Department for Environment Food & Rural Affairs

www.gov.uk/defra

Report on measures for 2013 exceedance of the Target Value for B[a]P in Swansea Urban Area agglomeration zone (UK0027)

November 2015

Llywodraeth Cymru
Welsh Government

This publication is available at www.gov.uk/government/publications

Any enquiries regarding this publication should be sent to us at:

Air Quality
Department for Environment, Food and Rural Affairs
Area 2C
Nobel House
Smith Square
London
SW1P 3JR
Email: air.quality@defra.gsi.gov.uk

With technical input from Ricardo Energy & Environment

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 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 Swansea Urban Area zone (UK0027) 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 Swansea Urban Area zone UK0027

Zone code	Zone Name	Area exceeding TV (km^2)	Population exceeding TV
UK0027	Swansea Urban Area	3	2499

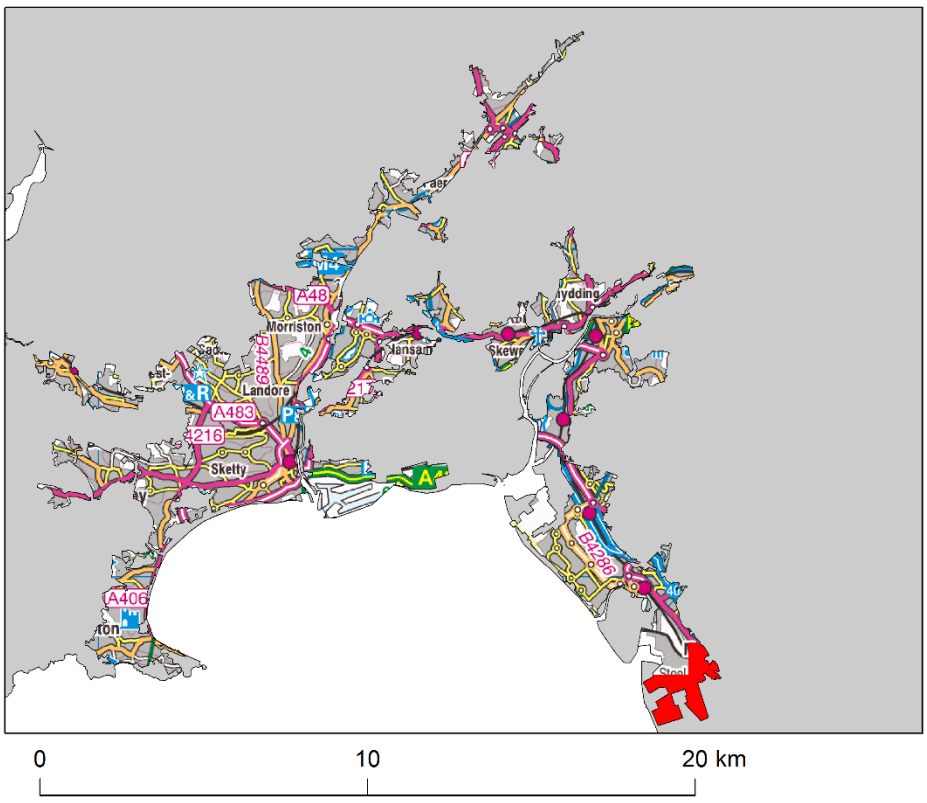
Figure 1 shows the locations of the exceedances in the context of the zone as a whole.

[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 Swansea Urban Area zone UK0027. 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:

- Swansea Urban Area [B[a]P_UK0027_2013_1] related to industrial emissions (area of exceedance 3 km^2)

However a subsequent finer scale assessment carried out by NRW, the Welsh national regulator, using additional local data suggests that it is unlikely that the industrial emissions resulted in off-site concentrations of B[a]P exceeding the target value in 2013. Further work is underway to fully evaluate this work and consideration is being given to how best it may inform future compliance assessments.

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. Information on measures is reported within e-Reporting dataflow K[4].

