



Department
for Environment
Food & Rural Affairs

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Report on measures for 2013 exceedance of the Target Value for Nickel in South Wales non- agglomeration zone (UK0041)

November 2015



Llywodraeth Cymru
Welsh Government

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1. Introduction

1.1 Context

Under the EU Directive 2004/107/EC¹, the target value for nickel (Ni) is an annual mean concentration of 20 nanograms (one billionth of a gram (10^{-9})) per cubic metre (m^{-3}) of ambient air or lower. The Directive requires that a report is produced on measures in place to address any exceedance of this target value and that all reasonable measures that do not entail disproportionate cost should be taken to ensure this target is not exceeded.

1.2 Status of zone

This is the report on measures required for exceedances of the target value for Ni within the South Wales non-agglomeration zone identified within the 2013 UK air quality assessment. Exceedances within this zone were identified on the basis of model data. Model results on a 1 km x 1 km grid resolution provided supplementary information for the assessment in addition to the results from fixed monitoring stations. Fine scale modelling on a 20 m x 20 m grid resolution located around an identified industrial source provided additional supplementary information. 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 exceedance identified in this zone, as reported via e-Reporting.

Table 1. Area exceeding Ni target value in 2013 and associated resident population for exceeding areas within South Wales zone UK0041

Zone code	Zone Name	Area exceeding TV (km^2)	Population exceeding TV
UK0041	South Wales	1	1,712

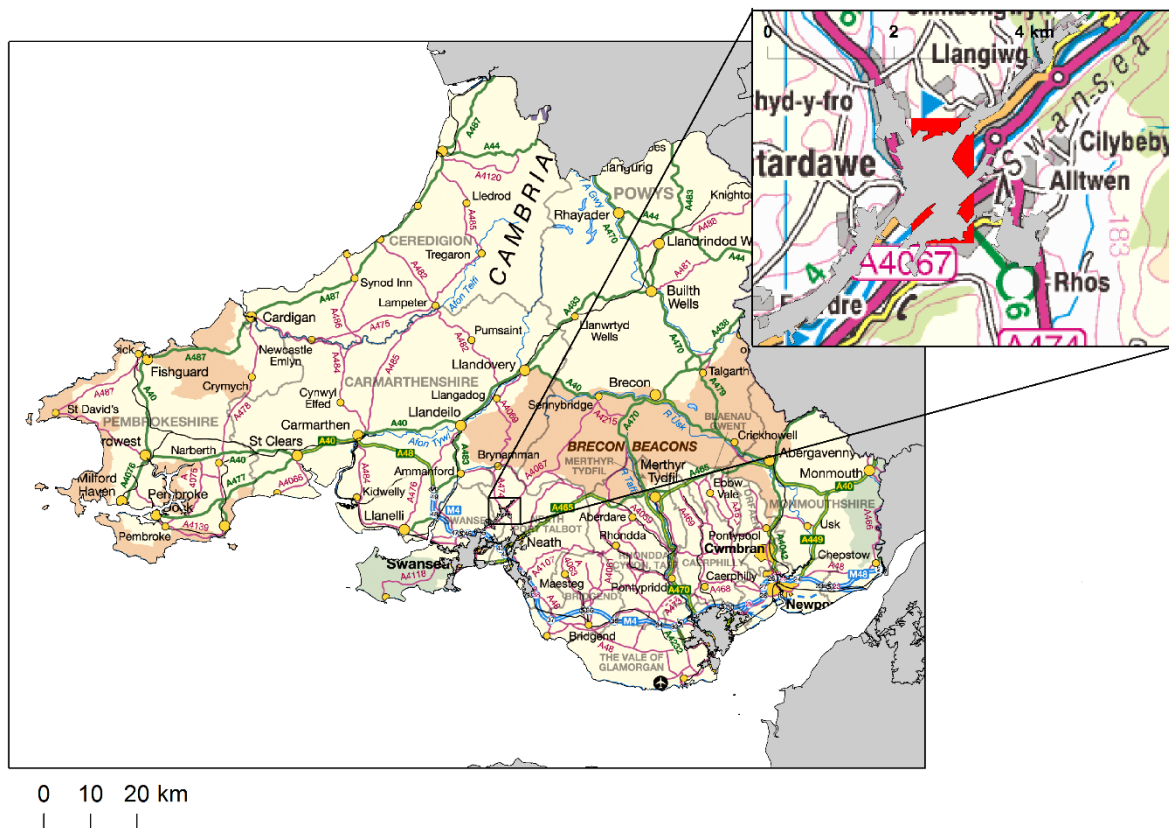
Figure 1 shows the locations of the exceedances in the context of the zone as a whole.

