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Report on measures for 2013 exceedance of the Target Value for B[a]P in North East non-agglomeration zone (UK0036)

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Contents

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 TV for B[a]P within the North East zone (UK0036) 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 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
UK0036	North East	4	2

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.

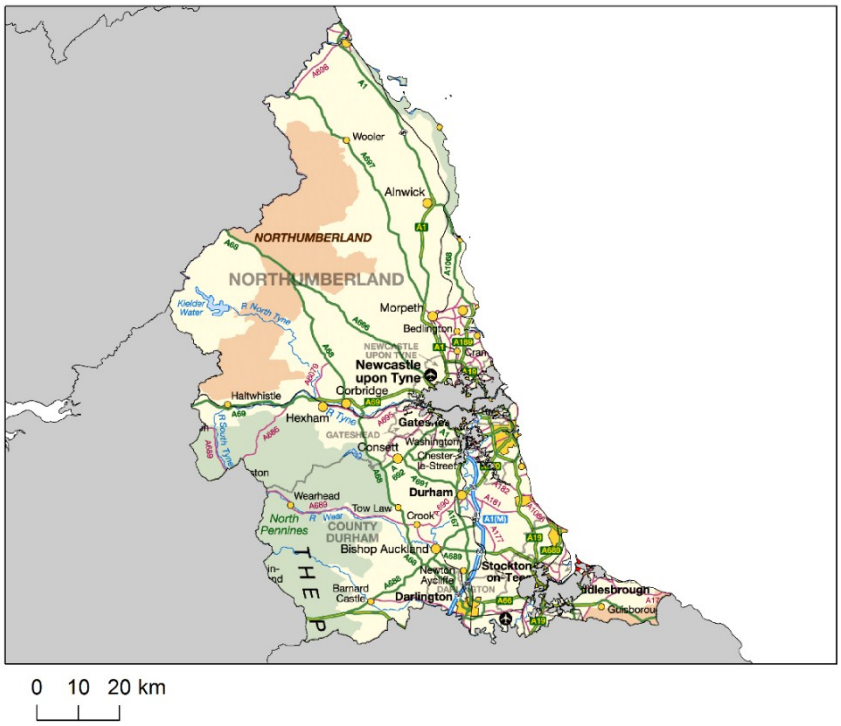
[1] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:023:0003:0016:EN:PDF

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

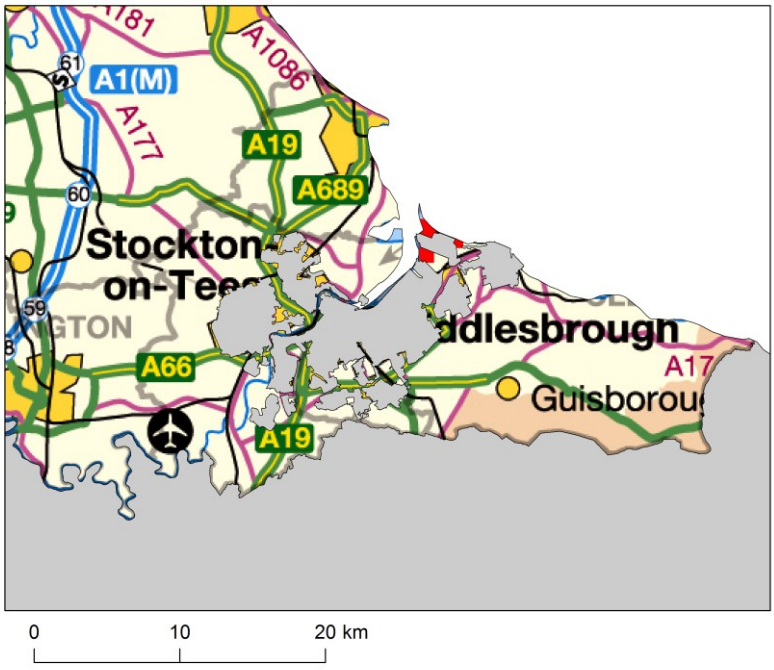
[3] http://uk-air.defra.gov.uk/library/annualreport/index

Figure 1. Location of exceedance of the B[a]P target value in 2013 within the North East zone UK0036. 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 has identified a single exceedance situation in this zone:

- North East [B[a]P_UK0036_2013_1] related to industrial emissions (area of exceedance 4 km^2)

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 K[4].

