

## 5 Updating and Screening Assessment for Benzene

### 5.1 THE NATIONAL PERSPECTIVE

The main sources of benzene emissions in the UK are petrol-engined vehicles, petrol refining, storage and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems. A number of policy measures already in place, or planned for future years, will continue to reduce emissions of benzene. Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1 %, from a previous upper limit of 5 %. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol are controlled by vapour recovery systems. The UK automatic monitoring network recorded no exceedences of the 2003 objective in 2003, or later years. While the 2010 objectives are expected to be met at all urban background and most roadside locations, there is the possibility for some remaining exceedences, which will require additional measures at a local level.

### 5.2 STANDARD AND OBJECTIVE FOR BENZENE

The Government and the Devolved Administrations have adopted a running annual mean concentration of  $16.25 \mu\text{g m}^{-3}$  as the air quality standard for benzene, with an objective for the standard to have been achieved by the end of 2003. However, in light of the health advice from EPAQS and the Department of Health's Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) to reduce concentrations of benzene in air to as low a level as possible, additional tighter objectives have also been set. The additional objective is for an annual mean of  $5 \mu\text{g m}^{-3}$  to be achieved by the end of 2010 in England and Wales.

### 5.3 CONCLUSIONS OF THE PREVIOUS ROUNDS OF REVIEW AND ASSESSMENT FOR BENZENE

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

- A single potential source was identified in the Stage 1 assessment – a petroleum terminal. However, this was ruled out as a source of a potential exceedence through monitoring at Stage 2, which indicated that there was no significant risk of the objective being exceeded by the end of 2003 and beyond. No further assessment was required.
- Current levels of benzene are estimated to be below the objective of  $16.25 \mu\text{g m}^{-3}$  in the Borough of King's Lynn and West Norfolk.

The national policies were expected to deliver the 2003 air quality objective for benzene and hence there is no need to undertake a detailed assessment for benzene. No AQMAs have been declared for benzene in the Borough of King's Lynn and West Norfolk.

## 5.4 SCREENING ASSESSMENT OF BENZENE

### 5.4.1 Screening Check List

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

- Monitoring data outside an AQMA
- Monitoring data within an AQMA
- Very busy roads or junctions in built-up areas
- New industrial sources
- Industrial sources with substantially increased emissions or new relevant exposure
- Petrol stations
- Major fuel storage depots (petroleum only)

These are described in the following sections.

### 5.4.2 Background Concentrations for Benzene

The 2003 average background benzene concentration in King's Lynn and West Norfolk, estimated from UK background maps (<http://www.airquality.co.uk/archive/laqm/tools.php>) was  $0.20 \mu\text{g m}^{-3}$ , with a maximum concentration of  $0.42 \mu\text{g m}^{-3}$ . This is well below the 2003 objective. Projected concentrations for 2010 are even lower, with an average concentration of  $0.17 \mu\text{g m}^{-3}$  and a maximum concentration of  $0.34 \mu\text{g m}^{-3}$ .

### 5.4.3 Screening Assessment of Monitoring Data

#### 5.4.3.1 Monitoring data outside an AQMA

Monitoring is not currently carried out in King's Lynn and West Norfolk.

#### 5.4.3.2 Monitoring data within an AQMA

No AQMAs have been declared in this Authority for benzene.

### 5.4.4 Screening Assessment of Very Busy Roads

The guidance document LAQM.TG(03) requires assessment of benzene only at 'very busy' roads or at junctions in built-up areas with a predicted background concentration of more than  $2 \mu\text{g m}^{-3}$  (Appendix 2 Table A2.1).

The traffic flow data obtained from the NAEI indicates that there are no roads in the area that can be classified as very busy. The background benzene concentration is also estimated to be below this threshold.

### 5.4.5 Screening Assessment of Industrial Sources

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

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

- Petroleum processes (73)
- Petrochemical processes (2)
- Carbonisation processes (12)
- Cement/lime manufacture (7)
- Gasification processes (5)

#### **Part B**

Processes for the storage and unloading of petrol at terminals

None of the Part A or Part B industrial processes in the Borough operate these processes (Appendix 3), nor have the potential to emit significant quantities of benzene. There is however one petroleum storage facility in King's Lynn that is considered in Section 5.4.7.