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

2 Exceedance situation Swansea Urban Area [B[a]P_UK0027_2013_1] related to industrial emissions

2.1 Description of exceedance

This exceedance situation has an area of exceedance of 3 km^2 in Margam in Neath Port Talbot. The resident population associated with this exceedance situation is 2,499, the majority (2,401) being in the grid square 278500, 187500, which is the exceedance square in the north east of the exceedance situation. This grid square is numbered as exceeding grid square 1 below. One of the grid squares (exceeding grid squares 277500, 186500) has no resident population and is wholly within the steelworks industrial complex area. This exceedance situation is adjacent to and shares common sources with the exceedance situation South Wales [B[a]P_UK0041_2013_1].

The nearest fixed monitoring to the exceedance situation is at Port Talbot Margam. Table 2 lists the measured concentrations of B[a]P at the Port Talbot Margam monitoring station. This site is approximately 1 km north 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.

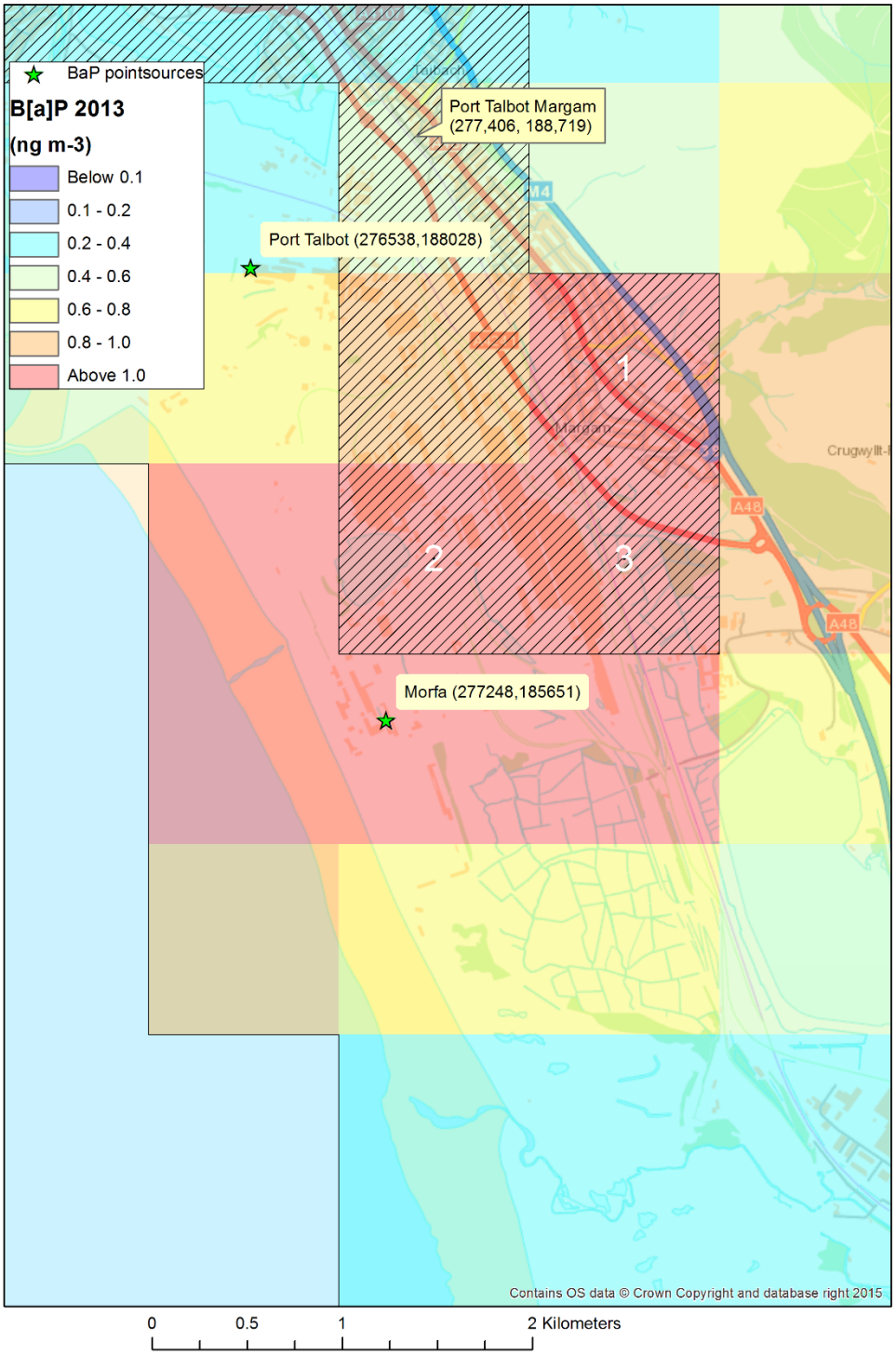
Table 2 Measured annual mean B[a]P concentration in Swansea Urban Area zone UK0027

