North Lincolnshire Council

Air Quality, Updating & Screening Assessment 2006

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Executive Summary

As part of the National Air Quality Strategy, North Lincolnshire Council is required to undertake an Updating and Screening Assessment of air quality within its boundaries; this builds on and updates the Council's first round of Air Quality Review and Assessment.

The Updating and Screening Assessment reconsiders all potential sources of pollution (primarily industry and traffic related sources) with respect to PM_{10} (particulate matter), nitrogen dioxide, sulphur dioxide, carbon monoxide, benzene, 1,3-butadiene and lead.

The main purpose of the review is to identify those aspects that have changed since completion of the last round Review and Assessment.

This report reviews and assesses the emissions from Part A and Part B processes located both within and close to North Lincolnshire, and the emissions from traffic on all road links which meet the criteria in the Local Air Quality Management Technical Guidance LAQM.TG(03) as updated in 2006. The Design Manual for Roads and Bridges (DMRB v1.02) has been used to assess the impact of pollutants from traffic sources.

In addition, to help the assessment of both industrial and traffic pollutants historical monitoring data has been used.

From the results of the monitoring and the screening exercises in this Review & Assessment, it is proposed that detailed assessments will be conducted in relation to the following: -

- Industrial emissions of 1,3-Butadiene in the vicinity of the Conoco Phillips Ltd and Total UK Ltd Oil Ltd Refineries, North Killingholme.

- Industrial emissions of Lead in the vicinity of the Corus (UK) Ltd Integrated Steelworks, Scunthorpe.

- Emissions of Nitrogen Dioxide in the vicinity of:
    - Doncaster Rd / Hilton Avenue, Scunthorpe
    - Junction of Brigg Road and A18, Mortal Ash, Scunthorpe

North Lincolnshire Council will undertake appropriate work in these areas to determine if it is necessary to declare any further Air Quality Management Areas.

Updating and Screening Assessment Summary Checklists

Carbon Monoxide

Item	Response
A) Monitoring data	The current background concentration of 0.268mg/m^3, identified on UK background maps, is well within the threshold value of 10mg/m^3. Monitoring at Scunthorpe Town site (Rowland Road) between February and November 2005 recorded a maximum 8 hourly concentration of 1.5mg/m3, within the threshold value.
B) Very busy roads or junctions in built-up areas	No roads within North Lincolnshire currently meet the guidelines specified in LAQM.TG(03). Therefore it was concluded that road traffic will not significantly affect Carbon Monoxide levels in the region.

Benzene

Item	Response
A) Monitoring data outside an AQMA	No exceedance of the 2010 air quality objective was recorded by the Benzene diffusion tube survey conducted in the Detailed Assessment 2004.
B) Monitoring data within an AQMA	There are no AQMAs for Benzene within North Lincolnshire.
C) Very busy roads or junctions in built up areas	No roads within North Lincolnshire currently meet the guidelines specified in LAQM.TG(03). Therefore it was concluded that road traffic will not significantly affect Benzene levels in the region.
D) New industrial sources.	There are no new significant industrial sources of Benzene within North Lincolnshire.
E) Industrial sources with substantially increased emissions, or new relevant exposure	Significant increase in mass emissions from two refineries due to a change in the methodology for calculating these mass emissions by the operators.
F) Petrol stations	No petrol stations in North Lincolnshire meet the specified criteria.
G) Major fuel storage depots (petrol only)	None of the fuel storage depots in the region will breach the 2010 air quality objective.

1,3-butadiene

Item	Response
H) Monitoring data	No ambient air quality monitoring for 1,3-butadiene is currently undertaken in North Lincolnshire.
I) New industrial sources.	There are no new significant industrial sources of 1,3-butadiene within North Lincolnshire.
J) Industrial sources with substantially increased emissions, or new relevant exposure	Significant increase in mass emissions from two refineries due to a change in the methodology for calculating these mass emissions by the operators. Detailed assessment required.

Lead

Item	Response
K) Monitoring data	No ambient air quality monitoring for lead is currently undertaken in North Lincolnshire.
L) New industrial sources.	Immingham CHP is the only newly commissioned industrial site with the potential to emit significant amounts of lead within North Lincolnshire.
M) Industrial sources with substantially increased emissions, or new relevant exposure	Significant increase in mass emissions from two sites due to a change in the methodology for calculating mass emissions by this operator. Detailed assessment required.

Nitrogen Dioxide

Item	Response
N) Monitoring data outside an AQMA	The NO_x diffusion tube survey identified two locations that exceeded the 2005 annual air quality objective for Nitrogen Dioxide.
O) Monitoring data within an AQMA	There are no AQMAs for Nitrogen Dioxide within North Lincolnshire.
P) Narrow congested streets with residential properties close to the kerb	No roads within North Lincolnshire currently meet the guidelines specified in LAQM.TG(03).

Q) Junctions.	None of the junctions identified exceeded the 2005 Nitrogen Dioxide air quality objective.
R) Busy streets where people may spend 1-hour or more close to traffic	None of the streets identified exceeded the 2005 Nitrogen Dioxide air quality objective.
S) Roads with high flow of buses and/or HGVs.	None of the roads identified exceeded the 2005 Nitrogen Dioxide air quality objective.
T) New roads constructed or proposed since the previous round of R&A	There have been no new/proposed roads since previous rounds of assessment that met the specified criteria.
U) Roads with significantly changed traffic flows, or new relevant exposure	There are no roads with significantly changed traffic flows or new relevant exposure.
V) Bus Stations	Scunthorpe bus station was considered during previous reports where it was found that it did not meet the specified criteria to be considered. This conclusion remains valid.
W) New industrial sources.	There has been one newly commissioned industrial site with the potential to emit significant amounts of Nitrogen Dioxide within North Lincolnshire.
X) Industrial sources with substantially increased emissions, or new relevant exposure	Five industrial processes with increased or incomparable emissions were considered. None require a detailed assessment at this stage but further data is required for two processes.
Y) Aircraft	Two airports were considered, neither requires a detailed assessment.

Sulphur Dioxide

Item	Response
Z) Monitoring data outside an AQMA	Monitoring data indicates that no location exceeded the 2000 15-minute, 1-hour or 24-hour Sulphur Dioxide air quality objectives.
AA) Monitoring data within an AQMA	There are no AQMAs for Sulphur Dioxide within North Lincolnshire.
BB) New industrial sources.	Immingham CHP is the only newly commissioned industrial site with the potential to emit significant amounts of Sulphur Dioxide within North Lincolnshire.

CC) Industrial sources with substantially increased emissions, or new relevant exposure	Ten industrial processes with increased or incomparable emissions were considered. None require a detailed assessment at this stage but further data is required for one process.
DD) Areas of domestic coal burning	Areas of coal burning were considered in a previous assessment, which concluded that there would be no impact on the air quality objectives. This conclusion remains valid.
EE) Small Boilers > 5 MW (thermal).	There are no coal burning boilers greater than $5MW_{(thermal)}$ in North Lincolnshire.
FF) Shipping	No relevant exposure was identified within 1km of the shipping terminals meeting the specified parameters.
GG) Railway Locomotives	Rail traffic will not give rise to any relevant exposure within North Lincolnshire.

PM_{10}

Item	Response
HH) Monitoring data outside an AQMA	Monitoring data indicates that there are no locations which would breach the 2004 PM_{10} air quality objectives.
II) Monitoring data within an AQMA	Further assessment work will continue throughout Scunthorpe and the surrounding villages in order to confirm that the boundaries of the AQMA are accurate and whether they need to be refined. Relative contributions of PM_{10} from different sources including industry, traffic and natural sources will be identified. An action plan will also be produced working with other stakeholders in order to reduce levels of PM_{10} within the area.
JJ) Busy roads and junctions in Scotland	N/A
KK) Junctions.	None of the junctions identified exceeded the 2005 PM_{10} air quality objective.
LL) Roads with high flow of	None of the roads identified exceeded the 2005 PM_{10} air quality

buses and/or HGVs.	objective.
MM) New roads constructed or proposed since last round of R&A	There have been no new/proposed roads since previous rounds of assessment that met the specified criteria.
NN) Roads with significantly changed traffic flows, or new relevant exposure.	There are no roads with significantly changed traffic flows or new relevant exposure.
OO) Roads close to the objective during the second round of Review and Assessment	No roads were considered to be close to breaching the air quality objectives during the last round of review and assessment, therefore none can be considered here.
PP) New industrial sources.	Immingham CHP is the only newly commissioned industrial site with the potential to emit significant amounts of PM_{10} within North Lincolnshire.
QQ) Industrial sources with substantially increased emissions, or new relevant exposure	Eight industrial processes with incomparable emissions were considered. None require a detailed assessment.
RR) Areas of domestic solid fuel burning	Areas of coal burning were considered in a previous assessment, which concluded that there would be no impact on the air quality objectives. This conclusion remains valid.
SS) Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.	No new sites have been identified since the last round of assessment. No significant changes to background concentrations or receptors could be identified from existing sources.
TT) Aircraft	Two airports were considered, neither requires a detailed assessment.

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Glossary of Terms

AQMA	Air Quality Management Area. A legally defined area identified as one in which the statutory Air Quality Objectives will not be met. An action plan must be drawn up to improve air quality.
Air Quality Objective	An air quality standard that includes a date by which it must be achieved.
Air Quality Standard	The maximum acceptable level of a pollutant in the air that will not present a risk to the health of the most susceptible groups in the population.
Average Time	The period of time over, which a pollutant level, must be measured and the mean result calculated. This can be a different period for each pollutant and directly affects which locations can be considered relevant.
C_6H_6	Benzene.
CO	Carbon Monoxide.
DEFRA	Department for Environment Food and Rural Affairs, the department responsible for Environmental Protection, including Air Quality.
Diffusion Tube	A simple, cheap monitoring device. Can be subject to inaccuracies and can only be used to measure Air Quality Objectives over longer time periods such as a month or year. Relatively cheap compared to continuous analysers so a larger number can be used.
Dispersion Model	A computer program which uses emissions inventory data and meteorological data to predict the concentration and distribution of pollutants in the atmosphere.
DMRB	Design Manual for Roads and Bridges version 1.02 (November 2003), a screening method.
Emissions Inventory	A catalogue of the sources of a pollutant in an area, with information about their positions and the quantities emitted. Used in dispersion models.
EPAQS	The Expert Panel on Air Quality Standards. The U.K. group appointed by the government to set standards for maximum acceptable levels of pollutants.
Exceedance	Any period of time where the concentration of a pollutant is greater than the appropriate Air Quality Standard.
Fugitive Emissions	Emissions of pollutants from a vent point other than a stack.
GIS	Geographical Information Systems
$\mu g/m^3$	Micrograms per cubic metre.
mg/m^3	Milligrams per cubic metre.
NAQS	National Air Quality Strategy.

