

## **3.0 Update and Screening Assessment for Benzene**

### **3.1 The national perspective**

The main sources of benzene emissions in the UK are petrol-engined vehicles and petrol refining and distribution activities. A number of policy measures already in place, or planned for future years, will ensure that benzene emissions continue to be reduced.

Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1% from a previous upper limit of 5%. Benzene emissions from vehicles will be reduced further through the provisions the European Auto-Oil Programme. Emissions from petrol storage and distribution activities are already widely controlled by the use of vapour fuel recovery systems.

### **3.2 The local perspective**

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

*'A running annual average of 5ppb or less to be achieved by the end of 2005'.*

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

In the Second and Third Stage Review and Assessment of Air Quality in York benzene was assessed against a revised objective which was:

*'A running annual mean of 16.25  $\text{mg}/\text{m}^3$  (5ppb) or less to be achieved by the end of 2003'.*

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

### 3.3 Scope of the update and screening assessment for benzene

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

*'A running annual mean of 16.25mg/m<sup>3</sup> or less to be achieved by the end of 2003'.*

*'A fixed annual mean of 5mg/m<sup>3</sup> to be achieved by the end of 2010.'*

In accordance with the air quality guidance note LAQM.TG(03) Update January 2006 the following items have been considered:

- Benzene monitoring data
- Impact of 'very busy' roads
- Impact of industrial sources of benzene
- Impact of petrol stations
- Impact of major fuel storage depots (petroleum only)

### 3.4 Assessment of benzene monitoring data for York

In the First Stage Review and Assessment of Air Quality in York the results of a benzene diffusion tube monitoring survey undertaken in 1997 were reported. These results indicated that in general benzene levels in the city were already below the 16.25mg/m<sup>3</sup> objective level. Since the completion of the First Stage Review and Assessment of Air Quality in York no further benzene monitoring has been undertaken in York.

As the background pollutant maps for benzene, shown on the national air quality archive (<http://www.airquality.co.uk/archive/laqm/tools.php>), have not been revised since submission of City of York Council's last Update and Screening Assessment in 2003, the figures presented in this earlier report still provide the best estimate of likely Benzene concentrations in the city. This report showed that the estimated annual average background benzene concentrations in York are already well below the objective levels.

## **3.5 Assessment of benzene from traffic**

### **3.5.1 Assessment procedure**

National monitoring and modelling suggests that any breaches of the current 2010 objective for benzene will occur close to 'very busy' roads. For the purpose of assessing benzene from traffic local authorities are required to undertake the following:

1. Identify all 'very busy' roads in their area. Where 'very busy' roads are defined as :
  - Single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day.
  - Dual carriageway (2 or 3-lane) roads with daily average traffic flows which exceed 120,000 vehicles per day.
  - Motorways with daily average traffic flows which exceed 140,000 vehicles per day.

At junctions flows should be added to give a combined total.

2. Identify if there is 'relevant' exposure within 10m of any 'very busy' road.
3. If 'relevant' exposure exists undertake DMRB modelling to predict annual mean concentrations in 2003.
4. If the DMRB modelling suggests potential for the benzene objectives to be breached proceed to a detailed assessment.

### **3.5.2 Assessment of traffic in York**

Traffic data derived from the council's SATURN transport model has been analysed to establish if any of the roads within the York network meet the criteria set to define a 'very busy' road. The SATURN model was extensively validated and refined during 2005 and provides the best estimate of current traffic flows around the city.

The road with the highest daily flows is the A64 to the south of the city which in some areas carries up to 40,500 vehicles per day.

The junction with the greatest traffic flow is the Grimston Bar interchange which when considered as a single junction carries approximately 66,000 vehicles per day.

None of the roads in York fit the definition of 'very busy' for the purpose of assessing against the benzene air quality objectives. This indicates that the current air quality objectives for benzene should be met in York without the need for further reductions in traffic emissions.

## **3.6 Assessment of benzene from industrial sources**

### **3.6.1 Assessment procedure**

Industrial processes which emit significant amounts of benzene may give rise to breaches of the benzene objectives in some locations. For the purpose of assessing benzene from industry local authorities are required to undertake the following:

1. Identify all significant industrial sources of benzene in their area. Significant emitters of benzene are listed in Annex 2 of technical guidance note LAQM.TG(03).
2. If significant industrial sources of benzene are identified the nomograms in technical guidance note LAQM.TG(03) should be used to determine if the benzene objectives are at risk of being breached.