Station (EoI code)	Annual mean concentration (ngm^{-3}) in 2013	Data capture (%)
Port Talbot Margam (GB0906A)	0.4	93

The measurements at Port Talbot Margam were less than the target value. In modelling the spatial coverage of B[a]P concentrations, the national scale model predictions were rescaled to ensure consistency with the measurements. The rescaled predictions exceeded the target in the vicinity of the steelworks industrial complex in Port Talbot due to industrial emissions. However, subsequent finer scale modelling that included a more detailed assessment indicated that ambient off-site concentrations of B[a]P due to industrial emissions are unlikely to have exceeded the target value outside of the bounds of the industrial site and this assessment is discussed in more detail in section 2.3. Further work is underway to fully evaluate these findings.

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 Swansea Urban Area (UK0027) and South Wales (UK0041) zones. The grid squares assigned to the Swansea Urban Area zone and this exceedance situation - Swansea Urban Area [B[a]P_UK0027_2013_1] are shown as hatched (in this report) and the non-hatched red grid squares correspond to exceedance situation South Wales [B[a]P_UK0041_2013_1] (discussed in the South Wales zone UK0041 report).

Figure 2. Exceedance situation Swansea Urban Area [B[a]P_UK0027_2013_1]. Exceeding grid squares are marked red. Locations of coke works at Morfa and sinter plant at Port Talbot are also shown. Hatched grid squares are those assigned to Swansea Urban Area zone UK0027 (this report). Non-hatched grid squares are assigned to South Wales zone UK0041 and do not form part of this exceedance situation (see UK0041 report).



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 Morfa are the main sources associated with this exceedance situation.

Table 3. Source apportionment for exceedance situation Swansea Urban Area [B[a]P_UK0027_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	278500	187500	27	n/a	0.103	0.009	0.005	0.049	0.000	0.005	0.035	1.241	1.241	1.3
2	277500	186500	27	n/a	0.068	0.002	0.005	0.035	0.000	0.004	0.021	4.599	4.599	4.7
3	278500	186500	27	n/a	0.104	0.003	0.005	0.040	0.000	0.028	0.029	1.822	1.822	1.9

Table 4. Detailed source apportionment for industrial sources only for exceedance situation Swansea Urban Area [B[a]P_UK0027_2013_1]. Annual mean B[a]P concentration (ngm^{-3})