NETCEN	National Environment Technology Centre (part of AEA.)
NO	Nitric Oxide.
NO_2	Nitrogen Dioxide.
NO_X	Oxides of Nitrogen.
Part A Processes	An industrial process that is required to obtain authorisation from the Environment Agency (Part A1) or by the Local Authority (Part A2). Regulation of the emissions to air is included in the authorised document.
Part B Processes	An industrial process that is required to obtain authorisation from the local authority in order to operate. Regulation of the emissions to air is included in the authorised document.
Pb	Chemical symbol for Lead.
Percentile	The percentage of items in a set of data lying above or below a particular value, e.g. concentration of a pollutant. For example for Nitrogen Dioxide the hourly mean of 200µg/m^3 can be exceeded up to 18 times a year. This is the equivalent of the 99.8th percentile being less than 200µg/m^3 because in one year there are 8760 hours of which 18 hours equals 0.2%, so 99.8% must be lower than the objective.
PM_{10}	Particulate matter less than 10 microns (millionths of a metre) in diameter.
ppb	Parts per billion.
ppm	Parts per million.
QA/QC	Quality Assurance/Quality Control. Procedures to ensure that data from pollutant monitoring equipment is representative of the site with good accuracy, precision and data capture.
Relevant Locations	These can differ for each pollutant according to the averaging period considered. Relevant locations are those areas where the public might reasonably be exposed to a pollutant over its averaging time. Long averaging times such as a year mean relevant locations could include schools, houses, hospitals etc. Short averaging times widen the scope, as less exposure time is needed.
Running Mean	As an example the air quality standard for Carbon Monoxide is 10mg/m^3 as a running 8-Hour Mean. To assess measured levels against this standard it is necessary to calculate the average of eight consecutive hourly values, e.g. from midnight to 8:00a.m. then from 1:00a.m to 9:00a.m. and so on throughout the period of interest. As each calculation of the “Running 8-Hour Mean” gives a result there will be 24 opportunities for the standard to be assessed each day. This will hold true for whether an 8-Hour, 24- Hour or Annual Running Mean is the time period under consideration.
SO_2	Sulphur Dioxide

VOC	Volatile Organic Compound, a compound that evaporates easily and is composed of carbon and hydrogen or containing carbon and hydrogen in combination with other elements. VOCs are thought to contribute towards the formation of photochemical smog.

1.0 Updating & Screening Assessment of Air Quality

1.1 Introduction

The concept of Local Air Quality Management was introduced under Part IV of the Environment Act 1995 ('The Act'). Section 82 of the Act placed a duty on all Local Authorities to review air quality in their area.

In 1997 The National Air Quality Strategy (NAQS) was published. This laid down a number of proposed Air Quality Objectives that were to be achieved by 2005. The Air Quality Objectives were subsequently formalised in the Air Quality Regulations 1997 ('The Regulations').

Air Quality Objectives can be defined as the Governments medium term objectives. They are based on Air Quality Standards set by the Expert Panel on Air Quality Standards (EPAQS) and are the maximum acceptable level of a pollutant in the air that will not present a risk to the health of the most susceptible groups in the population. The Air Quality Objectives include date(s) by which the Standards must be achieved. The length of time to achieve the Standard for each pollutant takes into account the costs to industry, the expected rate of improvements in available technology and the health effects on the country's population.

In January 1999 the Government consulted on proposals to revise the NAQS. This amended strategy was subsequently included in the Air Quality (England) Regulations 2000. The new Air Quality Objectives reduced the pollutant concentration for some pollutants and brought forward the compliance date for others.

The Air Quality (England) Regulations 2000 sets Air Quality Objectives for seven pollutants which must be achieved by varying dates, the latest being 31st January 2010. The Air Quality Objectives for the seven pollutants are listed in Table 1. Where an Objective is unlikely to be achieved within North Lincolnshire the area must be designated an Air Quality Management Area. The Authority must then develop and implement a local action plan setting out measures to reduce pollution levels.

Table 1 Objectives In The Air Quality (England) Regulations 2000

Pollutant	Objective		To Be Achieved By
	Concentration	Measured as	
Particles (PM_{10})	50µg/m^3	24-Hour Mean not to be exceeded more than 35 times a year.	31/12/2004
	40µg/m^3	Annual Mean	31/12/2004
Nitrogen Dioxide	200µg/m^3	1-Hour Mean not to be exceeded more than 18 times a year.	31/12/2005
	40µg/m^3	Annual Mean	31/12/2005
Sulphur Dioxide	350µg/m^3	1-Hour Mean not to be exceeded more than 24 times a year.	31/12/2004
	125µg/m^3	24-Hour Mean not to be exceeded more than 3 times a year.	31/12/2004
	266µg/m^3	15-Minute Mean not to be exceeded more than 35 times a year.	31/12/2005
Carbon Monoxide	10.0mg/m^3	Maximum Daily Running 8-Hour Mean	31/12/2003
Benzene	16.25µg/m^3	Running Annual Mean	31/12/2003
	5µg/m^3	Annual Mean	31/12/2010
1,3-Butadiene	2.25µg/m^3	Running Annual Mean	31/12/2003
Lead	0.5µg/m^3	Annual Mean	31/12/2004
	0.25µg/m^3	Annual Mean	31/12/2008

1.2 Conclusions and Recommendations from the Air Quality, Progress Report 2005

1.2.1 Benzene

The Benzene diffusion tube survey will continue for a further 12-month period from March 2005. The survey will be conducted at two sites in Scunthorpe:

- Dawes Lane, High Santon
- High Street East, Scunthorpe

1.2.2 Nitrogen Dioxide

The NOx diffusion tube survey will continue and will be reviewed in accordance with LAQM.TG(03).

Two locations were identified as sites likely to breach the air quality objectives for nitrogen dioxide. Chemiluminescent analysers are to be installed at both of these locations:

- Kingsway House – Lloyds Avenue / Ashby Road – Scunthorpe
- Gallagher Retail Park – Doncaster Road – Scunthorpe

1.2.3 Sulphur Dioxide

The automatic monitoring stations located at the sites below will remain in situ:

- Scunthorpe Town (Rowland Road)
- Killingholme Primary School

The 'Groundhog' mobile monitoring station will be relocated to Dawes Lane, High Santon to monitor emissions from industrial processes situated to the East of Scunthorpe.

1.2.4 PM_{10}

An Air Quality Management Area for PM_{10} is to be declared in Scunthorpe. Further work is to be undertaken into the sources and relative contribution of these sources to PM_{10} levels in the region.

1.3 Background to North Lincolnshire

North Lincolnshire is an area of around 85,000 hectares located on the southern side of the Humber estuary and occupying tracts of land on either side of the River Trent. The administrative area of North Lincolnshire was created in March 1995 by Parliamentary Order and on 1st April 1996 the new Unitary Authority area of North Lincolnshire came into being.

North Lincolnshire covers a large, mainly agricultural area. The pattern of settlements in the area reflects this with market towns surrounded by many small villages. An important exception to this is the substantial urban area of Scunthorpe and the adjoining town of Bottesford.

Almost half of North Lincolnshire's population, approximately 73,250 people, live in Scunthorpe and the adjacent town of Bottesford. Overall, 71 percent of the population live in this main urban area and other towns.

The local economy of North Lincolnshire was built on traditional industries such as steel manufacturing and related industries and agriculture. More recently there has been the establishment of two oil refineries and the introduction of several gas fired power stations.

The M180 motorway and several primary and strategic routes, including the A18 and A15, are located within North Lincolnshire. By rail there are regular freight movements to and from Scunthorpe Steelworks and Humber port related industries. With several wharf facilities along the banks of the Humber and the Trent North Lincolnshire is well positioned to take advantage of water transport.

1.4 Purpose of this Report

North Lincolnshire Council is required to assess air quality under the Environment Act 1995 and completed the first stage Review and Assessment process in December 2001 and the second in 2004.

The purpose of this report is to identify and reassess sources of emissions to air that have changed since the second round of review and assessment and identify the impact this may have on predicted exceedances.

A review of air quality means a consideration of the levels of pollutants in the air for which objectives are prescribed in Regulations and an estimation of likely future levels. An assessment of air quality is the consideration of whether estimated levels for the relevant future period are likely to exceed the levels set in the objectives.

The Regulations make it clear, however, that likely exceedances of the objectives should be assessed in relation to 'the quality of the air at locations which are situated outside of buildings or other natural or man made structures, above or below ground, and where members of the public are regularly present'. This report will therefore focus on locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective.

This Updating and Screening Assessment has been completed in accordance with the technical guidance LAQM.TG(03) as amended in 2006. Where this report identifies a risk that an air quality objective will be exceeded at a location with relevant public exposure, a detailed assessment will be carried out. The deadline for the detailed assessment is the end of April 2007.

2.0 Updating & Screening Assessment of Carbon Monoxide (CO)

2.1 Introduction

Carbon Monoxide is produced by the incomplete combustion of fossil fuels or organic compounds that contain carbon. The principal source of Carbon Monoxide in the U.K. is currently road traffic, accounting for 67% of total releases in 2000. The greatest concentrations of Carbon Monoxide are found by busy roads or in enclosed spaces, for example multi-storey car parks.

2.1.1 The Health Effects Of Carbon Monoxide

Carbon monoxide is colourless and odourless and consequently can be inhaled without giving any warning to the recipient. If inhaled in large enough concentrations carbon monoxide can kill. It does so by substituting itself for oxygen in the blood and also by blocking essential biochemical reactions in cells. People with existing blood flow problems are likely to be at particular risk if exposed to carbon monoxide. Lower levels can cause breathlessness and impair mental ability.

2.1.2 Air Quality Objective For Carbon Monoxide

The objective for carbon monoxide contained in the National Air Quality Strategy and Air Quality (England) Regulations 2000 is:

10mg/m^3, measured as a running 8-hour mean to be achieved by 31st December 2003.

2.2 Assessment of Carbon Monoxide

2.2 (A) Carbon Monoxide Monitoring Data Outside An AQMA

The maximum background concentration of carbon monoxide in North Lincolnshire for 2001 is 0.324mg/m^3. In order to determine the level in 2003, a correction factor of 0.826 as detailed in the Technical Guidance LAQM.TG(03) was applied. The maximum background concentration in 2003 is estimated as 0.268mg/m^3: The background concentration of carbon monoxide is well below the air quality objective of 10mg/m^3, measured as a running 8-hour mean.

Monitoring for carbon monoxide has been carried out at the Council's Scunthorpe Town (on Rowland Road) site from 2nd February to 7th November 2005. Data capture during this period was 90.3%. The maximum 8 hourly concentration recorded during this period was 1.5 mg/m^3, which is less than the Air Quality Objective of 10 mg/m^3. The maximum 8-hour running concentration was recorded for the hours ending: 0000 on the 2nd April, 0100

and 0200 hrs on the 3rd April 2005. The hourly mean carbon monoxide concentration across the monitoring period was 0.163 mg/m^3.

2.2 (B) Very Busy Roads Or Junctions In Built Up Areas

Having considered traffic data in relation to North Lincolnshire no roads or junctions met the following criteria as detailed in Technical Guidance LAQM.TG(03).

- Single carriageway roads with daily average traffic flows in excess of 80,000 vehicles per day.
- Dual carriageway (2 or 3 lane) roads with daily average traffic flows in excess of 120,000 vehicles per day.
- Motorways with daily average traffic flows exceeding 140,000 vehicles per day.

Due to the number of vehicles on North Lincolnshire's roads it is concluded that road traffic will not have a significant effect on the background concentration of carbon monoxide. A detailed assessment is therefore not considered necessary.

2.3 Conclusions of the updating & screening assessment for carbon monoxide

North Lincolnshire will not proceed to a detailed assessment for carbon monoxide.

3.0 Updating & Screening Assessment of Benzene (C_6H_6)

3.1 Introduction

Benzene (C_6H_6) is an aromatic volatile organic compound (VOC) and is a minor constituent of petrol. The maximum benzene content of petrol has now been reduced to 1% in accordance with EU legislation. The main source of benzene emissions to the atmosphere is from the refining, distribution and combustion of petrol. Benzene is emitted in vehicle exhaust fume as unburned fuel and also as a product of the decomposition of other aromatic compounds present in the fuel.

3.1.1 The Health Effects Of Benzene

Benzene has long been known to be both toxic and carcinogenic. People exposed to high concentrations of benzene have an increased risk of non-lymphocytic leukaemia.

3.1.2 Air Quality Objective For Benzene

The Air Quality Objective for benzene included in the National Air Quality Strategy and Air Quality (England) Regulations 2000 is:

- **Air quality objective for benzene: 2003**

  Running annual mean of 16.25µg/m^3 to be achieved by 31 December 2003.

- **Air quality objective for benzene: 2010**

  Annual mean of 5µg/m^3 to be achieved by 2010.

