7.0 Update and Screening Assessment for Sulphur Dioxide

7.1 The national perspective

The main sources of sulphur dioxide in the United Kingdom are power stations which accounted for more than 71% of the total emissions in 2000. Other sources of emissions include other industrial combustion sources, domestic solid fuel burning and shipping.

Although concentrations of sulphur dioxide have been reduced significantly in recent years, exceedances of the current sulphur dioxide objectives may still occur in the vicinity of localised combustion plant, in areas where solid fuels are still the predominant source of domestic heating and in close proximity to major ports.

In the first round of reviews and assessments a small number of AQMAs were declared due to sulphur dioxide emissions from coal fired boiler plants, domestic coal burning and a major port.

7.2 The local perspective

In the First Stage Review and Assessment of Air Quality in York sulphur dioxide was assessed against the following objective:

> *'The 99.9th percentile of 15-minute averages not to exceed 100ppb by the end of 2005.'*

The First Stage Review and Assessment of Air Quality in York concluded that in general concentrations of sulphur dioxide in York are low. However, the occurrence of occasional peaks in the monitoring data, possibly due to power station emissions, was highlighted and it was recommended that a detailed review and assessment of sulphur dioxide should be undertaken.

In the Second and Third Stage Review and Assessment of Air Quality in York sulphur dioxide was assessed against revised objectives which were:

> 'A 24 hour mean of 125µg/m^3 (47ppb), not to be exceeded more than 3 times a year, to be achieved by the end of 2004'
>
> 'A one hour mean of 350µg/m^3 (132ppb), not to be exceeded more than 24 times a year, to be achieved by the end of 2004'
>
> 'A 15 minute mean of 266µg/m^3 (100ppb), not to be exceeded more than 35 times a year, to be achieved by the end of 2005'

It was concluded that these objectives would also be met in York without the need for further action at a local level.

7.3 Scope of the update and screening assessment for sulphur dioxide

For the purpose of this update and screening assessment sulphur dioxide has been assessed against the current objectives which are:

- 'A 24 hour mean of 125µg/m^3 (47ppb), not to be exceeded more than 3 times a year, to be achieved by the end of 2004'

- 'A one hour mean of 350µg/m^3 (132ppb), not to be exceeded more than 24 times a year, to be achieved by the end of 2004'

- 'A 15 minute mean of 266µg/m^3 (100ppb), not to be exceeded more than 35 times a year, to be achieved by the end of 2005'

In accordance with the air quality guidance note LAQM.TG(03) the following items have been considered:

- Sulphur dioxide monitoring data
- New industrial sources
- Existing industrial sources with significantly increased emissions
- Areas of domestic coal burning
- Small boilers (>5$MW_{(thermal)}$) burning coal or oil
- Shipping
- Railway locomotives

7.4 Assessment of sulphur dioxide monitoring data for York

City of York Council has undertaken real time monitoring of sulphur dioxide at three locations in the city. These are:

- Bootham (urban background site)
- Dunnington (sub-urban background site)
- City Centre (city centre site)

The location of these monitoring sites are shown on Figure 38.