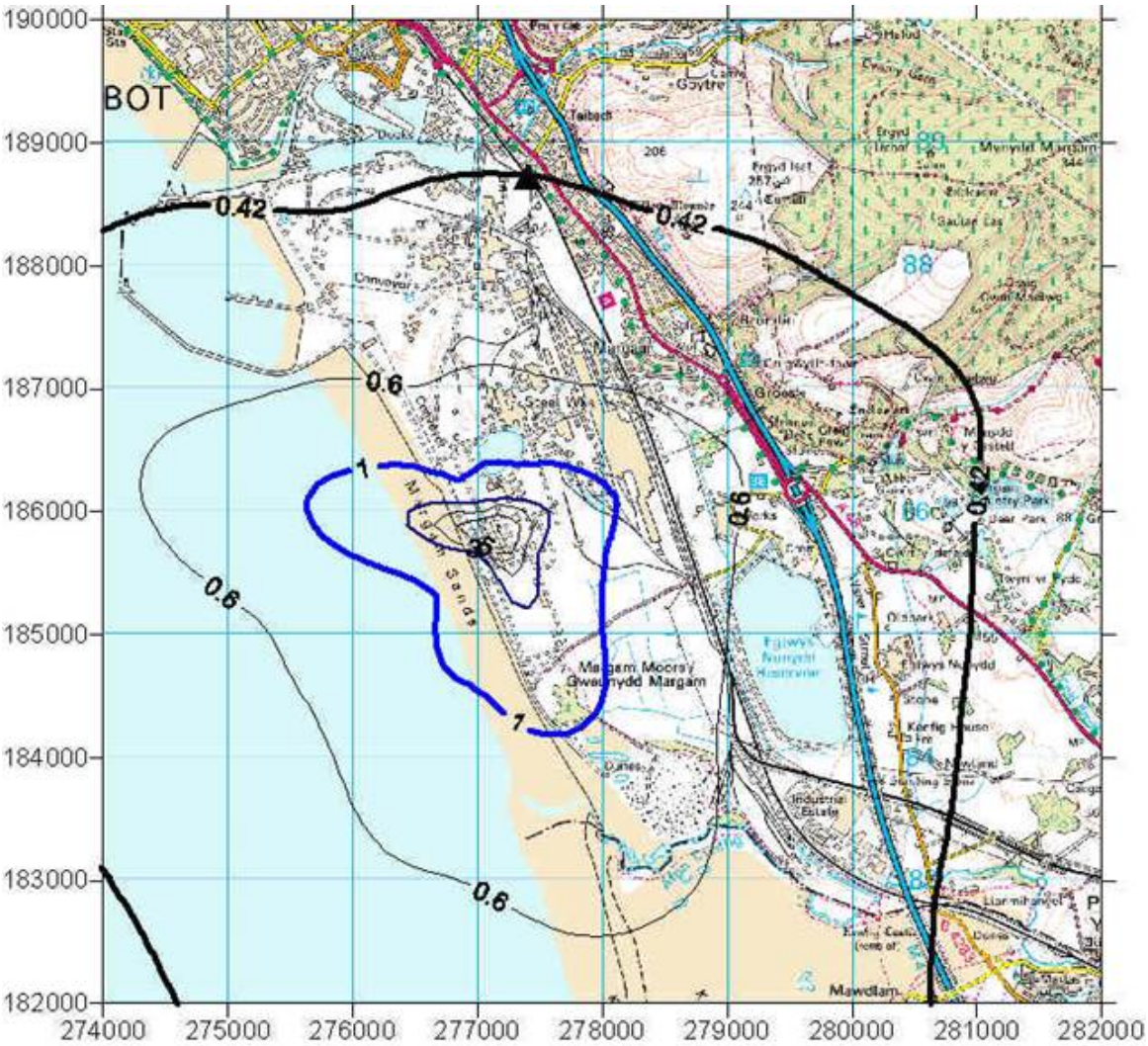
Grid square number	OS easting (m)	OS Northing (m)	Zone	Morfa coke ovens	Port Talbot sinter plant	Local increment: Industry including heat and power production
1	278500	187500	27	1.233	0.007	1.241
2	277500	186500	27	4.594	0.005	4.599
3	278500	186500	27	1.819	0.004	1.822

2.3 A finer scale assessment

In order to assess this exceedance in more detail a finer scale dispersion modelling assessment was undertaken, making use of additional local data. This assessment suggests that off-site concentrations of B[a]P did not exceed the target value in 2013. Figure 4 plots the sum of the process contribution, due to emissions from the steelworks complex, and the ambient B[a]P background, derived from the measurement at the Port Talbot Margam site (this differs to how the national scale model derives the background). The blue contour indicates the predicted environmental concentration of 1ng/m3 and shows that it would be unlikely that the target value would have been exceeded beyond the industrial site boundary.