3.2 Assessment of Benzene

3.2 (A) Benzene Monitoring Data Outside An AQMA

The Progress Report produced by North Lincolnshire Council in April 2005 identified relevant receptor sites along Dawes Lane, Santon Village, Scunthorpe that may be exposed to levels of Benzene in excess of the 2010 air quality objective for benzene.

The monthly concentrations of benzene recorded in the 2003/4 survey of co-located tubes in Santon ranged between 1.43 - 6.50 µg/m^3 with an annual mean of 3.39µg/m^3. Four of the monthly concentrations at this location were above 4µg/m^3, these were observed in December 2003, January, February and November 2004.

An additional site at High Street East, Scunthorpe was also identified as having relevant receptors for which no previous monitoring had been conducted.

In March 2005 further monitoring was commenced at two locations on High Street East and Dawes Lane, Santon.

Chromosorb diffusion tubes were exposed for a period of one month; this was then repeated for a period of 11 months.

Where possible the tubes were attached to lampposts. The chosen lampposts were sited as close as possible to relevant receptors.

The diffusion tubes were attached to the lampposts on metal brackets. The tubes were greater than 5cm away from the vertical surface of the lamppost. The tubes were mounted vertically with the sampling end downwards. All tubes were located at least 1.5m above ground, no tube was positioned greater than 2.5m above ground.

Table 2 Benzene Diffusion Tube Results for 2005/06

	Benzene Concentration µg/m^3		
	Tube 1	**Tube 2**	**Tube 3**
Grid Reference	**SE9019311290**	**SE92981195**	**SE92981195**
Location	**High Street East, Scunthorpe**	**Dawes Lane, Santon**	**Dawes Lane, Santon**
March 2005	1.46	5.56	5.75
April 2005	2.41	2.24	2.18
May 2005	0.72	2.60	2.80
June 2005	0.78	1.50	1.56
July 2005	1.89	1.59	1.79
August 2005	2.47	2.54	
September 2005	3.02	1.11	1.89
October 2005	3.54	3.54	3.54
November 2005	3.58	3.58	3.58
December 2005	3.55	3.35	3.35
January 2006	4.29	4.29	4.29
Average	**2.50**	**2.90**	**3.07**

Results from the 2005/06 survey can be found in Table 2. After September 2005 the cross-referencing of the tube location and the subsequent reported benzene concentrations could not be relied upon; consequently from October onwards the highest monthly value from the three tubes has been used at each location to ensure that the monitoring results identify the worst possible scenario, i.e. the maximum value of Benzene. It must be noted therefore that levels may well be less than that stated. In March 2005 at Dawes Lane, Santon the tube data did exceed 5µg/m^3 however this was never repeated.

In relation to the objective for 2010 the diffusion tube data suggests that it is unlikely that the annual mean objective for benzene of 5µg/m^3 will be exceeded in this location.

3.2 (B) Monitoring Data Within An AQMA

There are no designated AQMAs for benzene within North Lincolnshire.

3.2 (C) Very Busy Roads Or Junctions In Built-Up Areas

Having considered traffic data in relation to North Lincolnshire, no roads or junctions met the following criteria as detailed in Technical Guidance LAQM.TG(03):

- Single carriageway roads with daily average traffic flows in excess of 80,000 vehicles per day.
- Dual carriageway (2 or 3 lane) roads with daily average traffic flows in excess of 120,000 vehicles per day.
- Motorways with daily average traffic flows exceeding 140,000 vehicles per day.
- And located in an area where the background concentration is likely to exceed 2μg/m^3, with reference to the NETCEN estimated background concentration maps for 2010.

The average background benzene concentration for North Lincolnshire estimated from the UK background maps for 2003 and 2010 was 0.27μg/m^3 and 0.23μg/m^3 respectively, with a maximum concentration of 1.09μg/m^3 and 1.04μg/m^3.

Due to the number of vehicles on North Lincolnshire's roads and the fact that no areas are expected to be above the background concentration of 2μg/m^3, it is concluded that road traffic will not have a significant effect on the background concentration of benzene. Road traffic will therefore not be considered further.

3.2 (D) New Industrial Sources

There are no new major industrial processes within North Lincolnshire with the potential to emit significant amounts of benzene.

3.2 (E) Industrial Sources With Substantially Increased Emissions

- **Industrial Sources Within North Lincolnshire**

With reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03), there are five existing industrial processes identified with the potential to emit benzene.

- Total UK Ltd Oil Refinery
- Conoco Phillips Ltd, Humber Refinery
- Total UK Ltd Oil Petrol Terminal
- Koppers UK Ltd
- Corus UK Ltd, Coke Ovens

The significant sources of benzene are detailed in Table 3 with the annual mass emission data reproduced from the emissions inventory for the year 2000 through to 2005.

The sites identified are regulated by the Environment Agency under the Pollution Prevention and Control Act 1999 as Part A1 processes.

Table 3 Data from the Environment Agency Emissions Inventory

Type of process	Operator	Auth Ref	Receptor distance	Annual Benzene Mass Emissions (T)					
				2000	2001	2002	2003	2004	2005
Gasification & Refining	Corus UK Ltd (Appleby Coke Ovens)	AF7193	1,390m	16	15.5	15.5	16.5	15.5	14.5
Gasification & Refining	Corus UK Ltd (Dawes Lane Coke Ovens)	AF7193	810m	16	15.5	15.5	16.5	15.5	14.5
Tar & Bitumen	Koppers UK Ltd	AU8296	230m	1.45	1.04	<1	<1	<1	<1
Gasification & Refining	Conoco Phillips Ltd, Humber Refinery	AF8173	840m	140	90	99	105	319	312
Gasification & Refining	Total UK Ltd Oil Refinery	AF6928	840m	91	82	88	76	127	117

Corus UK Ltd

Data obtained since the Progress Report produced in 2005 indicates that there has been a slight reduction in the mass emission of benzene from the coke ovens in Scunthorpe.

Koppers UK Ltd

Data for 2005 shows no change in emissions from this process.

Conoco Phillips Ltd & Total UK Ltd

Although the mass emission of benzene for 2004 has substantially increased from 2003 it should be noted that the methodology for calculation of the mass emission has changed.

The new method involves twice yearly fence-line speciation studies carried out by the refineries to determine the ratio of speciated VOCs. This ratio is then applied to the calculated mass emission of Benzene. The mass emission is calculated using a standard methodology agreed with the Environment Agency.

The data for the year 2004 also corresponds with the period during which the council located benzene diffusion tubes at sensitive receptor sites around the boundary of the installation. The results of this survey were originally documented in the progress report 2005, the annual mean recorded, ranged between 0.86 – 2.09μg/m^3 and no monthly benzene concentration exceeded 4μg/m^3. It was concluded that there was no likelihood of the 2010 air quality objective being breached.

- **Industrial Sources Outside Of North Lincolnshire**

The following authorities were contacted with regard to obtaining information about Part A and B processes within their boundaries which have the potential to emit Benzene and which may as a result impact on air quality within North Lincolnshire.

- Bassetlaw Council
- Doncaster City Council
- East Riding of Yorkshire Council
- East Lindsey District Council
- Hull City Council
- North East Lincolnshire Council
- West Lindsey District Council

Information received from these authorities indicates that there have been no significant increases in emissions since the previous review and assessment. Therefore, it is concluded that those processes with the potential to emit Benzene within neighbouring authorities are unlikely to have a significant impact on air quality within North Lincolnshire.

3.2 (F) Petrol Stations

North Lincolnshire does not have any petrol stations with a throughput of more than 2,000,000 litres per annum situated close to a busy road (more than 30,000 vehicles per day). Petrol stations therefore need not be considered further.

3.2 (G) Major Fuel Storage Depots (Petroleum Only)

There are three major fuel storage depots in North Lincolnshire however the contribution of Benzene from Conoco Phillips (UK) Ltd and Total UK Ltd Oil Refinery are already considered in the mass emission data for the refinery. Only the road-loading terminal operated by Total Oil Ltd is considered further. Emissions data for the Total UK Ltd Oil road-loading terminal can be found in Table 4.

Table 4 Benzene Emissions From Major Fuel Storage Depots

Process	Distance from Receptor	Annual Emissions 2000 (Tonnes)	Annual Emissions 2005 (Tonnes)
Total UK Ltd Oil Road-Loading Terminal	690m	0.0024	0.0786

Total Oil Ltd emits 0.0786 Tonnes of benzene per annum. This is a significant increase on the emission value of 0.0024 Tonnes in 2000. However, when the emission figure for 2005 was inputted into the Industrial Emissions Screening Tool, the maximum emission rate calculated, with regard to the receptor distance of 690m, was 19.1 Tonnes per annum. The Total Oil Ltd road-loading terminal can therefore be discounted as requiring a detailed assessment.

3.3 Conclusions Of The Updating & Screening Assessment For Benzene

North Lincolnshire will not proceed to a detailed assessment for benzene.

4.0 Updating & Screening Assessment of 1,3-Butadiene (C_4H_6)

4.1 Introduction

1,3-butadiene is a Volatile Organic Compound (VOC) usually emitted to the atmosphere by the combustion of petrol and diesel fuel. It is not a constituent part of the fuel but is produced by the combustion of olefins that are present in the fuel.

1,3-butadiene is also used in industry, for example in the manufacture of synthetic rubber. Notwithstanding locations in close proximity to such processes, the major source of 1,3-butadiene is from vehicles.

4.1.1 The Health Effects Of 1,3-Butadiene

Short-term exposure to high concentrations of 1,3-butadiene (several million ppb) can cause irritation of the eyes, nose, throat and skin. Other disorders include diseases of the blood and nervous system.

Long-term exposure at much lower concentrations is by far the greatest concern in the U.K. This can increase the chance of cancers of the lymphoid system and blood forming tissues, lymphomas and leukaemia.

4.1.2 Air Quality Objective For 1,3-Butadiene

The Objective for 1,3-butadiene in the National Air Quality Strategy and Air Quality (England) Regulations 2000 is:

2.25µg/m^3 (1ppb) measured as a running annual mean to be achieved by 31 December 2003.

4.2 Assessment Of 1,3-Butadiene

4.2(A) 1,3-Butadiene Monitoring Data

North Lincolnshire Council does not carry out any ambient air quality monitoring of 1,3-butadiene.

4.2 (B) New Industrial Sources

There are no new major industrial processes within North Lincolnshire with the potential to emit significant amounts of 1,3-butadiene.

4.2 (C) Industrial Sources With Significantly Increased Emissions

- **Existing industrial sources within North Lincolnshire**

With reference to both the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) and also the Environment Agency's Pollution Inventory, two Part A(1) industrial processes were identified as having the potential to emit 1,3-butadiene. The annual mass emission data has been considered with reference to the nomograms and the outcome detailed in Table 5.

Table 5 Industrial sources of 1,3-butadiene within North Lincolnshire

Type of Process	Operator	Permit Ref	Receptor Distance	Mass Emission (Tonnes)	
				2000	2005
Gasification & Refining	Total UK Ltd Oil Refinery	AF6928	840m	0.45	11
Gasification & Refining	Conoco Phillips Ltd, Humber Refinery	AF8173	840m	< 0.1	12

Conoco Phillips Ltd & Total UK Ltd

Although the mass emission of 1,3-butadiene for 2005 has substantially increased it should be noted that the methodology for calculation of the mass emission has changed.

The new method involves twice yearly fence-line speciation studies carried out by the refineries to determine the ratio of speciated VOCs. This ratio is then applied to the calculated mass emission of 1,3-butadiene. The mass emission is calculated using a standard methodology agreed with the Environment Agency.

With reference to the industrial nomograms in Technical Guidance LAQM.TG(03) the allowable maximum emission rate from each installation is 3.66 tonnes having regard to the distance of local receptors. As each installation exceeds this emission level there is a likelihood that the air quality objective for 1,3-butadiene may be breached.