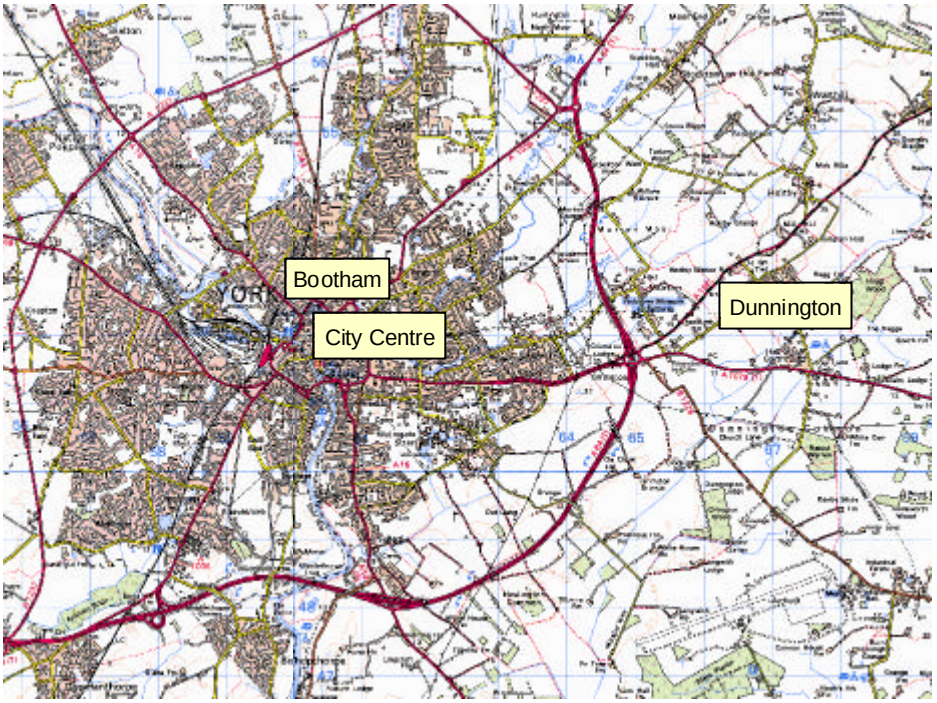
The results of the sulphur dioxide monitoring undertaken at these sites are shown in Table 9. In accordance with the technical guidance note LAQM.TG(03) the number of exceedances of an objective level can only be reported if the data capture is greater than 90%. Where data capture is less than 90% the following must be reported instead:

- 99.9th percentile of 15 minute means
- 99.7th percentile of 1 hour means
- 99th percentile of 24 hour means

Both exceedances and percentile values are given in Table 9.

Full information about the air pollution station locations, data management procedures and other QA/QC procedures for the real time air pollution stations have been previously documented as part of the Second and Third Stage Review and Assessment of Air Quality in York.[1]

Figure 38: Locations where real time monitoring of sulphur dioxide has been undertaken in York



[1] CITY OF YORK COUNCIL Second and Third Stage Review and Assessment of Air Quality in York – Technical Annex 2: Air Quality Monitoring in York Feb 2001

Table 9 : Summary of real time sulphur dioxide monitoring results

Parameter	Station	Monitoring Period (calendar year)		
		2003	2004	2005
Number of exceedances of 266 ug/m^3 15 minute mean objective (35 allowed in any one year)	Bootham	0	0	0
	Dunnington	2	0	0
	City Centre	12	0	0
99.9th percentile of 15 minute means (µg/m^3)	Bootham	91.56	66.93	42.11
	Dunnington	90.52	46.56	11.59
	City Centre	187.92	50.44	32.45
Number of exceedances of 350ug/m^3 hourly mean objective (24 allowed in any one year)	Bootham	0	0	0
	Dunnington	0	0	0
	City Centre	0	0	0
99.7th percentile of 1 hour means (µg/m^3)	Bootham	28.76	32.88	27.12
	Dunnington	54.45	25.20	26.88
	City Centre	110.35	30.07	20.53
Number of exceedances of 125ug/m^3 24 hour mean objective (3 allowed in any one year)	Bootham	0	0	0
	Dunnington	0	0	0
	City Centre	0	0	0
99th percentile of 24 hour means (µg/m^3)	Bootham	12.03	13.52	11.70
	Dunnington	19.64	9.45	11.89
	City Centre	31.90	14.44	8.24
Daily Average (ppb)	Bootham	1.5	1.35	1.36
	Dunnington	2.1	1.46	1.85
	City Centre	3.0	1.42	0.85
Percentage data capture	Bootham	91%	89%	74%
	Dunnington	78%	89%	38%
	City Centre	96%	79%	73%

[Note : only 9 months worth of ratified data is presented for 2005]

The results shown in Table 9 indicate that the objectives for sulphur dioxide are already being met at all the real time monitoring locations in York. On this basis, City of York Council does not propose to carry out a detailed assessment for sulphur dioxide at this time.

