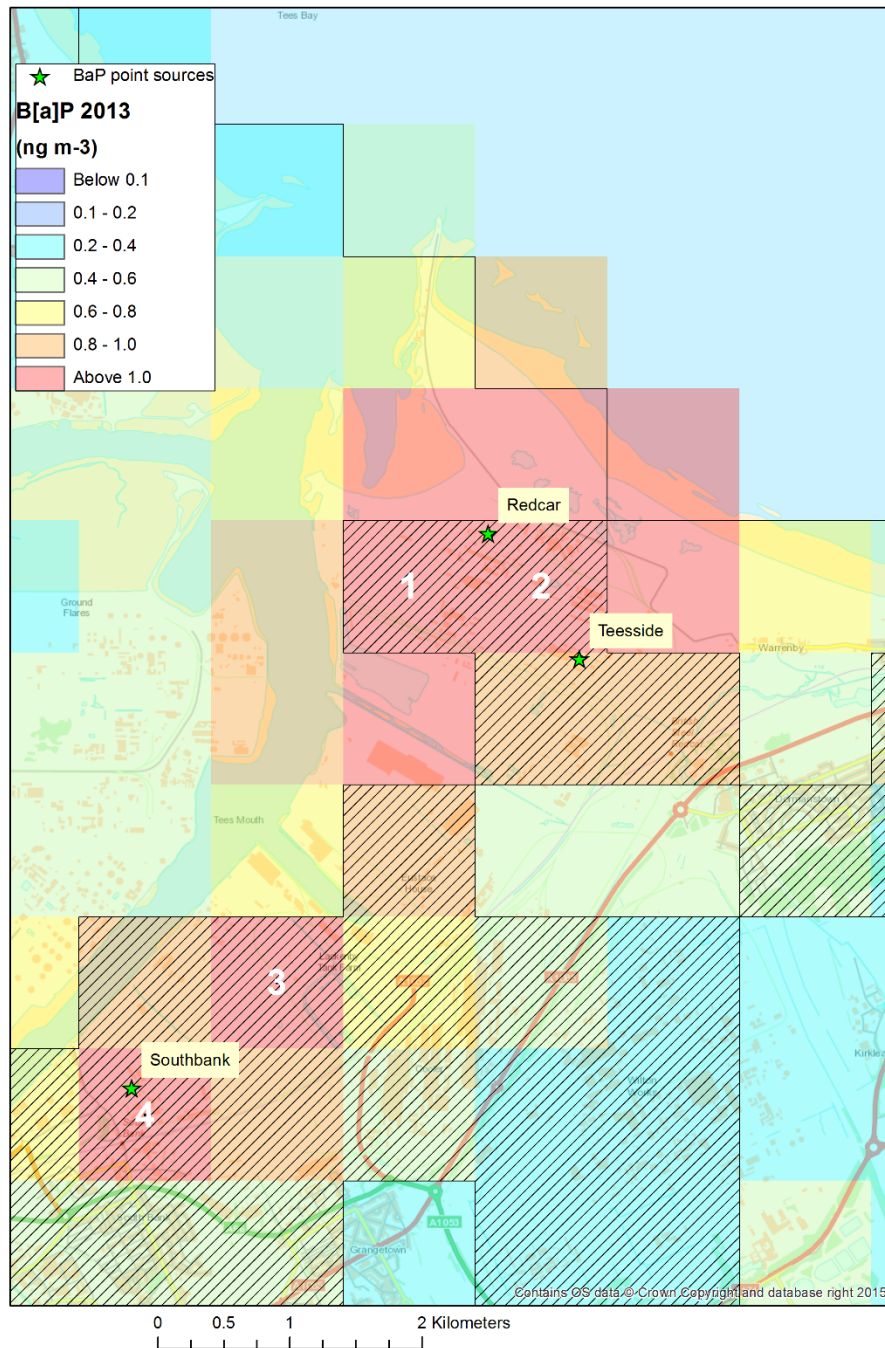
The nearest monitoring station to this exceedance situation is at Middlesbrough. Table 2 lists the measured concentrations of B[a]P at the Middlesbrough monitoring station, which is approximately 3 km south west of the nearest part of the exceedance situation. The measured concentration at this station was below the target value. The modelled concentration at this location is also below the target value, which is consistent with the measured value.

Table 2 Measured annual mean B[a]P concentration in Teesside Urban Area zone UK0013

Station (EoI code)	Annual mean concentration (ngm ⁻³) in 2013	Data capture (%)
Middlesbrough (GB0583A)	0.4	100

Figure 2 shows the location of the exceedance situation in detail. This map also shows the locations of the key industrial sources. The area shown on this map includes grid squares assigned to both the Teesside Urban Area (UK0013) and North East (UK0036) zones. The grid squares assigned to the Teesside Urban Area zone are shown as hatched. Thus the hatched red grid squares correspond to exceedance situation Teesside Urban Area [B[a]P_UK0013_2013_1] (this report) and the non-hatched red grid squares correspond to exceedance situation North East_[B[a]P_UK0036_2013_1]. (see North East zone UK0036 Report on Measures). The exceeding grid squares within this exceedance situation are numbered and the numbers correspond to those in subsequent tables.