- **Industrial Sources outside North Lincolnshire**

The following authorities were contacted with regard to obtaining information about Part A and B processes within their boundaries which have the potential to emit 1,3-butadiene and which may as a result impact on air quality within North Lincolnshire.

- Bassetlaw Council
- Doncaster City Council
- East Riding of Yorkshire Council
- East Lindsey District Council
- Hull City Council
- North East Lincolnshire Council
- West Lindsey District Council

Information received from these authorities indicates that there have been no significant increases in emissions since the previous review and assessment. Therefore, it is concluded that those processes with the potential to emit 1,3-butadiene within neighbouring authorities are unlikely to have a significant impact on air quality within North Lincolnshire.

4.3 Conclusions Of The Updating & Screening Assessment For 1,3-Butadiene

North Lincolnshire will proceed to a detailed assessment for 1,3-butadiene for the area around the Conoco Phillips Ltd and Total UK Ltd Oil Refineries, North Killingholme.

5.0 Updating & Screening Assessment of Lead (Pb)

5.1 Introduction

Lead (Pb) has many industrial applications either in its elemental form or in alloys or compounds. It is the most widely used of the non-ferrous metals. The largest use of lead is in the manufacture of batteries and it is also used as a pigment in paints and glazes. Lead was banned as an additive to petrol with effect from 1 January 2000.

5.1.1 The Health Effects Of Lead

Lead is a cumulative poison to the central nervous system. In children it can cause behavioural problems and mental retardation and there is some evidence it can affect the kidneys, joints and blood pressure in adults.

5.1.2 Air Quality Objective For Lead - 2004

The Objective for lead in the National Air Quality Strategy and Air Quality (England) Regulations 2000 is:

- 0.5µg/m^3, measured as an annual mean to be achieved by 31st December 2004

5.1.3 Air Quality Objective For Lead – 2008

- 0.25µg/m^3, measured as an annual mean to be achieved by 31st December 2008.

5.2 Assessment of Lead

5.2 (A) Lead Monitoring Data

North Lincolnshire does not carry out any ambient air quality monitoring for lead.

5.2 (B) New Industrial Sources Of Lead

There are no new major industrial processes within North Lincolnshire with the potential to emit significant amounts of Lead.

5.2 (C) Industrial Sources With Significantly Increased Emissions

- **Industrial Sources Within North Lincolnshire**

With reference to both the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03), and also the Environment Agency's Pollution Inventory, 7 industrial processes were identified as having the potential to emit significant quantities of lead. Operator and emission details are contained in Table 6.

Five of these seven processes had no comparable data for 2000 and 2005 therefore the maximum emissions data available for these five processes were inputted into the Industrial Emissions Screening Tool (IEST) in order to calculate acceptable individual emission limits for these sites. Data inputted into the IEST for all processes can be found in Appendix 10.9. The results for these five processes are contained within Table 6. The maximum emission rates calculated by the screening tool for each of these processes were in excess of their respective 2005 emission rates and therefore these processes need not be considered further.

The remaining two processes, Cemex UK Cement Ltd and Corus UK Ltd, both increased their emissions between 2000 and 2005 by more than 30% and therefore the maximum emissions reported for these processes were inputted into the IEST. The reported 2005 emission rate from Cemex UK Cement Ltd is within the IEST calculated maximum emission rate and therefore this process will not be considered further.

The maximum emission rate reported by Corus UK Ltd is significantly greater than the maximum emission rate calculated by the IEST. Queries were raised with both the operator and the Environment Agency, who regulate the site, regarding this sharp increase in emissions from 2000 to 2005. Information received back from these parties revealed that in 2005 the operator's reporting basis for Lead changed from that of previous years due to a lack of confidence in variables used in the emissions reporting process. Whereas previously the reporting basis took into account monitoring results and numerous variables the new reporting method is based on calculations and emission factors. The revised methodology may be subject to further review.

Considering that the lead emission reported by Corus UK Ltd exceeds the IEST calculated maximum emission rate and that no previous monitoring of lead has been conducted in the Scunthorpe area a detailed assessment of lead will be conducted for the Scunthorpe area.

Table 6 Part A(1) Industrial Processes Within North Lincolnshire With The Potential To Emit Lead

Type of process	Operator	Permit Ref	NGR	Receptor distance	Annual Mass Emission (Tonnes)		Variation	Max Emission Rate
					2000	2005		
1.3 Combustion Processes	Immingham CHP	BJ8802IZ	TA1651216981	28m	N/A	-	Data Not Comparable	[2] 12.1 Tpa
1.3 Combustion Processes	Regional Power Generators Ltd	AA6904	SE9870006200	780m	-	<0.1	Data Not Comparable	[2] 1.7 Tpa
1.3 Combustion Processes	Keadby Power	AB4745	SE8350011500	280m	-	<0.1	Data Not Comparable	[2] 1.9 Tpa
1.3 Combustion Processes	National Grid Gas Plc	AF7410	SE8890004200	83m	<0.01	0	Data Not Comparable	[2] 0.2 Tpa
2.1 Ferrous Metals	Corus UK Ltd	BL3838IW	SE9200009500	260m	[1] 5.0	12.9	157%	[2] 2.8 Tpa
3.1 Cement & Lime	Cemex	AH8743	SE9730020900	95m	0.13	0.21	61%	[2] 4.1 Tpa
4.2 Organic Chemicals	Conoco Phillips Ltd	AF8173	TA1610016500	238m	<0.01	<0.1	Data Not Comparable	[2] 3.87 Tpa

[1] Combined Lead emissions from Corus UK Ltd installations License Numbers AF7193 & AR0080 in 2000
[2] Industrial Emissions Screening Tool acceptable emission limit (Tonnes per annum)

- **Industrial Sources Outside North Lincolnshire**

The following authorities were contacted with regard to obtaining information about Part A and B processes within their boundaries which have the potential to emit significant levels of lead and which may as a result impact on air quality within North Lincolnshire.

- Bassetlaw Council
- Doncaster City Council
- East Riding of Yorkshire Council
- East Lindsey District Council
- Hull City Council
- North East Lincolnshire Council
- West Lindsey District Council

Information received from these authorities indicates that there have been no significant increases in emissions since the previous review and assessment. Therefore, it is concluded that those processes with the potential to emit lead within neighboring authorities are unlikely to have a significant impact on air quality within North Lincolnshire.

5.3 Conclusions Of The Updating & Screening Assessment For Lead

North Lincolnshire will proceed to a detailed assessment for lead in the vicinity of the Corus Integrated Steelworks, Scunthorpe.

6.0 Updating & Screening Assessment of Nitrogen Dioxide (NO_2)

6.1 Introduction

Nitrogen dioxide (NO_2) and nitric oxide (NO) are commonly referred to as oxides of nitrogen (NOx) and are produced by all combustion processes. Road transport accounted for about 49% of the total UK emissions in 2000; electricity generation contributes about 24% and the industrial and commercial sectors contribute about 23%.

6.1.1 The Health Effects Of Nitrogen Dioxide

Nitrogen dioxide is known to have an adverse effect on human health. It is a respiratory irritant. It affects airways and reduces lung function giving feelings of breathlessness during exercise and increasing the likelihood of coughing and other respiratory problems. Asthmatics as a group can be particularly affected by even short exposure to high levels of nitrogen dioxide.

6.1.2 Air Quality Objective For Nitrogen Dioxide

The Objective for nitrogen dioxide in the National Air Quality Strategy and Air Quality (England) Regulations 2000 are:

- 200µg/m^3 (105ppb), measured as an hourly mean, which can be exceeded up to 18 times a year (and conversely may be defined as a 99.8th percentile of less than 200µg/m^3).

- 40µg/m^3, expressed as an annual mean.

The Air Quality (England) Regulations 2000 state a compliance date of 31 December 2005.

6.2 Assessment of Nitrogen Dioxide

6.2 (A) Monitoring Data Outside An AQMA

North Lincolnshire Council currently has five automatic monitoring sites across the county, of which three were actively monitoring NO_2 levels during 2005. These sites are listed in Table 7.

Table 7 Automatic Monitoring Sites for Nitrogen Dioxide 2005

Site Name	NGR	Data Capture	Annual Mean Conc^n (µg/m^3) 2005	No. of Exceedances of 1-Hour Mean Conc^n of 200µg/m^3	99.8th Percentile 1-Hour Mean Conc^n (µg/m^3)
Scunthorpe Town	SE9031 010830	81.7%	22 (C)	0 (E)	88 (C)
Killingholme Primary School, South Killingholme	TA1488 016120	99.5%	22 (C)	0 (E)	N/A
Kingsway House, Scunthorpe	SE8914 309886	96.8%	19 (C)	1 (E)	N/A

In accordance with Technical Guidance LAQM.TG(03) data should meet certain criteria with respect to data capture. In order to estimate the number of exceedances of the air quality objectives for NO_2 a minimum of 90% data capture is required, if 90% data capture has not been achieved the appropriate percentile concentration value should be stated rather than the actual number of exceedances. Values in Table 7 suffixed by (E) detail the actual number of exceedances whereas values suffixed by (C) represent percentile values that should be compared with the actual air quality objective limit value.

From the continuous monitoring data in Table 7 it can be seen that the annual mean concentration of 40µg/m^3 for NO_2 was not exceeded at any of the automatic monitoring sites during 2005.

An 81.7% data capture at the Scunthorpe Town site necessitated the calculation of the 99.8th percentile 1-hour mean NO_2 concentration. This resulted in a concentration of 88µg/m^3, which is within the 200µg/m^3 NO_2 hourly mean objective.

Only one exceedance of the NO_2 hourly mean objective was recorded in 2005, this is within the annual limit of 18 exceedances per site. This exceedance occurred at the Kingsway House site in Scunthorpe on 29 December 2005 between 8:00-9:00am with an hourly mean of 220µg/m^3.

In conclusion the Council is satisfied that the NO_2 annual mean and the 1-Hour mean Air Quality Objectives were not exceeded in 2005 at any of the automatic monitoring sites.

- **Diffusion Tube Monitoring Data For Nitrogen Dioxide**

North Lincolnshire Council currently has a nitrogen dioxide diffusion tube network consisting of 28 sites, details of the tube locations are contained in Appendices 10.10 – 10.14.

The diffusion tubes are supplied and analysed by South Yorkshire Laboratory, the chemical absorbent used consists of 50% Acetone and 50% Triethanolamine.

Table 8 contains bias-adjusted results from all diffusion tube monitoring sites for 2005. Out of the 28 sites surveyed, 4 exceeded the annual air quality objective for 2005 of 40µg/m^3; these 4 sites are highlighted in bold.

- **Locations Exceeding The Air Quality Objective**

Scotter Road, Scunthorpe

Data gathered in 2005 identified that data from the Scotter Road kerbside tube exceeded the annual mean objective, measuring an annual mean of 43µg/m^3. With reference to the monthly data however only six tubes were analysed during the year and therefore data from this location will be reviewed at the end of 2006 when 12 months of data will be available for analysis.

Doncaster Rd/ Hilton Ave, Scunthorpe

Data gathered in 2004 identified that concentrations at this site were consistently higher than the annual mean objective. The annual mean for 2005 remains above the objective at a level of 42µg/m^3. A chemiluminescent NO_x analyser was installed at this location in January 2006 at NGR SE8669711109 in line with the façade of the nearest dwellings in order to obtain continuous monitoring data. The results of this survey will be reported in the detailed assessment 2007.