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 Ni target value on 2013 in the South Wales zone UK0041. Exceeding areas are marked red. The inset map shows the exceedance location within a reduced map extent.



An initial source apportionment was carried out and this analysis identified one exceedance situation within this zone related to industrial emissions:

- South Wales [Ni_UK0041_2013_1] related to industrial emissions (area of exceedance 1 km²) This report describes the exceedance situation in the zone. The sections below include 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. This exceedance situation is adjacent to and shares common sources with the exceedance situation Ni_UK0027_2013_1 and where appropriate this document refers to the content of the Report on measures for 2013 exceedance of the Target Value for Ni in Swansea Urban Area agglomeration zone (UK0027), henceforth referred to as the report on measures for Swansea UK0027.

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

2 Exceedance situation South Wales [Ni_UK0041_2013_1] related to industrial emissions

2.1 Description of exceedance

This exceedance situation has an area of exceedance of 1 km² and is located in the Swansea valley within the South Wales non-agglomeration zone. The resident population associated with this exceedance situation is 1,712. This exceedance situation is adjacent to and shares common sources with the exceedance situation Swansea [Ni_UK0027_2013_1].

Table 2 lists measured annual mean concentrations of Ni from the monitoring site in South Wales non-agglomeration zone from 2004 to 2013. There is one monitoring station in the South Wales non-agglomeration zone, Cwmystwyth (GB08544A) located towards the north of the South Wales non-agglomeration zone (277138, 274242) approximately 70 km from the exceedance situation South Wales [Ni_UK0041_2013_1]. No exceedance of the Ni target value was measured at this monitoring site in 2013 or in previous years.

The exceedance situation South Wales [Ni_UK0041_2013_1] is located adjacent to Swansea Urban Area agglomeration zone. The report on measures for UK0027, section 2.1, presents measured annual mean concentrations of Ni from monitoring sites in Swansea Urban Area agglomerations zone. These sites are located closer to the exceedance situation than the Cwmystwyth site in the South Wales zone. There is one measured exceedance at Pontardawe Tawe Terrace (GB1016A) in 2013. Figure 2 shows the location of the exceedance situation in detail. This map also shows the locations of the monitoring sites in the vicinity of the exceedance situation and the locations of local industrial sources. The map shows that Pontardawe Tawe Terrace is located within the adjacent exceedance situation Swansea [Ni_UK0027_2013_1]. The measured concentrations of Ni at other monitoring sites within the Swansea Urban Area agglomeration zone were all below the target value in 2013.

Figure 2 shows the high resolution zone boundary used to assign the locations of monitoring sites in grey and the zone boundaries for the 1 km grid used to assign exceedance situations and associated populations as black hatching. The local topography and locations of settlements results in the Swansea Urban Area Agglomeration zone extending up the Swansea Valley but only the larger urban areas are assigned to the agglomeration zone within the 1 km gridded data.

Detailed dispersion modelling has been undertaken for the area in Swansea Urban Area where exceedances of the annual mean target value have been measured. This includes detailed modelling of Ni emissions from the Wall Colmonoy site, an industrial source located close to the Pontardawe Tawe Terrace monitoring site (see Figure 2). The Wall Colmonoy site is located close to the boundary of the Swansea Urban Area agglomeration zone and the South Wales zone and therefore the modelled area extends into both zones. The modelling has been used to assess the likely spatial scale of the exceedance. The conclusions from this dispersion modelling study were that it is likely there was an exceedance of Ni target value in both the South Wales and Swansea Urban Area zones in 2013 and this exceedance was likely to have extended over a spatial area of relevance to