As of 1st April 2006, all the sulphur dioxide analysers within City of York Council's monitoring network were closed due to lack of funding to support the ongoing service and maintenance contracts. City of York Council will explore the possibility of additional funding to re-establish the sulphur dioxide monitoring network if there are any significant increase in sulphur dioxide emissions from localised sources.

7.5 Assessment of sulphur dioxide from industrial sources

7.5.1 Assessment procedure

The presence of industrial processes which emit significant amounts of sulphur dioxide may give rise to localised breaches of the sulphur dioxide objectives. For the purpose of assessing sulphur dioxide from industry local authorities are required to undertake the following:

1. Identify and assess all new industrial sources of sulphur dioxide.

2. Identify any industrial sources of sulphur dioxide which have substantially increased their emissions since the last round of review and assessment.

7.5.2 Assessment of industry in York

Annex 2 of technical guidance note LAQM.TG(03) lists the following processes as being significant sulphur dioxide emitters:

- iron and steel processes
- petroleum processes
- combustion processes
- non-ferrous metal processes
- carbonisation processes
- cement/lime manufacture
- ceramic production
- tar and bitumen processes
- furnaces
- aluminium processes
- zinc and alloy processes
- copper and copper alloy processes
- manufacture of heavy clay and refractory goods
- glass and lead glass manufacturing
- roadstone coating plants

For the purpose of City of York Council's Update and Screening Assessment, all the Part A and Part B installations, controlled under the regulatory regimes of the Environmental Protection Act 1990 and the Pollution Prevention and Control Act 1999 (PPC), in the vicinity of York were reviewed using information posted on the Internet (http://www.environment-agency.gov.uk), and by consulting the relevant public registers.

In accordance with guidance note LAQM.TG(03), City of York Council also needs to consider the impact of emissions stacks within neighbouring authorities, if there is the potential for these to be significant.

Since the last round of review and assessment, no new A1 nor A2 installations have been permitted under the PPC regime within the boundaries of City of York Council.

Using the table in Appendix 1 all industrial processes within 5km of York which have the potential to emit significant quantities of sulphur dioxide have been identified. These are shown in Table 10 below.

Table 10 : Industrial processes within 5km of York which have the potential to emit significant quantities of sulphur dioxide

Process	Process Type	Authorisation Reference Number	Regulating Authority
BRITISH SUGAR PLC	COMBUSTION	AA2518	Environment Agency
BRITISH SUGAR PLC	CEMENT AND LIME	AH8590	Environment Agency

British Sugar has been thoroughly considered during previous rounds of review and assessment and is included as a source within City of York Council's emissions inventory used for dispersion modelling. Modelling studies carried out by City of York Council have not indicated any potential breaches of the sulphur dioxide objectives. Furthermore, there have been no significant increase in emissions from British Sugar since City of York Council's last round of review and assessment.

It should also be noted that Drax and Eggborough power stations (located 19km and 22km of York respectively), although outside the boundary required for the current Update and Screening Assessment, have been fully considered during previous rounds of review and assessment. There have been no significant increases in emissions from either of these two power stations since City of York Councils Update and Screening Assessment in May 2003. It should also be highlighted that these two sources are included within City of York Councils emissions inventory and are included in all modelling work carried out for the review and assessment procedure. Modelling studies carried out by City of York have not indicated any potential breaches of the sulphur dioxide objectives due to these two sources.

7.6 Assessment of sulphur dioxide from domestic sources

7.6.1 Assessment procedure

In some areas of the UK domestic coal burning is still undertaken at a large number of properties. This can result in significant emissions of sulphur dioxide.

For the purpose of assessing sulphur dioxide from domestic coal burning local authorities are required to undertake the following:

- Identify all areas where significant coal burning still takes place. This includes areas where solid smokeless fuels are in frequent use. For the purpose of the update and screening assessment 'significant' can be taken to mean any 500m x 500m area within which more than 100 houses burn solid fuels as their primary source of heating.