Britannia Corner, Scunthorpe

As part of North Lincolnshire's first round Air Quality Review and Assessment – Stage 3 Report, the area covering Britannia Corner was specifically modelled to assess likely compliance with the 2005 objectives. The modelling exercise concluded, "this area should be viewed as being at little risk of exceeding the annual mean air quality objective 2005." It was also noted that there was no relevant exposure to members of the public at those points where there was a risk of exceedance.
Predicted traffic data for 2006 was reviewed and it was found that both the average daily vehicle count and percentage of HGVs had reduced from that

recorded in 2005. GIS maps of the area were consulted from which no relevant exposure could be identified within 10m of the kerb at this location. Therefore this Authority is satisfied that the situation at this location remains the same as that identified in the Stage 3 report and therefore the conclusion of this report remains valid.

Junction of Brigg Road and A18, Mortal Ash, Scunthorpe

This tube is located close to a busy roundabout on a main dual carriageway. Most of the monthly averages exceed 40 µg/m^3 resulting in an annual mean of 55 µg/m^3. A new housing development is currently under development approximately 500m from the location of this NO_2 tube, on the opposite side of the A18, which this tube monitors. This development will impact upon this local road network by increasing traffic and is itself a potential receptor. Therefore this tube has been left in-situ in order to gain further data in 2006.

- **Locations Previously Identified As Exceeding The Air Quality Objective**

Oswald Road, Scunthorpe

The Oswald Road tube was predicted to be marginally above the annual mean objective of 40µg/m^3 recording a level of 41µg/m^3 in 2004. This tube was therefore left in situ in order to gain further data in 2005 when a value of 38µg/m^3 was recorded. A NO_2 concentration of 37µg/m^3 is predicted for 2006.

Ashby Road, Ashby Road/ Old Brumby St, Scunthorpe

The Ashby Road tubes all exceeded the annual mean objective in 2004. Additional tubes were located along Ashby Road as there was the potential for breaches of both the 1-hour and annual mean objective. A chemiluminescent NO_x analyser was also installed in order to obtain continuous monitoring data. This is located next on the corner of Lloyds Ave and Ashby Road on the green area to the front of Kingsway House. In 2005 none of the Ashby Road tubes exceeded the annual mean objective of 40µg/m^3. NO_2 concentrations of 34µg/m^3 and 36µg/m^3 are predicted for Ashby Road and Ashby Road/Old Brumby Street respectively.

Holydyke, Barton

The Holydyke, Barton tube was predicted to be at the annual mean objective of 40µg/m^3 in 2004. This tube was therefore left in situ in order to gain further data in 2005 when a level of 35µg/m^3 was recorded. A further reduced NO_2 concentration of 34µg/m^3 is predicted for 2006.

Table 8 Nitrogen Dioxide Diffusion Tube Survey Bias-Adjusted Results showing Potential Exceedance of NO_2 Annual Mean Objective

Tube No.	Location	National Grid Ref	Site Type	Mean Annual NO_2 Conc^n (µg/m^3)	
				2005	2006 [1]
1	Frodingham Road, Scunthorpe	SE891011726	Kerbside	37	36
2	Normanby Road	SE8941611944	Kerbside	35	34
3	A1077 Orbital Road	SE8654211957	Kerbside	33	32
4	Epworth / Belton Road Junction	SE7806403922	Kerbside	34	33
5	Keadby Bridge	SE8396310652	Kerbside	36	35
6	**Scotter Road**	**SE8721911096**	**Kerbside**	**43**	**42**
7	**Doncaster Rd / Hilton Av, Scunthorpe**	**SE8693011160**	**Kerbside**	**42**	**41**
8	Doncaster Road / Royal Hotel	SE8862211261	Kerbside	31	30
9	**Britannia Corner, Scunthorpe**	**SE8918911306**	**Kerbside**	**42**	**41**
10	Oswald Road, Scunthorpe	SE8920811136	Kerbside	38	37
11	Ashby Road, Scunthorpe	SE8924610355	Kerbside	35	34
12	Ashby Road / Old Brumby St, Scunthorpe	SE8910009531	Kerbside	37	36
13	Lloyds Ave / Glover Road	SE8848609946	Kerbside	32	31
14	Lloyds Ave / Ashby Road	SE8913509885	Kerbside	38	37
15	Junction Ashby Road / A18	SE8917809940	Kerbside	36	35
16	Old Brumby St / East Common Ln/ Queensway	SE8977109698	Kerbside	37	36
17	Dudley Rd / Queensway	SE9150308664	Kerbside	32	31
18	Lakeside Parkway	SE9172408388	Kerbside	30	29
19	**Junction of Brigg Road and A18, Mortal Ash, Scunthorpe.**	**SE9185708639**	**Kerbside**	**55**	**53**
20	Barnard Ave, Brigg	TA0000907419	Kerbside	40	38
21	Station Rd, Brigg / Hewson House Background	TA0023307008	Kerbside	18	17
22	Station Rd, Brigg / Hewson House Roadside	TA0024307130	Kerbside	23	22
23	Wrawby Rd, Brigg	TA0045507314	Kerbside	33	32
24	Humber Rd, South Killingholme	TA1548016117	Kerbside	34	33
25	St Crispins Close, North Killingholme	TA1464317364	Kerbside	23	22
26	Holydyke, Barton	TA0305221907	Kerbside	35	34
27	Scunthorpe Town	SE9031710834	Kerbside	31	30
28	Scunthorpe Town	SE9031710834	Kerbside	33	32
29	Scunthorpe Town	SE9031710834	Kerbside	32	31
30	Station Rd / Brigg Rd, Scunthorpe	SE9009011263	Kerbside	34	33

[1] Estimated annual mean using correction factors detailed in Box 6.6 of Technical Guidance LAQM.TG(03).

6.2 (B) Monitoring Data Within An AQMA

There are no designated AQMAs within North Lincolnshire.

6.2 (C) Narrow Congested Streets With Residential Properties Close To The Kerb

Using the criteria in the Technical Guidance LAQM.TG(03), there are no narrow congested streets with residential properties close to the kerb in North Lincolnshire.

6.2 (D) Junctions

The junctions in North Lincolnshire that met the following criteria were identified and are detailed in Appendix 10.4. The criteria being:

- Traffic flow in excess of 10,000 vehicles per day.
- Relevant public exposure within 10m of the kerb.

Relevant exposure was considered for both the annual mean and 1-hour objectives.

The DMRB screening model was then used to predict annual mean concentrations in 2006, the results of which are shown in Table 9. The screening model results predict that there will be no locations with an annual mean of greater than 40µg/m^3 in 2006.

Table 9 Annual Mean NO_2 Concentration Results For Junctions In 2006 As Specified In LAQM.TG(03) Box 6.2(D).

Junction	NO_2 Annual Mean Conc^n (µg/m^3)
Britannia Corner	29.68
Ashby Road / West Common Lane / Old Brumby St	28.25
Monument Roundabout	27.76
Messingham Rd / Burringham Rd / Priory Rd	27.71
Ferriby Rd / Holydyke / Hungate	27.32
Ashby High St / Grange Lane South	28.34
Barnard Avenue / Wesley Rd / Old Courts Road	27.48
Messingham Road / Chancel Road / Willoughby Road	27.22
Barrow Road / Whitecross Street	27.06

As the annual mean objective is not likely to be exceeded at any location, it can be reasonably assumed that the 1-hour objective will also be achieved in 2006.

6.2 (E) Busy Streets Where People May Spend 1 Hour Or More Close To Traffic

The roads in North Lincolnshire that met the following criteria were identified and are detailed in Appendix 10.5.

- Traffic flow in excess of 10,000 vehicles per day.
- Relevant public exposure within 5m of the kerb for 1 hour or more.

Relevant exposure was considered for both the annual mean and 1-hour objectives.

The DMRB screening model was then used to predict annual mean concentrations in 2006, the results of which are shown in Table 10. The screening model showed that there were no locations with a predicted annual mean of greater than 40µg/m^3.

Table 10 Annual Mean NO_2 Concentration Results For Roads As Specified In LAQM.TG(03) Box 6.2(E).

Road			NO_2 Annual Mean Conc^n (µg/m^3)
Ashby Road	Scunthorpe	CU6	33.04
Howdens Hill	Scunthorpe	CU6	33.87
Queensway	Scunthorpe	A18	30.85
Scawby Road	Scawby Brook	A18	31.44
Barnard Avenue	Brigg	A18	32.14
Ashby Road	Scunthorpe	A159	30.05
Bridge Street	Brigg	A18	31.77
Grange Lane South	Scunthorpe	B1501	29.02
Glebe Road	Scunthorpe	CU3	28.56
Frodingham Road	Scunthorpe	CU6	28.42
Wrawby Road	Wrawby	A18	38.87

As the annual mean objective is not likely to be exceeded at any location, it can be reasonably assumed that the 1-hour objective will also be achieved in 2006.

6.2 (F) Roads With High Flow Of Buses And/Or HGVs

The roads in North Lincolnshire that met the following criteria were identified and detailed in Appendix 10.6.

- Flow of HDVs greater than 25%
- 2,500 HDVs or more per day
- Relevant public exposure within 10m of the kerb

Relevant exposure was considered for both the annual mean and 1-hour objectives.

The DMRB screening model was then used to predict annual mean concentrations in 2006, the results of which are shown in Table 11. The screening model showed that Humber Road in South Killingholme would exceed the annual mean of 40µg/m^3. However, the NO_2 tube data for Humber Road, detailed in Table 11, gives an annual mean concentration of 33 µg/m^3 for 2006.

As stated in box 6.2 (F) of LAQM.TG(03) monitoring data is considered to take precedence over the DMRB screening tool data. Therefore the NO_x tube data dictates that a detailed assessment for nitrogen dioxide will not be required at Humber Road in South Killingholme.

Table 11 Annual Mean NO_2 Concentration Results For Roads As Specified In LAQM.TG(03) Box 6.2(F).

Road			NO_2 Annual Mean Conc^n (µg/m^3)
Humber Road	South Killingholme	A160	41.16

As the annual mean is not exceeding 60µg/m^3 at this location, it can be reasonably assumed that the 1-hour objective will be met by 2006.

6.2 (G) New Roads Constructed Or Proposed Since The First Round Of R&A

There have been no new roads constructed or proposed with a daily traffic flow in excess of 10,000 vehicles per day since the first round of Review and Assessment.

6.2 (H) Roads With Significantly Changed Traffic Flows

There are no roads with a traffic flow of more than 10,000 vehicles per day that have experienced a greater than 25% increase in traffic flow since the last round of Review and Assessment.

6.2 (I) Bus Stations

There are no newly identified bus stations within North Lincolnshire. Scunthorpe bus station was considered during the 2003 Updating and Screening Assessment when the average number of buses using the station was found to be approximately 2,500 per week. Consequently this bus station has not been considered further as its flow does not exceed 1000 buses per day.

6.2 (J) New Industrial Sources

One new major industrial process with the potential to emit significant amounts of nitrogen dioxide has commenced operation within North Lincolnshire since the last round of review and assessment. This process is Immingham Combined Heat & Power (CHP) Plant, which commenced full commercial operation on 1st November 2004. This CHP station has an electrical output of 735MW generated through the operation of two gas turbines, two heat recovery steam generators and two steam turbines.

6.2 (K) Industrial Sources With Significantly Increased Emissions

- **Industrial Sources Within North Lincolnshire**

With reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) there are 14 industrial processes identified with the potential to emit nitrogen dioxide. These processes are detailed in Table 12.

Nine of the processes contained in Table 12 have reduced their emissions of nitrogen dioxide between 2000 and 2005 and therefore need not be considered further.

Fibrogen Ltd have increased their emissions by 49% between 2000 and 2005. As this increase in emissions is greater than the 30% from previous rounds of review and assessment allowed by the guidance in box 6.2(K) of Technical Guidance LAQM.TG(03) this process requires further assessment. The 2005 annual emission figure for Fibrogen was therefore inputted into the 'Industrial Emissions Screening Tool' (IEST) in order to calculate a maximum acceptable annual emission rate for this process. Data inputted into the IEST for all processes can be found in Appendix 10.9. The maximum annual emission rate calculated by the IEST for Fibrogen is 315 Tonnes per annum, which is greater than the 2005 emission rate and as such this process need not be considered further.