Figure 2 Exceedance situation Teesside Urban Area [B[a]P_UK0013_2013_1]. Exceeding grid squares are marked red. Locations of coke works at Redcar and South Bank and sinter plant at Teesside are also shown. Hatched grid squares are those assigned to Teesside Urban Area zone UK0013 (this report). Non-hatched grid squares are assigned to North East zone UK0036 and do not form part of this exceedance situation (see North East zone UK0036 Report on Measures).



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. 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. It is clear that industrial sources are the main source associated with this exceedance situation. Table 4 gives a more detailed source apportionment indicating how the separate industrial processes contribute to the total industrial figure and show that the coke ovens at South Bank are the main source associated with the exceedance at the two grid squares at South Bank and the Redcar coke ovens are the main source associated with the exceedance at the two grid squares at Redcar. These sources are regulated by the Environment Agency.

Table 3. Source apportionment for exceedance situation Teesside Urban Area [B[a]P_UK0013_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	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	455500	525500	13	n/a	0.074	0.002	0.030	0.013	0.007	0.002	0.019	3.040	3.040	3.1
2	456500	525500	13	n/a	0.083	0.002	0.044	0.013	0.003	0.002	0.019	4.220	4.220	4.3
3	454500	522500	13	n/a	0.065	0.003	0.020	0.014	0.001	0.002	0.024	1.295	1.295	1.4
4	453500	521500	13	n/a	0.067	0.005	0.016	0.014	0.001	0.002	0.029	6.581	6.581	6.6

Table 4. Detailed source apportionment for industrial sources only for exceedance situation Teesside Urban Area [B[a]P_UK0013_2013_1]. Annual mean B[a]P concentration (ngm⁻³)

Grid square number		OS easting (m)	OS Northing (m)	Zone	Redcar coke ovens	South Bank coke ovens	Teesside sinter plant	Local increment: Industry including heat and power
1		455500	525500	13	2.930	0.108	0.002	3.040
2		456500	525500	13	4.088	0.131	0.000	4.220
3		454500	522500	13	0.246	1.043	0.006	1.295
4		453500	521500	13	0.158	6.418	0.005	6.581

Footnote to Table 4: South Bank Coke Ovens stopped production during September 2015. Redcar Coke Ovens and Teesside sinter plant stopped production during October 2015.

2.3 Measures

The installation relating to the identified exceedance was the Sahaviriya Steel Industries (SSI UK) owned steelworks near Redcar and its associated coke ovens. SSI UK placed the steelworks into liquidation in early October 2015 and the Official Receiver announced on 12th October⁵ that the steelworks and its coke ovens would be closed down. A number of measures had been in place that were expected to have an impact on the emissions from the plant (these are set out in table 5 below). Future modelled assessments of this zone will reflect the closure of the plant and the zone will be expected to show compliance with the target value.

Table 5 shows the measures taken at the Teesside industrial site.

⁵ <https://www.gov.uk/government/news/redcar-coke-ovens-to-be-closed>

Table 5. Table of measures taken at Teesside industrial site prior to its closure in October 2015

Measure code	Description	Classification	Implementation dates	Other information	Comment
SSI1	Ongoing enhanced maintenance/cleaning regime at the Redcar Coke Ovens to improve compliance with the Door Leakage Control Factors (DLCF). Some key measures implemented include door replacements/refurbishment and new/upgraded door extractor & door/jamb cleaner unit	Permit systems and economic instruments: IPPC permits	Start: 2011 Expected end: 2016 Status: Implementation	Source affected: Industry including heat and power production Spatial scale: Local Cost: Operator information. Indicator: Door Leakage Control Factor, Tops Leakage Control Factor, Pushing Emission Factor from British Coal Research Authority methodology ⁶	The Environment Agency conducted an in depth audit into the operation/maintenance and cleaning regimes at both sets of coke ovens (2 and 3 July 2015). Audit showed progress being made. It was expected to be back in compliance by Q1 2016.

⁶ The significant proportion of the emissions at coke ovens is due to fugitive releases from the coking process and these cannot be directly measured or completely eliminated. Regulation is through surrogate limits based on the frequency and intensity of visible leakages from the coke oven batteries from the coke side and coke pushing doors, from the oven top emission points, from the coal charging into the ovens and from the intensity of dust emission when coke is discharged from the oven. These various parameters are assigned factors using a methodology devised by the British Coal Research Authority (BCRA) (as was) and used in current permits. This is one of the recommended methodologies from the BAT Conclusions (Ref 46) Document for ensuring compliance with the BAT.

				Target emissions reduction:	Not available	
SSI3	Repairs to battery refractories .A well-established programme of silica welding and end flue repairs to seal oven wall cracks is in place	Permit systems and economic instruments: IPPC permits	Start: 2011 Expected end: 2016 Status: Implementation	Source affected:	Industry including heat and power production	
				Spatial scale:	Local	
				Cost:	Not available	
				Indicator:	Reduction in B[a]P ambient concentrations	
				Target emissions reduction:		
SSI4	Replacement of battery refractories. Through wall repairs undertaken regularly at South Bank Coke Ovens due to age of	Permit systems and economic instruments: IPPC permits	Start: 2011 Expected end: 2016 Status: Implementation	Source affected:	Industry including heat and power production	
				Spatial scale:	Local	

	<p>battery. Ongoing programme. Plans were being considered for the Redcar Coke Ovens.</p>			<p>Cost:</p> <p>Indicator:</p> <p>Target emissions reduction:</p>	<p>Operator information</p> <p>Reduction in B[a]P ambient concentrations</p> <p>Not available</p>	
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