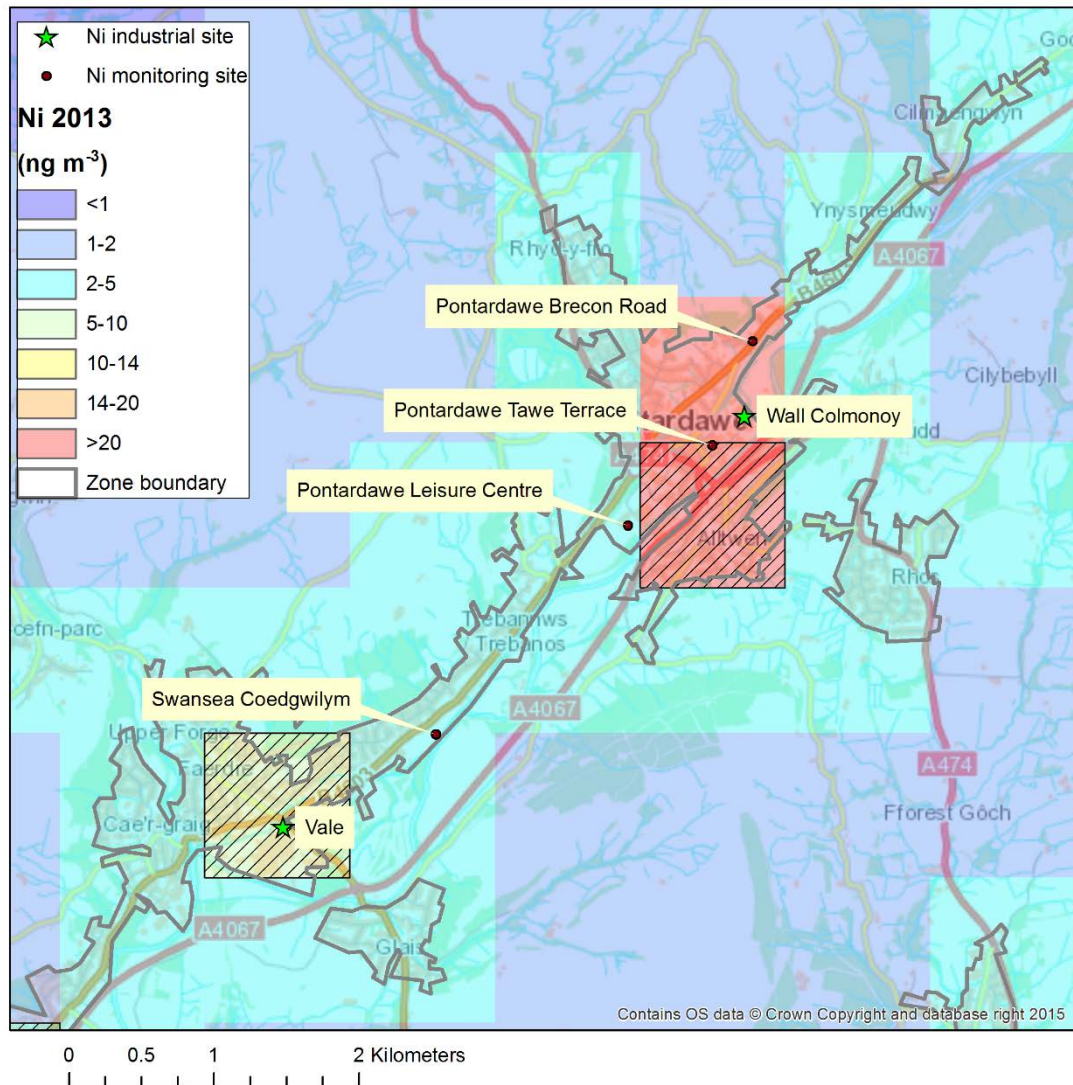
the directive (at least 250 m x 250 m for industrial locations). The assessed exceedance of the target value in the South Wales zone based on modelling is less certain than the assessed exceedance of the Swansea Urban area zone which is assessed based on measurements for the reasons discussed in Appendix 1 of the report on measures for Swansea UK0027.

Due to the discrepancy between the measured and modelled levels of Ni at the known location of exceedance (Pontardawe Tawe Terrace) in the adjacent Swansea Urban Area Agglomeration, the Welsh Government plan to undertake further detailed assessments. This will help to improve the confidence in the source apportionment and identification of the predominant sources, and confirm the spatial extent of the exceedance. Details of these additional assessments are presented in Appendix 1 of the report on measures for Swansea UK0027.

Table 2. Measured annual mean Ni concentrations in the South Wales zone UK0041 from 2004 to 2013 (ngm^{-3}). Percentage data capture is shown in parentheses.

Station (Eol code)	Zone	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Cwmystwyth (GB0854A)	UK0041			0.56 (100)	0.31 (89)	0.46 (87)	0.46 (2)	0.49 (72)	0.39 (89)	0.33 (48)	0.37 (80)

Figure 2 Exceedance situation South Wales [Ni_UK0041_2013_1]. Exceeding grid squares are marked red. Locations of local industrial sites Wall Colmonoy works at Pontardawe and Vale Europe Ltd Clydach refinery and the locations local monitoring stations are also shown. Hatched grid squares are assigned to Swansea Urban Area agglomeration zone UK0027 and do not form part of this exceedance situation.