From the remaining four processes both Caparo Merchant Bar Plc and Immingham CHP had no comparable emissions data for 2000, whilst Edinburgh Oil & Gas, Fibrogen Ltd and Singleton Birch Ltd did not provide precise emission data that would allow accurate comparison. Therefore the

emissions data for these four processes were inputted into the IEST in order to calculate acceptable individual emission limits for these sites. The results for these four processes are contained within Table 12. The maximum annual emission rates calculated by the screening tool for two of these processes, Edinburgh Oil & Gas Plc and Immingham CHP, were in excess of their respective 2005 emission rates and therefore these two processes need not be considered further.

The maximum annual emission rates calculated for the remaining two processes, Caparo Merchant Bar Plc and Singleton Birch Ltd, were below their current emission rates. However, as accurate emission data for these sites was not forthcoming before this review was submitted it is not possible to confirm that emissions from these two sites will be in excess of the calculated maximum emission rate. The 2005 emission data, when submitted by these two processes, will be incorporated into the next stage of the review process.

In summary, after comparing emissions from 2000 to those of 2005 a detailed assessment for Nitrogen Dioxide will not be required for any industrial process within North Lincolnshire.

Table 12 Part A(1) Industrial Processes Within North Lincolnshire With The Potential To Emit Nitrogen Dioxide

Type of process	Operator	Permit Ref	NGR	Receptor distance	Mass Emission (T)		Variation	Max Emission Rate
					Year 2000	Year 2005		
1.1 Gasification & Refining	Total UK Ltd Oil Refinery	AF6928	TA1580017700	840m	2,200	1,679	-24%	N/A
1.1 Gasification & Refining	Edinburgh Oil & Gas PLC	AF6871	SE9110012900	1280m	<10	<10	Data Not Comparable	[2] 29 Tpa
1.1 Gasification & Refining	Conoco Phillips Ltd	AF8173	TA1610016500	840m	3,400	3,238	-17%	N/A
1.3 Combustion Processes	National Grid Gas PLC	AF7410	SE8890004200	83m	69.8	[3] 58.9	-16%	N/A
1.3 Combustion Processes	Immingham CHP	BJ8802IZ	TA1651216981	28m	N/A	340	Data Not Comparable	[2] 33,721 Tpa
1.3 Combustion Processes	Regional Power Generators Ltd	AA6904	SE9870006200	780m	2,009	482	-76%	N/A
1.3 Combustion Processes	Centrica KPS Ltd	AF0920	TA1350017500	510m	2,276	1,802	-21%	N/A
1.3 Combustion Processes	Keadby Power	AB4745	SE8350011500	280m	919	460	-50%	N/A
1.3 Combustion Processes	E.ON UK Plc	AB5873	TA1400018800	510m	2,180	691	-68%	N/A
2.1 Ferrous Metals	Corus UK Ltd	BL3838IW	SE9200009500	260m	7,081 [1]	2,822	-60%	N/A
2.1 Ferrous Metals	Caparo Merchant Bar PLC	BR8832IJ	SE9130510305	680m	N/A	<100	Data Not Comparable	[2] 25 Tpa
3.1 Cement & Lime	Cemex	AH8743	SE9730020900	95m	1,900	1,710	-6%	N/A
3.1 Cement & Lime	Singleton Birch	BL880512	TA0830011200	457m	21	<100	Data Not Comparable	[2] 2 Tpa
5.1 Waste Incineration	Fibrogen Ltd	BE7621	SE8601514794	505m	85	126	+49%	[2] 315 Tpa

[1] Combined NO_2 emissions from Corus UK Ltd installations in 2000
[2] Industrial Emissions Screening Tool acceptable emission limit (Tonnes per annum)
[3] Figure received from National Grid Gas Plc

- **Industrial Sources Outside North Lincolnshire**

The following authorities were contacted with regard to obtaining information about Part A and B processes within their boundaries which have the potential to emit nitrogen dioxide and which may as a result impact on air quality within North Lincolnshire.

- Bassetlaw Council
- Doncaster City Council
- East Riding of Yorkshire Council
- East Lindsey District Council
- Hull City Council
- North East Lincolnshire Council
- West Lindsey District Council

Information received from these authorities indicates that there have been no significant increases in emissions since the previous review and assessment. Therefore, it is concluded that those processes with the potential to emit nitrogen dioxide within neighboring authorities are unlikely to have a significant impact on air quality within North Lincolnshire.

6.2 (L) Aircraft

- **Humberside International Airport**

Humberside International Airport is located within North Lincolnshire. Concentric circles were drawn on GIS to identify any possible receptors within a 1000m radius of the airfield (See Appendix 10.26). Several residential properties were identified. With reference to the information contained in Appendix C, Annex 2 of Technical Guidance LAQM.TG(03), on the throughput of passengers and freight at Humberside Airport in 2005 the total equivalent number of passengers per annum was calculated.

Air transport movements	13,392
Terminal passengers	464,662
Freight lifted	2,700 tonnes

100,000 tonnes freight = 1 million passengers per annum (mppa)

2,700 tonnes freight = 0.027 mppa
464,662 terminal passengers = 0.46 mppa

The total equivalent number of passengers per annum is: 0.487 mppa.

The total equivalent number of passengers per annum is well below the threshold of 5 mppa. The throughput at the airport has not increased considerably over recent years and is not expected to do so in the near future. Humberside International Airport will not have a significant effect on nitrogen dioxide concentrations.

- **Robin Hood Airport**

On the 28th of April 2005 both passenger and freight flights began operating out of the new Robin Hood Airport (Doncaster / Sheffield). This airport is outside of North Lincolnshire but is considered due to its proximity to the county and therefore has the potential to impact on the air quality within North Lincolnshire.

As Robin Hood Airport was not in operation for the entirety of 2005, a 12-month period, from May 2005 until May 2006, has been considered in order to calculate the total equivalent number of passengers per annum as per the information contained in Appendix C, Annex 2 of Technical Guidance LAQM.TG(03).

Air transport movements	7,561
Terminal passengers	837,000
Freight lifted	590 tonnes

100,000 tonnes freight = 1 million passengers per annum (mppa)

590 tonnes freight = 0.0059 mppa
837,000 terminal passengers = 0.837 mppa

The total equivalent number of passengers per annum is: 0.843 mppa.

The total equivalent number of passengers per annum for Robin Hood Airport is 0.843; this is below the threshold of 5 mppa. This low figure, combined with the out of area location of Robin Hood Airport enables this Council to confidently predict that Robin Hood Airport will not have a significant effect on nitrogen dioxide concentrations within North Lincolnshire. However, comments on the likely future throughput at the airport cannot be made as 2005 was the first year of operation.

6.3 Conclusions Of The Updating & Screening Assessment For Nitrogen Dioxide

It is proposed that North Lincolnshire Council will proceed to a detailed assessment for nitrogen dioxide at the following locations:

- Doncaster Rd / Hilton Avenue, Scunthorpe
- Junction of Brigg Road and A18, Mortal Ash, Scunthorpe

7.0 Updating & Screening Assessment of Sulphur Dioxide (SO_2)

7.1 Introduction

Sulphur dioxide (SO_2) is a gas at normal temperature and pressure. It dissolves in water to produce an acidic solution, which is then readily oxidised to sulphuric acid (H_2SO_4) causing acid rain. The principal source of sulphur dioxide is the combustion of fossil fuels such as coal and oil that contain sulphur. Before the Clean Air Act 1956, the main source of sulphur dioxide emissions was the use of coal in domestic, commercial and industrial sectors. There were also many power stations located within or adjacent to towns and cities. Today cleaner fuels have replaced coal, and power generation is concentrated in larger, more efficient stations located in rural areas.

7.1.1 The Health Effects Of Sulphur Dioxide

Studies indicate that levels of sulphur dioxide above 100ppb can cause changes in lung function and aggravation of bronchitis plus respiratory ailments by causing constriction of the bronchus. Increases in wheezing, breathlessness during exercise and a chronic cough have also been noted.

7.1.2 Air Quality Objectives For Sulphur Dioxide

The Objective for sulphur dioxide in the National Air Quality Strategy and Air Quality (England) Regulations 2000 are:

- 266µg/m^3 (100ppb), measured as the 99.9th percentile of 15-minute means in a calendar year to be achieved by 2005. The number of allowable exceedances in a year is 35.
- 350µg/m^3 (132ppb), measured as a 1-hour mean, allowing up to 24 exceedances per year (99.7th percentile).
- 125µg/m^3 (47ppb), measured as a 24-hour mean, allowing up to 3 exceedances per year (99.2nd percentile).

7.2 Assessment Of Sulphur Dioxide

7.2 (A) Monitoring Data Outside An AQMA

North Lincolnshire Council currently has five Automatic Monitoring Sites across the county, of which three were actively monitoring SO_2 levels during 2005. These three stations were Scunthorpe Town (Scunthorpe), Killingholme Primary School (South Killingholme) and Ermine Farm (Appleby).

- **Scunthorpe Town**

The Scunthorpe Town air monitoring station at Rowland Road was previously sited at the North Lincolnshire Neighbourhood and Environmental Services Depot on Cottage Beck Road (NGR: SE9055510674). However, this station was re-located to its current position at Scunthorpe Town (NGR: SE9031010830) on 6th June 2004 in order to more accurately reflect the exposure of the local population. The current location of this monitor can be found in Appendix 10.23.

- **Killingholme Primary School**

The Killingholme Primary School (NGR: TA1488016120) air monitoring station was re-located from its prior position at Killingholme West Fire Station on 14th March 2003 to allow a more accurate representation of pollutant exposure to the local population. The location of this monitor can be found in Appendix 10.24.

- **Appleby – Ermine Farm**

The air monitoring station at Appleby was situated at Ermine Farm (NGR: SE4981914965) for 5 months from 24th March 2005 to 24th August 2005. The location of this monitor can be found in Appendix 10.25.

Information regarding the capture of data and exceedances of the Air Quality Objectives for these monitoring stations are contained in Table 13.

Site Name	National Grid Reference	Data Capture, %	No. of exceedances of 15-min limit value.	No. of exceedances of 1-hour limit value.	No. of exceedances of 24-hour limit value.
Killingholme Primary School, South Killingholme.	TA1488016120	95.6	0	0	0
Site Name	National Grid Reference	Data Capture, %	99.9th percentile concentration, ug m^{-3}	99.7th percentile concentration, ug m^{-3}	99th percentile concentration, ug m^{-3}
Scunthorpe Town	SE9031010830	87.3	85	74	34
Appleby - Ermine Farm	SE4981914965	92.6	80	59	9

Table 13 Automatic Monitoring Sites for Sulphur Dioxide 2005

Note: Appleby (Ermine Farm) was operational from 24th March 2005 to 24th August 2005, the period rather than annual data capture is quoted.

In accordance with Technical Guidance LAQM.TG(03) data should meet certain criteria with respect to data capture. In order to estimate the number of exceedances of the air quality objectives for SO_2 a minimum of 90% data capture is required, if 90% data capture has not been achieved the

appropriate percentile concentration value should be stated rather than the actual number of exceedances.

From the continuous monitoring data displayed in Table 13 it can be seen that the annual mean objectives for SO_2 were not exceeded at any of the automatic monitoring sites during 2005.

Scunthorpe Town

An 87.3% data capture at the Scunthorpe Town site necessitated the calculation of the 99.9th percentile of 15-minute means, the 99.7th percentile of 1-hour means and the 99th percentile of 24-hour means for sulphur dioxide, resulting in concentrations of 85 µg/m^3, 74 µg/m^3 and 34 µg/m^3. These are within the respective mean SO_2 objectives of 266µg/m^3, 350µg/m^3 and 125µg/m^3.