2 Exceedance situation North East [B[a]P_UK0036_2013_1] related to industrial emissions

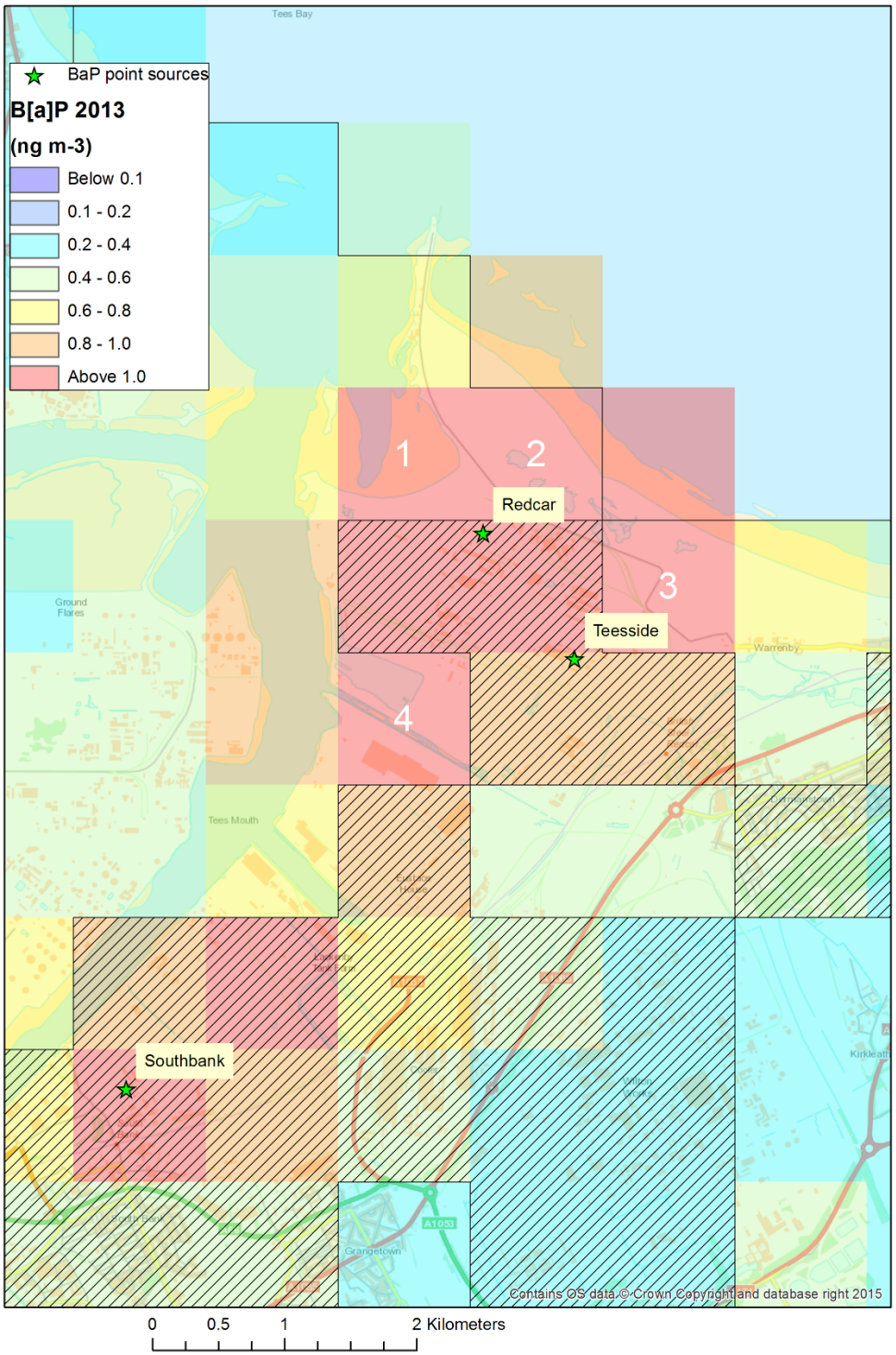
2.1 Description of exceedance

This exceedance situation has an area of exceedance of 4 km^2 and consists of four 1 km^2 grid squares adjacent to part of exceedance situation Teesside Urban Area [B[a]P_UK0013_2013_1] close to Redcar, in Redcar and Cleveland. There is no resident population in three of the grid squares, which are largely or wholly within the SSI Redcar steelworks industrial complex area. Grid square 457500, 525500 has a resident population of 2 and also includes part of a golf course. This grid square is numbered as exceeding grid square 3 below. This exceedance situation is adjacent to and shares common sources with the exceedance situation Teesside Urban Area [B[a]P_UK0013_2013_1] .

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] and the non-hatched red grid squares correspond to exceedance situation North East [B[a]P_UK0036_2013_1]. The exceeding grid squares within this exceedance situation are numbered and the numbers correspond to those in subsequent tables.

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

Figure 2. Exceedance situation North East [B[a]P_UK0036_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. Non-hatched grid squares are those assigned to North East Zone UK0036. Hatched grid squares are assigned to Teesside Urban Area Zone UK0013 and do not form part of this exceedance situation.



2.2 Source apportionment

Table 2 provides a breakdown of the main emission sources (source apportionment) that have contributed to the grid squares in this exceedance situation. It is clear that industrial sources are the main source associated with 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. Table 3 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 Redcar are the main source associated with this exceedance situation.

Table 2. Source apportionment for exceedance situation North East [B[a]P_UK0036_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	526500	36	n/a	0.065	0.002	0.024	0.013	0.007	0.001	0.018	1.251	1.251	1.3
2	456500	526500	36	n/a	0.073	0.003	0.025	0.016	0.004	0.002	0.023	5.898	5.898	6.0
3	457500	525500	36	n/a	0.083	0.003	0.045	0.012	0.002	0.002	0.019	1.285	1.285	1.4
4	455500	524500	36	n/a	0.082	0.002	0.038	0.014	0.004	0.002	0.022	1.047	1.047	1.1

Table 3. Detailed source apportionment for industrial sources only for exceedance situation North East [B[a]P_UK0036_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	526500	36	1.183	0.067	0.002	1.251
2		456500	526500	36	5.809	0.085	0.004	5.898
3		457500	525500	36	1.158	0.121	0.006	1.285
4		455500	524500	36	0.835	0.204	0.008	1.047

Footnote to Table 3: 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 October[5] 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 4 below shows the measures taken at the Teesside industrial site.

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

Table 4. 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	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.
				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]	

[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 battery. Ongoing programme. Plans were being considered for the Redcar Coke Ovens.	Permit systems and economic instruments: IPPC permits	Start: 2011	Source affected:	Industry including heat and power production	