

9 Updating and Screening Assessment for Sulphur Dioxide

9.1 THE NATIONAL PERSPECTIVE

The main source of sulphur dioxide in the United Kingdom is power stations, which accounted for 69 % of emissions in 2004. There are also significant emissions from other industrial combustion sources. Emissions from domestic sources fell by 34 % in 2002-2003, but these can still have a significant effect locally. Road transport currently accounts for less than 1 % of emissions.

Local exceedences of the objectives (principally the 15-minute mean objective) may occur in the vicinity of small combustion plant (less than 20 MW) that burn coal or oil, in areas where solid fuels are the predominant form of domestic heating, and in the vicinity of major ports.

9.2 STANDARD AND OBJECTIVE FOR SULPHUR DIOXIDE

The Government and the Devolved Administrations have adopted a 15-minute mean of $266 \mu\text{g m}^{-3}$ as an air quality standard for sulphur dioxide, with an objective for the standard not to be exceeded more than 35 times in a year by the end of 2005.

Additional objectives have also been set which are equivalent to the EU limit values specified in the First Air Quality Daughter Directive. These are for a 1-hour mean objective of $350 \mu\text{g m}^{-3}$, to be exceeded no more than 24 times per year, and a 24-hour objective of $125 \mu\text{g m}^{-3}$, to be exceeded no more than 3 times per year, to be achieved by the end of 2004.

9.3 CONCLUSIONS OF THE PREVIOUS ROUNDS OF REVIEW AND ASSESSMENT FOR SULPHUR DIOXIDE

The following conclusions were given for SO_2 in the earlier stages of Review and Assessment for King's Lynn and West Norfolk Borough Council:

- Stage 1 – A number of potentially significant sources were identified, as were emissions from domestic coal burning.
- Stage 2 – The sources were assessed using screening monitoring and air dispersion modelling and it was found that no sources within the borough were considered to pose a significant risk of exceeding the air quality objectives in the area. A source outside the Borough was found to have potential to cause an exceedence but not within the borough and Fenland District Council has since declared an AQMA in Wisbech.
- The previous Updating and Screening Assessment concluded that there are no significant industrial or domestic sources of sulphur dioxide in the King's Lynn and West Norfolk Borough and no further action was required at that stage.

No AQMAs have been declared for SO_2 in King's Lynn and West Norfolk.

9.4 SCREENING ASSESSMENT OF SULPHUR DIOXIDE

9.4.1 Source checklist

The Technical Guidance LAQM.TG(03) requires assessment of sulphur dioxide to consider the following sources, data or locations:

- Monitoring data outside an AQMA
- Monitoring data within an AQMA
- New industrial sources
- Industrial sources with substantially increased emissions, or new relevant exposure
- Areas of domestic coal burning
- Small boilers (>5MW (thermal)) burning coal or oil
- Shipping
- Railway Locomotives

These are evaluated in the following sections.

9.4.2 Background Concentrations for Sulphur Dioxide

The estimated average background sulphur dioxide concentration for 2001 was 2.0 $\mu\text{g m}^{-3}$ with a maximum concentration of 7.7 $\mu\text{g m}^{-3}$. The Guidance LAQM.TG(03) states that authorities may assume that the background annual mean sulphur dioxide concentrations at the end of 2004 and 2005 will be 75 % of the 2001 values, *i.e.* 1.5 $\mu\text{g m}^{-3}$.

Exceedences of the short-term objectives for sulphur dioxide are unlikely based on the annual mean background concentrations and absence of significant sources (domestic and industrial) of sulphur dioxide.

9.4.3 Screening Assessment of Monitoring Data

SO₂ monitoring in 2005 took place at the Stoke Ferry acid deposition network site. The Borough Council operate the site as part of a UK-wide Defra monitoring programme, which is managed and quality assured by **netcen**. The Stoke Ferry site is representative of a rural background site. The measured annual mean SO₂ concentration was 1.4 $\mu\text{g m}^{-3}$, which is comparable to the 1.5 $\mu\text{g m}^{-3}$ estimated and derived from the NAEI background maps.

Table 9.1 Sulphur Dioxide Concentrations at Stoke Ferry Acid Deposition Monitoring site, 2005

Site Code	Site Name	SO ₂ Annual Mean Concentration
5004	Stoke Ferry	1.4 $\mu\text{g m}^{-3}$

The annual mean background concentrations indicate that the short-term objectives for SO₂ are unlikely to be exceeded.