Ermine Farm - Appleby

With reference to paragraph 7.15 of LAQM.TG(03) monitoring is recommended to be conducted over a 12-month period. The monitoring station at Ermine Farm, Appleby was only on site for approximately 5 months. Therefore the Local Authority Help Desk was consulted for advice on the appropriate method of incorporating this data into this report. The Helpdesk advised this Authority to calculate the following:

- The annual number of exceedances of the 15-minute 1-hour and 24-hour objectives
- The 99.9th percentile of 15-minute means, the 99.7th percentile of 1-hour means and the 99th percentile of 24-hour means for sulphur dioxide.

During the 5 months of monitoring at Ermine Farm, Appleby the 15-minute mean was exceeded on 7 occasions, whilst during the same period the 1-hour and 24-hour objectives were not breached. If this number of exceedances were scaled up for a 12-month period the total number of exceedances would be 17. This is within the acceptable limit of 35 exceedances of the 15-minute mean for a 12-month period.

In order to obtain suitable data for comparison with the sulphur dioxide objectives the following percentile calculations were conducted on the 5-months of data collected at Ermine Farm, Appleby. The 99.9th percentile of 15-minute means, the 99.7th percentile of 1-hour means and the 99th percentile of 24-hour means for sulphur dioxide resulted in concentrations of 80 µg/m^3, 59 µg/m^3 and 9 µg/m^3. These are within the respective mean SO_2 objectives of 266µg/m^3, 350µg/m^3 and 125µg/m^3.

As only 5 months of data was collected from Ermine Farm, Appleby no significant conclusions for that site can be drawn. However, an indication of the air quality in this area can be derived from the above results calculated

through use of the techniques suggested by the Local Authority Helpdesk. The results above both suggest that the 15-minute, 1-hour and 24-hour objectives for sulphur dioxide would not have been exceeded if the monitoring station had remained in situ for a 12-month period.

In conclusion the Council is satisfied that the sulphur dioxide 15-minute, 1-hour and 24-hour mean Air Quality Objectives were not exceeded in 2005 at any of the automatic monitoring sites.

7.2 (B) Monitoring Data Within An AQMA

There are no designated AQMAs within North Lincolnshire.

7.2 (C) New Industrial Sources

One new major industrial process with the potential to emit significant amounts of sulphur dioxide has commenced operation within North Lincolnshire since the last round of review and assessment. This process is Immingham CHP Plant, which commenced full commercial operation on 1st November 2004. This CHP station has an electrical output of 735MW generated through the operation of two gas turbines, two heat recovery steam generators and two steam turbines.

7.2 (D) Industrial Sources With Substantially Increased Emissions

There have been no industrial sources identified since the last round of Review and Assessment which have increased their emissions by over 30%.

- **Existing Industrial Sources Within North Lincolnshire**

With reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) there are 14 industrial processes identified with the potential to emit sulphur dioxide. The sulphur dioxide emissions for these 14 processes were obtained from the Environment Agency's Pollution Inventory and also from the site operators themselves. Operator and emission details are contained in Table 14.

Three of the processes contained in Table 14, Conoco Phillips Ltd, Corus UK Ltd and Cemex, have reduced their emissions of sulphur dioxide between 2000 and 2005 and therefore need not be considered further.
Only one of the 14 industrial processes considered here, Total UK Ltd Oil Refinery increased it's emissions between 2000 and 2005. The increase in emissions from Total UK Ltd Oil Refinery was less than 30% and with reference to the guidance in box 6.2(K) of Technical Guidance LAQM.TG(03), which allows for an increase in emissions up to 30% from previous rounds of review and assessment, this process will not be considered further.

Fibrogen Ltd increased its emissions by 49% and therefore the 'Industrial Emissions Screening Tool' (IEST) was used to calculate the maximum annual emission rate of sulphur dioxide for this site. The maximum annual emission rate calculated by the IEST was 315 Tonnes per annum, which is in excess of the current emission level of 126 Tonnes per annum. Fibrogen Ltd therefore need not be considered further.

Table 14 Part A(1) Industrial Processes Within North Lincolnshire With The Potential To Emit Sulphur Dioxide

Type of process	Operator	Permit Ref	NGR	Receptor distance	Mass Emission (T)		Variation	Max Emission Rate
					Year 2000	Year 2005		
1.1 Gasification & Refining	Conoco Phillips Ltd	AF8173	TA1610016500	840m	5,800	5,649	-3%	N/A
1.1 Gasification & Refining	Total UK Ltd Oil Refinery	AF6928	TA1580017700	840m	9,600	9,932	+3%	N/A
1.3 Combustion Processes	Regional Power Generators Ltd	AA6904	SE9870006200	780m	3.7	<100	Data Not Comparable	[2] 598 Tpa
1.3 Combustion Processes	Centrica KPS Ltd	AF0920	TA1310017500	510m	<10	<100	Data Not Comparable	[2] 2,195 Tpa
1.3 Combustion Processes	National Grid Gas PLC	AF7410	SE8890004200	83m	<10	<100	Data Not Comparable	[2] 290 Tpa
1.3 Combustion Processes	Immingham CHP	BJ8802IZ	TA1651216981	28m	N/A	<100	Data Not Comparable	[2] 4,895 Tpa
1.3 Combustion Processes	E.ON UK Plc	AB5873	TA1400018800	510m	<10	<100	Data Not Comparable	[2] 638 Tpa
1.3 Combustion Processes	Keadby Power	AB4745	SE8350011500	280m	<10	<100	Data Not Comparable	[2] 1,531 Tpa
2.1 Ferrous Metals	Corus UK Ltd	BL3838IW	SE9200009500	260m	7,583 [1]	5,649	-26%	N/A
2.1 Ferrous Metals	Caparo Merchant Bar	BR8832IJ	SE9130510305	680m	45	<100	Data Not Comparable	[2] 507 Tpa
3.1 Cement & Lime	Cemex	AP8314	SE9730020900	95m	920	867	-6%	N/A
3.1 Cement & Lime	Singleton Birch	BL88051Z	TA0830011200	457m	<10	<100	Data Not Comparable	[2] 177 Tpa
5.1 Waste Incineration	Fibrogen Ltd	BE7621	SE8601514794	505m	44	<100	Data Not Comparable	[2] 474Tpa
6.3 Tar & Bitumen	Koppers UK Ltd	AU8296	SE9020011600	214m	19.7	<100	Data Not Comparable	No Calculation Possible

[1] Combined SO_2 emissions from Corus UK Ltd installations in 2000
[2] Industrial Emissions Screening Tool acceptable emission limit (Tonnes per annum)

Due to accurate emission rates not being available, the maximum reported emission data for nine of the remaining ten processes were inputted into the IEST to calculate acceptable individual emission limits for these sites. The data inputted for these ten individual processes can be found in Appendix 10.9, whilst the results are contained within Table 14. The maximum emission rates calculated by the screening tool for these nine processes were all in excess of their respective 2005 emission rates and therefore none need be considered further.

Information necessary for input into the IEST was not forthcoming from the remaining process, Koppers UK Ltd, before this report was submitted and therefore a maximum emission rate could not be calculated for this process. Emissions data from this process will be reported in the next stage of the review and assessment process.

In summary, after comparing emissions from 2000 to those of 2005, none of the 14 industrial processes identified as having the potential to emit sulphur dioxide have increased their emissions by a significant margin and therefore none require a detailed assessment for sulphur dioxide.

Conoco Phillips (UK) Ltd & Total UK Ltd Oil Refineries

The "Updating and Screening Assessment 2003" recommended that a detailed assessment for sulphur dioxide be conducted in Killingholme in response to modelling reports submitted with regard to both the Conoco Phillips Ltd Refinery and also the Total UK Ltd Oil Refinery. These reports indicated that the 2005 15-minute objective for sulphur dioxide may be exceeded in this area.

The data gathered from the automatic monitoring station in Killingholme, situated at Killingholme Primary School, indicates that there have been no exceedances of the 1-hour or 24-hour mean sulphur dioxide objectives and only one exceedance of the 15-minute mean objective since the sites installation in March 2003. This information would indicate that the 15-minute, 1-hour and 24-hour mean objectives for sulphur dioxide are unlikely to be exceeded in this area.

- **Industrial Sources Outside North Lincolnshire**

The following authorities were contacted with regard to obtaining information about Part A and B processes within their boundaries which have the potential to emit significant levels of sulphur dioxide and which may as a result impact on air quality within North Lincolnshire.

- Bassetlaw Council
- Doncaster City Council
- East Riding of Yorkshire Council
- East Lindsey District Council
- Hull City Council
- North East Lincolnshire Council

- West Lindsey District Council

Information received from these authorities indicates that there have been no significant increases in emissions since the previous review and assessment. Therefore, it is concluded that those processes with the potential to emit sulphur dioxide within neighboring authorities are unlikely to have a significant impact on air quality within North Lincolnshire.

7.2 (E) Areas Of Domestic Coal Burning

The village of Keadby was identified in the "Updating and Screening Assessment 2003" as an area with a significant level of domestic coal burning. During the USA 2003 a residential survey was conducted on this area to assess the extent of domestic coal burning, the results of which led to a detailed assessment of sulphur dioxide in this location.

An automatic monitoring station was installed at Station Road, Keadby from 12th January 2004 to 15th February 2005 to monitor sulphur dioxide levels in the Keadby area. After reviewing the data recorded by this monitoring station in the "Air Quality Progress Report 2005" submitted by this authority it was concluded that there was no need to declare an air quality management area for sulphur dioxide in Keadby.

As domestic coal burning within Keadby was covered in previous reports and as there have been no other areas of domestic coal burning identified since these reports this authority concludes that a detailed assessment into sulphur dioxide regarding domestic coal burning will not be required.

7.2 (F) Small Boilers (>5MW$_{(thermal)}$)

There are no boilers greater than 5MW$_{(thermal)}$ in size that burn coal or fuel oil within North Lincolnshire.

7.2 (G) Shipping

There are two shipping terminals within North Lincolnshire which have the capacity for the acceptance of large ships (i.e. container ships, roll-on/roll-off ships etc).

- Humber International Terminal (NGR: 518910 / 416610)
- North Killingholme Haven (NGR: 516536 / 420012)

Using GIS, no relevant exposure was identified within 1km of either of the terminals (Appendices 10.24 & 10.25). A detailed assessment into sulphur dioxide for shipping will therefore not be conducted. Humber and Goole Port Health Authority regulate Humber International Terminal and North Killingholme Haven, as well as other operations at Gunness Wharf, Grove Wharf, Flixborough Wharf and New Holland Bulk Services.

7.2 (H) Railway locomotives

During the last round of Review and Assessment it was confirmed that there were no incidences where any passenger or freight rail traffic would be stationary for periods of 15 minutes or more with engines running. Consequently there would be no occurrences of rail traffic giving rise to significant relevant exposure within North Lincolnshire.

7.3 Conclusions of the updating & screening assessment for sulphur dioxide

North Lincolnshire will not proceed to a detailed assessment for sulphur dioxide.

8.0 Updating & Screening Assessment Of PM_{10}

8.1 Introduction

Fine particles (PM_{10}), unlike individual gaseous pollutants, are composed of a wide range of substances arising from a variety of sources. Particles in the UK may be regarded as having three predominant source types.

Primary	Produced by combustion processes, mainly road traffic.
Secondary	Mainly sulphates and nitrates, formed by chemical reactions in the atmosphere.
Coarse	Suspended soils and dusts, sea-salt, particles from construction work.

Nationally, road traffic accounts for 25% of PM_{10} emissions, rising to 30-40% in city centres.

8.1.1 The Health Effects Of PM_{10}

In recent years the emphasis with regard to particulate matter has centred on the size of the particles. Material that is less than 10 microns (µm), i.e. one hundred thousandth of a metre, in diameter will penetrate deep into the lungs when inhaled and consequently presents the greatest risk to human health.