- Where the density of coal burning premises exceeds 100 per 500m x 500m area a more detailed assessment should be undertaken.

7.6.2 Assessment of domestic solid fuel burning

City of York Council's Update and Screening Assessment submitted to DEFRA in May 2003 presented the results of a housing condition survey undertaken in York. The results of this survey indicated that in some areas of York there was the potential for more than 50 houses per 500m x 500m to be using solid fuels as a primary or secondary source of heating. Following this study, City of York Council undertook a further study to assess the levels of domestic solid fuel burning in Wheldrake, a small rural village, nine miles to the south east of York. This study was carried out for City of York Council's Detailed Assessment report, submitted to DEFRA in April 2004. This study showed that there were approximately 80 households within the village where solid fuel burning still took place. Since this is below the threshold value of 100 houses, City of York Council does not intend on carrying out any further assessment at this time.

7.7 Assessment of sulphur dioxide from small boilers (>5 $MW_{(thermal)}$)

7.7.1 Assessment procedure

In some areas of the UK emissions from small coal and oil fired boiler plants (>5 $MW_{(thermal)}$) have been found to give rise to high short term concentrations of sulphur dioxide which may result in exceedances of the 15 minute objective for sulphur dioxide.

For the purpose of assessing sulphur dioxide from large boiler plant local authorities are required to undertake the following:

1) Identify all boiler plant >5$MW_{(thermal)}$ that burn coal or fuel oil.

2) Identify if there is relevant exposure near to any such boiler plant.

7.7.2 Assessment of large boiler plant

For the purpose of the Second and Third Stage Review and Assessment of Air Quality in York all large boilers and other incineration plant in York were identified and their emissions entered into the York ADMS-Urban emissions inventory. The plant identified in this process were as follows:

- British Sugar boilers
- Barbican Leisure Centre boiler
- Monkhill Confectionary boiler
- Nestle Rowntree CHP
- Terrys Suchard boiler
- York Crematorium
- York District Hospital boilers
- University of York boilers

All the plant identified in this survey use gas as their primary fuel, although a number also use oil as a reserve fuel. Since the completion of the Second and Third Stage Review and Assessment of Air Quality in York there have not been any significant increases in emissions from any of the plant listed above and no new plant has been developed.

7.8 Assessment of sulphur dioxide from transport sources

7.8.1 Assessment procedure

Fuels used in the transport sector contain various amounts of sulphur which in some cases can give rise to exceedances of the 15 minute sulphur dioxide objective.

For the purpose of the update and screening assessment local authorities are required to consider sulphur dioxide emissions from the following:

1. Shipping – identify all relevant locations which are in the vicinity of ports which have greater than 5000 shipping movements per year.

2. Railway Locomotives – identify locations where diesel or coal fired locomotives are regularly stationary for periods of 15 minutes or more.

7.8.2 Assessment of sulphur dioxide emissions from shipping

There are no large ports in the York area. A detailed assessment of shipping movements is therefore not required.

7.8.3 Assessment of sulphur dioxide emissions from railway locomotives

City of York Council has previously considered the impact of sulphur dioxide emissions from idling railway locomotives[2]. This was investigated using the ADMS-Urban air quality dispersion model. The results of the modelling work indicated that the air quality objectives for sulphur dioxide were unlikely to be breached as a result of locomotives idling within railway sidings. City of York Council feels that it has already carried out a thorough assessment of sulphur dioxide emissions from railway locomotives and as such it does not consider a detailed assessment necessary at this time.

7.9 Conclusions from the update and screening of sulphur dioxide

Based on this assessment it is concluded that City of York Council is not required to progress to a detailed assessment of sulphur dioxide at this time. It should however undertake a further update and screening exercise for sulphur dioxide in April 2009.

[2] City of York Council, Detailed Assessment Report, April 2004.