9.4.4 Screening Assessment of Industrial Sources

The Guidance LAQM.TG(03) lists the following processes as significant potential sources of sulphur dioxide:

Part A (*percentage of total emissions from all UK plant in this sector to the UK total in brackets*)

- Iron and steel (9)
- Petroleum processes (15)
- Combustion processes (45)
- Cement/lime manufacture (3)
- Carbonisation (10)
- Non-ferrous metals (7)
- Ceramic Production (9)

Part B

- Combustion plant 20-50 mwth
- Furnaces 20-50 mwth
- Copper processes
- Refractory goods
- Glass manufacture
- Roadstone coating

Five Part A processes were identified in the Stage 1 Review and Assessment, as listed below:

- British Sugar, Wisington
- Anglian Power Generators, Saddlebow
- British Gas, East Winch
- Porvair International, King's Lynn
- Dow Chemical Company King's Lynn

And two Part B processes:

- British Sugar, Wisington
- Favor Parker, Stoke Ferry (now Grampian Country Feeds Ltd, under EA control)
- Del Monte, West Lynn was also identified for its boiler plant.

The Stage 2 Review and Assessment and detailed dispersion modelling by CERC ruled out all the above processes as having the potential to cause exceedences of the objectives.

Roadstone coating plants are situated at King's Lynn docks and at Pentney. These are existing processes that have already been screened in previous rounds. Since the last round of Review and Assessment, no new sources or sites with increased emissions have been identified with the potential to cause an exceedence of the sulphur dioxide objectives.

9.4.5 Small Boilers

No significant changes have been identified since the previous round of Review and Assessment.

9.4.6 Domestic Coal Burning

Domestic coal burning in the area was assessed in a previous stage of Review and Assessment and found that there was solid fuel burning, but not to an extent that could cause an exceedence of the objectives. NAEI activity statistics indicate that solid fuel use continues to decline throughout the area. The Borough Council of King's Lynn and West Norfolk advise it is unlikely that there are any areas with 50 houses using these fuels in a 500m x 500 m square.

9.4.7 Screening Assessment of Other Transport Sources

Shipping

King's Lynn has a port with activity, but less than 5,000 large shipping movements occur per year. The Conservancy Board reports a total of 758 movements per annum into ABP's King's Lynn Docks of vessels over 35 m long requiring pilots. This number is comparable to the ABP report, quoting a figure of 384 vessels entering the port x 2 = 768 movements per annum. It is generally the larger ships that burn bunker oils with higher sulphur content.

Currently, approximately 35-40 active commercial fishing vessels also use the port (excluding other smaller craft used for activities other than commercial fishing). It is uncertain how many individual movements are undertaken as the fishing industry is very seasonal and dependant on quantities and market prices of caught commodities. These vessels use a lower sulphur diesel fuel and therefore unlikely to contribute significantly to exceedences of the SO₂ short-term objective.

Railways

The King's Lynn mainline is electrified and these movements do not need to be considered further.

There are currently 7-10 train movements per week to and from the WBB minerals site, which idle for approximately 1½ to 2 hrs at Leziat. Trains are timetabled so there ought to be no waiting period, however delays do happen; delays are reportedly occurring 1-2 times a month, where trains have been identified idling on the sidings near Morrison's supermarket for up to an hour with the engine running. The frequency and duration of this practice should continue to be monitored. According to the information supplied, there are no occasions where diesel locomotives run for 15 minutes or more on at least two occasions per day, with relevant exposure to members of the public.

9.5 CONCLUSIONS FOR SULPHUR DIOXIDE IN THE BOROUGH

There are no significant industrial or domestic sources of sulphur dioxide in the Borough of King's Lynn and West Norfolk. A Detailed Assessment is not required for sulphur dioxide.

	Source, location or data that need to be assessed	Updating and Screening Assessment
A	Monitoring data outside an AQMA	Sulphur dioxide concentrations are measured at Stoke Ferry Acid Deposition monitoring site. The 2005 annual mean concentration of SO ₂ is 1.4 µgm ⁻³ .
B	Monitoring data within an AQMA	Not applicable – no AQMAs have been declared in the borough for sulphur dioxide.
C	New industrial sources	There are no new or proposed industrial sources in the Borough that have the potential to emit significant quantities of sulphur dioxide.
D	Industrial sources with substantially increased emissions	No such sources have been identified in the borough since the previous round of review and assessment.
E	Areas of domestic coal burning	Domestic coal burning continues to decline across the borough. It is unlikely that there are any areas with 50 houses using solid fuels in a 500m x 500 m square.
F	Small Boilers (>5 MW(thermal)) burning coal or oil	No new processes have been identified
G	Shipping	Fewer than 5,000 large shipping movements were reported in South Quay during 2005. Shipping does not need to be considered further.
H	Railway locomotives	There are no occasions where diesel locomotives run for 15 minutes or more on at least two occasions per day, with relevant exposure to members of the public.
	Conclusion	There have been no significant changes with regards to sulphur dioxide in this Authority. A detailed assessment is not required for King's Lynn and West Norfolk.