As indicated in section 2.2 of the overview report on B[a]P, further work is being undertaken to understand these conclusions and consider whether they can be incorporated into the national modelling.

Figure 3. Predicted environmental concentration of B[a]P (ng/m^3) for 2013.



2.4 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), in either the Coke Ovens or Sinter plant which are the main sources of this pollutant. BAT looks to control emissions in general and the techniques required will also affect B[a]P concentrations. The iron and steel 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 reduction of emissions of polychlorinated dibenzodioxins/furans (PCDD/F) and polychlorinated biphenyls (PCB) by utilising lignite injection at the sinter plant will also result in a reduction of B[a]P. Monitoring and further modelling as the techniques are employed will

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

demonstrate the scale of the reduction. The regulator is of the view that Tata will be at BAT within the timescales required by the Industrial Emissions Directive or within the periods of any agreed derogations for the Sinter Plant and the Coke Ovens.

Table 5 shows the measures taken or to be taken at Port Talbot industrial site.

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

Measure code	Description	Classification	Implementation dates	Other information	Comment
Coke Ovens 1	Measures to meet new fugitive BAT emission limits (BATELs)	Permit systems and economic instruments: IPPC permits	Start: 2015 Expected end: 2016 Status: Implementation	Source affected: Industry including heat and power production Spatial scale: Local Cost: Not available Indicator: Emissions estimate Target emissions reduction: Not available	Tata adopted a modified US Environmental Protection Agency approach to fugitive release assessment. The measures outlined should enable Tata to meet the new fugitive BATELs by March 2016
Coke Ovens 2	Spigot improvements. The spigot is the joint between the oven and the gas main. Fitting of new collars, change of sealing material to silicon, shortening of ascension pipes and new seals fitted.	Permit systems and economic instruments: IPPC permits	Start: 2015 Expected end: 2016 Status: Implementation	Source affected: Industry including heat and power production Spatial scale: Local Cost: Not available Indicator: Percentage leak rate reduced to target of 1% Target emissions reduction: Not available	The B[a]P releases from the tops are not a major contributor to the coke ovens' B[a]P releases. They are currently at approx. 6% leakage rate for the tops and they expect to comply with the 1% BAT-AEL for the tops fugitive releases by the March 2016 deadline by the use of these collars and the gradual replacement of the spigots.
Coke Ovens 3	Coke Oven door improvements	Permit systems and economic instruments: IPPC permits	Start: 2015 Expected end: 2016 Status: Implementation	Source affected: Industry including heat and power production Spatial scale: Local Cost: Not available	Tata have previously provided evidence, to the satisfaction of NRW (the regulator) that showed that they only have a few percentage

				Indicator: Target emissions reduction:	Percentage leak rate reduced to target of 10% Not available	points to make up before they can attain the doors 10% limit value.
Coke Ovens 4	Reduction of emissions during charging	Permit systems and economic instruments: IPPC permits	Start: 2015 Expected end: 2016 Status: Implementation	Source affected: Spatial scale: Cost: Indicator: Target emissions reduction:	Industry including heat and power production Local Not available Duration of release reduced to 30 seconds as a monthly mean Not available	Based on the current view of their coke ovens, Tata will be able to comply with the charging BAT-AELs by the March 2016 deadline
Sinter Plant	Improvements to Lignite Injection	Permit systems and economic instruments: IPPC permits	Start: 2015 Expected end: 2016 Status: Implementation	Source affected: Spatial scale: Cost: Indicator: Target emissions reduction:	Industry including heat and power production Local Not available We expect the monitored B[a]P results in Port Talbot to start to drop in 2016. Not available	This forms part of a number of projects to ensure that the sinter plant complies with the new tighter EU Industrial Emissions Directive (IED) standards.