#### 5.4.6 Screening Assessment of Petrol Stations

There are a number of petrol stations in King's Lynn and West Norfolk that are authorised as Part B processes. The guidance requires petrol stations to be considered only if they are near a busy road, *i.e.* with more than 30,000 vehicles per day, and have a throughput greater than 2 million litres per annum. There are no petrol stations in the Borough that meet both criteria where members of the public might regularly be exposed within 10 m of the pumps.

Stage II petroleum vapour recovery will be required by 2007 at some service stations and by 2010 at others.

#### 5.4.7 Screening Assessment of Fuel Storage Depots

There is one existing fuel storage depot in the Borough: Pace Petroleum, King's Lynn, formerly Petroleum (GB Ltd) and then Q8 Petroleum. A new permit was issued on 22<sup>nd</sup> December 2004, and the process is categorised as a medium risk. The new permit requires benzene monitoring to be undertaken in the form of one diffusion tube operated by the site user. Results are not yet available.

The previous Updating and Screening Assessment (2003) estimated that benzene emissions from the depot were unlikely to cause an exceedance of the 2003 and 2010 objectives. These estimates were supported by the results of an extensive diffusion tube survey for benzene undertaken in 2000, where the annual average concentrations were < 5 µgm<sup>-3</sup>, meeting both the 2003 and 2010 objectives. Although updated information used in the Progress Report (2004) predicted a possible risk of exceedance, this was considered unlikely and further assessment was not required.

No additional throughput, emissions or ambient monitoring data have been made available since the previous round of Review and Assessment, so this source will not be considered further at this stage. However, the Council understands that there may be a future likelihood of increased emissions as more deliveries are made by road tankers rather than directly from sea-going tankers. It is recommended that any available benzene monitoring data should be reviewed in the next progress report.

No other storage depots have been identified either in or close to the King's Lynn and West Norfolk Borough Council area.

### 5.5 CONCLUSIONS FOR BENZENE IN THE BOROUGH

No monitoring of benzene has been carried out in King's Lynn and West Norfolk since the last round of Review and Assessment, but the background maps indicate low concentrations. Benzene exceedances have been discounted in previous rounds of Review and Assessment following a previous diffusion tube survey at the Pace Petroleum fuel storage depot. However, the PPC permit now requires benzene monitoring at the Pace Petroleum fuel storage depot by way of a diffusion tube, which should be considered in the next progress report. There are no roads that can be classified as 'very busy' in the Borough or any petrol stations with a throughput greater than 2 million litres and with relevant exposure within 10 m of the pumps. A Detailed Assessment is not required for benzene in King's Lynn and West Norfolk.

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	Source, location or data that need to be assessed	Updating and Screening Assessment
A	Monitoring data	This Authority does not currently undertake benzene monitoring, although monitoring in 2000 indicated that the benzene objectives were likely to be met. The new operating permit (Dec 2004) for Pace Petroleum storage depot requires benzene monitoring to be undertaken by diffusion tube in the vicinity, but results are not yet available. It is recommended that any available monitoring data should be reviewed in the next progress report.

B	Very busy roads or junctions in built-up areas	No roads or junctions in the Borough of King's Lynn and West Norfolk can be classified as 'very busy', according to the criteria in the guidance
C	Industrial sources	There are no Part A or Part B industrial processes in the Borough that have the potential to emit significant quantities of benzene.
D	Petrol sources	There are no petrol stations in the Borough that meet both throughput and AADTF criteria, and no places where members of the public might regularly be exposed within 10 m of the pumps.
E	Major fuel storage depots (petroleum only)	Pace Petroleum: no further throughput or emissions data have been made available since the previous progress report was undertaken, which predicted a possible but unlikely risk of exceedence. This source will not be considered further at this stage, but it is recommended that any available benzene monitoring data should be reviewed in the next progress report.
	<b>Conclusion</b>	There have been no significant changes with regards to benzene in this Authority. <b>A detailed assessment is not required for King's Lynn and West Norfolk.</b>