### **3.6.2 Assessment of industry in York**

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

- petroleum processes
- carbonisation and associated processes

For the purpose of this update and screening assessment all the Part A and Part B processes in the vicinity of York have been reviewed using information posted on the Internet ([www.environment-agency.gov.uk](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. A summary of all the authorised processes in and around York can be found at Appendix 1.

It can be seen from the table in Appendix 1 that there are no petroleum or carbonisation processes in or close to York. This indicates that in York there is no risk of industrial emissions giving rise to breaches of the current benzene objectives.

### **3.7 Assessment of benzene from petrol stations**

#### **3.7.1 Assessment procedure**

In some locations petrol stations may emit sufficient benzene to put the 2010 objective at risk of being breached, especially where emissions from the petrol stations are combined with emissions from nearby busy roads. For the purpose of assessing benzene from petrol stations local authorities are required to undertake the following:

- Identify all petrol stations with an annual throughput of more than 2000m<sup>3</sup> of petrol which have a busy road nearby. A busy road should be taken as any road with a flow of more than 30,000 vehicles per day. Only petrol should be considered when assessing the throughput.
- Determine whether there is relevant exposure within 10m of the pumps.

#### **3.7.2 Assessment of petrol stations in York**

The pollution Prevention and Control (England and Wales) Regulations 2000 (as amended) requires that the activity of unloading petrol into stationary tanks at a service station, where the quantity in any 12 months is likely to be 5000 m<sup>3</sup> or more, requires a permit from the local authority. A list of petrol stations currently authorised by City of York Council is given in Table 2. In each case the distance of the petrol pumps from relevant locations has been checked using the ArcView GIS system. The results of this search are also shown in Table 2.

**Table 2 : Authorised petrol stations in York**

<b>Petrol station</b>	<b>Authorisation reference number</b>	<b>Is there residential property within 10m of the pumps?</b>	<b>Is there any other 'relevant' location within 10m of the pumps?</b>
Asda Monks Cross	1/14/1A	No	No
Inner Space Station Nether Poppleton	1/14/2A	No	No
Tesco Askham Bar	1/14/4A	No	No
Tesco Clifton Moor	1/14/5A	No	No
Sainsburys Monks Cross	1/14/6A	No	No
Station Garage Haxby Road	1/14/7A	No	No
FR Pulleyn Wigginton Road	1/14/8A	No	No
Jorvick Filling Station Hull Road	1/14/12A	No	No
National Car Rental	1/14/13A	No	No
Costcutter Garage A1079 Hull Road	1/14/15A	No	No
London Bridge Service Station Tadcaster Road	1/14/17A	No	No
Inner Space Station Hull Road	1/14/20A	No	No
Inner Space Station Boroughbridge Road	1/14/21A	No	No
SAVE Mill Street	1/14/23A	No	No
Knavesmire Service Station Tadcaster Road	1/14/24A	No	No
Shell Service Station Hull Road	1/14/14A	No	No

[Please note that permits have been revoked from three petrol stations since the council's USA report in 2003, viz. Bristows of York, Fina, and Fulford Service Station]

As can be seen from Table 2 none of the authorised petrol stations in York have relevant locations within 10m of the pumps. This indicates that in York

there is no risk of petrol stations giving rise to breaches of the current benzene objectives.

### **3.8 Assessment of benzene from major fuel storage depots**

#### **3.8.1 Assessment procedure**

In some locations the presence of fuel storage depots may put the 2010 objective at risk of being breached, especially where emissions from the fuel storage depot are combined with emissions from nearby busy roads. For the purpose of assessing benzene from fuel storage depots local authorities are required to undertake the following:

- Identify any major fuel storage depots handling petrol.
- Determine the distance of the nearest relevant exposure.
- Establish the annual emissions from the storage depot.
- Use the nomograms in LAQM.TG(02) to determine if the source require further assessment.

#### **3.8.2 Assessment of fuel storage depots in York**

There are no major fuel storage depots in York.

### **3.9 Conclusions from the update and screening of benzene**

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