2.2 Source apportionment

Modelling has been used to determine the annual mean Ni source apportionment for the exceedance situation. National modelling on a 1 km x 1 km grid resolution apportions the Ni concentration to background sources. Additional fine scale modelling has also been carried out to characterise local industrial emissions for the Wall Colmonoy site located in the vicinity of the exceedance situation, this is described in Appendix 1 of the report on measures for Swansea UK0027.

Table 3 provides a breakdown of the main emission sources (source apportionment) that have contributed to the grid square in this exceedance situation. It is clear that industrial sources are the main source associated with this exceedance situation. The final column in the table is the total from all emissions sources. The values in this column have been rounded to integers for consistency with the values 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 for the industry sector and shows that the main source associated with this exceedance situation are fugitive emissions attributed to local unidentified industrial activities. Appendix 1 of the report on measures for Swansea UK0027 discusses the uncertainties in the identification of this source of Ni in air and the activities that are being undertaken by the Welsh Government to understand this emissions source. Stack emissions from the Wall Colmonoy works contributed to the exceedance situation, although the contribution was small compared to the unidentified fugitive emissions. The emissions from Wall Colmonoy are regulated by the Neath Port Talbot County Borough Council and measures undertaken (see section 2.3) describe how these stack emissions have been reduced by a factor of ten since 2009.

Table 3. Source apportionment for exceedance situation Ni_UK0041_2013_1. Annual mean Ni concentration (ngm⁻³).

OS easting (m)	OS Northing (m)	Zone	Regional background: Total	Regional background: From within Member State	Urban background increment: Total	Urban background increment: Traffic	Urban background increment: Industry including heat and power production	Urban background increment: commercial and residential ⁵	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
272500	204500	41	1.14	1.14	3.92	0.01	0.13	3.74	0.01	0.04	0.00	32.16	32.16	37

⁵ The commercial and residential combustion contribution to urban background sources are associated with use of petroleum based fuels for domestic heating.

Table 4. Detailed source apportionment for industrial sources only for exceedance situation Ni_UK0041_2013_1. Annual mean Ni concentration (ngm⁻³).

OS easting (m)	OS Northing (m)	Zone	Wall Colmonoy stack emissions	Fugitive emissions	Local increment: Industry including heat and power production
272500	204500	41	3.42	28.74	32.16

2.3 Measures

Air quality is a high priority for the Welsh Government, including the attainment of EU target values. The government works closely with regulators and local industrial operators with emissions of Ni to air in pursuit of this aim. Recent meetings have enabled:

- the Welsh Government to communicate to the industrial regulators and operators the extent of the issue and the seriousness with which it is taken;
- the regulators to demonstrate that the operators are applying all cost-effective measures, and in particular are applying best available techniques as required by Council Directive 96/61/EC;
- the operators to cooperate and share best practice in managing their operations; and
- the development of the latest evidence in understanding the predominant sources.

The exceedance situation South Wales [Ni_UK0041_2013_1] shares common industrial sources with Swansea [Ni_UK0027_2013_1] and these sources are located in Swansea Urban Area agglomeration zone (UK0027). Measures to reduce Ni concentrations in air in the exceedance situation South Wales [Ni_UK0041_2013_1] target the identified common industrial sources. No additional sources of Ni have been identified for the exceedance situation in South Wales [Ni_UK0041_2013_1].

The Report on Measures for Swansea [UK0027, section 2.3], details measures that have been taken and are to be taken at the Wall Colmonoy and Vale industrial sites. Emissions from the Vale site are not identified as contributors to this exceedance situation but will contribute to the background concentrations in the area. The regulator for the Vale site, Natural Resources Wales, has assessed that the measures that have already been taken by Vale constitute BAT for the industrial site. The regulator for the Wall Colmonoy site, Neath Port Talbot County Borough Council, has assessed that the measures that have been taken at the Wall Colmonoy site also constitute BAT.

The measures introduced by Wall Colmonoy in 2014 have resulted in a ten-fold reduction in stack emissions since 2009.

The report on measures for Swansea UK0027 shows that despite significant reductions in stack emissions from the Wall Colmonoy site, annual mean concentrations of Nickel measured at the Pontardawe Tawe Terrace site have not reflected this trend. Given the level of uncertainty and the cause and spatial extent of this local exceedance, the Welsh Government is undertaking further measurement studies to help identify the predominant sources (see the report on measures for Swansea UK0027 for more information).