Small particles aggravate a range of respiratory and other medical conditions giving rise to particular problems for sensitive groups such as asthmatics. It has been suggested that the rise in allergic disorders, such as hay fever and eczema, are linked to particulate matter in the air, although there is no clear evidence to support this at present.

The National Air Quality Standards (NAQS) detail PM_{10} as the most appropriate measure of particulate matter in the environment, due to its likely health effects

8.1.2 Air Quality Objective For PM_{10}: 2004

The objectives for PM_{10} detailed in the Air Quality Strategy are: -

- A measured 24-hour mean of 50µg/m^3, which allows for 35 exceedances in a year. Conversely, this may be defined as the 90th percentile of less than 50µg/m^3.
- An annual mean not exceeding 40µg/$m^{3.}$

8.4 Assessment Of PM_{10}

8.4 (A) PM_{10} Monitoring Data Outside An AQMA

Monitoring data for all of North Lincolnshire Council's PM_{10} air quality monitoring stations, within and outside of the PM_{10} Air Quality Management Area (AQMA), can be found in Table 15.

- **Allanby Street (Scunthorpe) – TEOM**

The TEOM PM_{10} analyser situated on Allanby Street, Scunthorpe (NGR: SE8927311446) (Appendix 10.17) has been recording data since 1st July 2005. Air quality data collected by this station indicates that the 24-hour mean of 50µg/m^3 for PM_{10} was exceeded 15 times during 2005.

However, as less than 9 months of data was captured during 2005 the number of exceedances at this site over a 12-month period was estimated as per guidance contained in Box 8.5 of LAQM.TG(03). Following this guidance the 2004 monitoring data from the nearby Killingholme station was utilised to calculate a ratio through which the 6-month mean at Allanby Street could be adjusted to a 12-month mean. The resultant 2004 annual mean was then adjusted for 2005 using the NETCEN Year Adjustment Calculator. The resulting estimated 2005 annual mean for this monitoring site is 27.6 µg/m^3.

The estimated number of annual exceedances at this site was then calculated by inputting the estimated annual mean into the calculation described in Figure 8.1 of LAQM.TG(03), shown in Equation 1.

Equation 1 Relationship Between Annual Mean Conc^n (µg/m^3) and number of 24-Hour exceedances of 50µg/m^3 as Specified in Figure 8.1 LAQM.TG(03)

$$\text{Annual Exceedances} = -18.5 + 0.00145 \times \text{Annual Mean}^3 + \frac{206}{\text{Annual Mean}}$$

The estimated number of exceedances for Allanby Street during 2005 as calculated using Equation 1 is 20; this is within the 35 exceedances acceptable through the 2004 objective for PM_{10}.

During the 6 month monitoring period an 83% data capture was achieved. As this is less than the 90% specified in 8.4 (A) of LAQM.TG(03) the 90th percentile of 24-hour means was calculated. This resulted in a 90th percentile concentration of 47.3µg/m^3, below the 24-hour mean objective of 50µg/m^3.

- **Lincoln Gardens Primary School (Scunthorpe) - TEOM**

The Lincoln Gardens Primary School TEOM air quality monitoring station (NGR: SE8949008910) (Appendix 10.21) has been in place since 30th November 2004.

The continuous monitoring data collected by this station indicates that there were 7 exceedances of the PM_{10} 24-hour objective of 50µg/m^3 in 2005.

- **Killingholme – Killingholme Primary School - TEOM**

The Killingholme Primary School (NGR: TA1488016120) 'Rollalong' air monitoring station, includes a PM_{10} analyser using the TEOM method of detection.

The continuous monitoring data recorded from the Killingholme Primary School monitoring station indicates that the 24-hour mean of 50µg/m^3 was exceeded 9 times during 2005. This is within the PM_{10} objective of 35 exceedances of the 24-hour objective.

- **Appleby – Ermine Farm - TEOM**

The 'Groundhog' air monitoring station, which includes a PM_{10} analyser using the TEOM method of detection, was situated at Ermine Farm, Appleby (NGR: SE4981914965) for 5 months from 24th March 2005 to 24th August 2005.

As this site was monitoring for less than 9 months the mean PM_{10} concentration calculated for this short monitoring period was adjusted to estimate the annual mean following guidance in Box 8.5 of LAQM.TG(03). The estimated annual 2005 mean at Ermine Farm, Appleby is 28.9µg/m^3. Utilising the equation in Equation 1 the estimated number of exceedances of the 24-hour PM_{10} objective is 24, within the accepted threshold of 35.

8.4 (B) Monitoring Data Within An AQMA

An Air Quality Management Area (AQMA) was declared in North Lincolnshire on 26th October 2005 in relation to a likely breach of the 24-hour air quality objective for particulate matter less than 10 microns in diameter as specified in the Air Quality Regulations (England & Wales) 2000.

A map of the AQMA area can be found in Appendix 10.27. The monitoring stations detailed below fall within the boundary of North Lincolnshire's AQMA.

Monitoring data for all of North Lincolnshire Council's PM_{10} air quality monitoring stations, within and outside of the PM_{10} Air Quality Management Area (AQMA), can be found in Table 15.

- **East Common Lane (Scunthorpe) – TEOM**

The TEOM PM_{10} analyser located on East Common Lane, Scunthorpe (NGR: SE9066209791) (Appendix 10.16) has been in place since March 2005.

The monitoring data collected by this station during 2005 indicates that the 24-hour mean of 50µg/m^3 for PM_{10} was exceeded 30 times.

- **Scunthorpe Town (Scunthorpe) – Partisol**

There are two PM_{10} monitoring stations co-located at the Scunthorpe Town site one Partisol analyser and one TEOM analyser. The Partisol analyser (NGR: SE9031010830) (Appendix 10.23) has been monitoring in this location since November 2004.

During 2005 there were 28 exceedances of the 50µg/m^3 24-hour mean objective for PM_{10}. Throughout the active monitoring period in 2005 this station achieved a data capture of 80.5%. If the data capture at any given site falls below 90% the 90th percentile of 24-hour means is calculated for comparison to the 24-hour PM_{10} objective of 50µg/m^3. The 90th percentile calculated for this site is 49.2µg/m^3, within the 50µg/m^3 objective.

- **Scunthorpe Town (Scunthorpe) – TEOM**

The TEOM analyser (NGR: SE9031010830) (Appendix 10.23) has been actively monitoring PM_{10} at the Scunthorpe Town site since July 2004. Data collected from this site during 2005 indicates that there were 25 exceedances of the 24-hour mean objective for PM_{10} of 50µg/m^3.

- **Lakeside (Scunthorpe) – Partisol**

The Partisol analyser situated at Lakeside (NGR: SE9175508242) (Appendix 10.20) has been monitoring in this location since 23rd January 2005.

Data collected from this site during the course of 2005 indicates that the 24-hour PM_{10} objective of 50µg/m^3 was exceeded on 36 occasions. This is in excess of the 35 allowable exceedances over the course of the year.

During this site's active monitoring period in 2005 this station achieved a data capture of 87.8%, necessitating the calculation of the 90th percentile of 24-hour means. The PM_{10} 90th percentile recorded at this site is 55.2 µg/m^3, which is in excess of the acceptable 24-hour objective for PM_{10} of 50 µg/m^3.

Monitoring at this site ceased on 8th August 2006 due to ground/construction works commencing directly adjacent to the site, which have the potential to significantly affect the monitoring data.

- **Lakeside (Scunthorpe) – TEOM**

A TEOM analyser was installed by the Environment Agency at the Lakeside site between 26th May 2005 and 7th August 2005. During this period 1 exceedance of the 24-hour mean for PM_{10} was recorded.

This station was on site for approximately 2 months, which is short of the minimum period of 9 months specified by Box 8.4(A) of LAQM.TG(03). Following the guidance in Box 8.5 of LAQM.TG(03) the estimated annual mean of 20.9µg/m^3 was calculated before being entered into the equation in Equation 1 to produce an estimated number of annual exceedances of the 24-hour mean objective of 5. This is within the acceptable 35 exceedances over a 12-month period.

- **Santon - TEOM**

The "Groundhog" automatic monitoring station situated in Santon, Scunthorpe (NGR: SE9294411934) (Appendix 10.22) monitors PM_{10} through use of a TEOM analyser.

This station has been actively monitoring since 1st October 2005, and therefore collected 3 months of data during 2005. In these 3 months this station recorded 41 exceedances of the 24-hour PM_{10} objective of 50µg/m^3, which is in excess of the 12-month allowance of 35 exceedances.

As this station was monitoring for less than 9 months the estimated annual mean was calculated using guidance in Box 6.5 of LAQM.TG(03). The estimated annual mean for this site is 48.1µg/m^3. This estimated annual mean was entered into the equation in Equation 1 resulting in an estimated number of annual exceedances of the 24-hour mean objective of 147. This result is in excess of the objective allowance of 35 exceedances of the 24-hour PM_{10} objective.

Table 15 Gravimetric Data For The PM_{10} Monitoring Sites Within North Lincolnshire For 2005

Monitoring Station		Dates of Operation in 2005	Overall Data Capture (%)	Annual Data Capture (%)	90th Percentile (µg/m3)	98th Percentile (µg/m3)	Mean Concn (µg/m3)	Number Of Exceedances	Estimated Annual Mean Concn (µg/m3)	Estimated Number of Exceedances
[1] Scunthorpe Town	TEOM	01/01/05 - 31/12/05	97.5	97.5	N/A	N/A	24.9	25	N/A	N/A
[1] Scunthorpe Town	Partisol	01/01/05 - 31/12/05	80.5	80.5	49.2	86.1	27.5	28	N/A	N/A
[1] East Common Lane	TEOM	01/04/05 - 31/12/05	99.6	75.1	50.4	76.2	26.8	30	26.3	16
[1] Santon Groundhog	TEOM	01/10/05 - 31/12/05	100.0	25.2	72.7	115.7	49.0	41	48.1	147
[1] Lakeside	Partisol	27/01/05 – 31/12/05	87.8	76.6	55.2	76.6	28.9	36	N/A	N/A
[1] Lakeside	TEOM	26/05/05 - 07/08/05	94.6	19.2	31.0	46.4	21.4	1	20.9	5
Allanby Street	TEOM	01/07/05 - 31/12/05	83.2	41.9	47.3	69.7	28.2	15	27.7	20
Lincoln Gardens	TEOM	01/01/05 - 31/12/05	99.2	99.2	N/A	N/A	23.0	7	N/A	N/A
Killingholme	TEOM	01/01/05 - 31/12/05	98.4	98.4	N/A	N/A	23.9	8	N/A	N/A
Ermine Farm, Appleby	TEOM	24/03/05 - 24/08/05	98.0	40.3	44.2	73.9	29.5	11	28.9	24

[1] Air Quality Monitoring Stations within the PM_{10} Air Quality Management Area

8.4 (D) Junctions

The junctions in North Lincolnshire that met the following criteria were identified through the use of GIS and data obtained from North Lincolnshire Council's Traffic & Road Safety Team and are detailed in Appendix 10.4. The criteria being:

- Traffic flow in excess of 10,000 vehicles per day.
- Relevant public exposure within 10m of the kerb.

Relevant exposure was considered for the 24-hour objective of 50 $\mu g/m^3$ not being exceeded more than 35 times per year.

The DMRB screening model was then used to predict annual mean concentrations in 2006, the results of which are shown in Table 16. The screening model results predict that there will be no locations with more than 35 exceedances of the 24-hour mean objective of 50$\mu g/m^3$ in 2006 and therefore a detailed assessment for PM_{10} at the locations in Table 16 will not be required.

Table 16 Number of Exceedances of the 24-hour Mean PM_{10} Objective In 2006 For Junctions As Specified In LAQM.TG(03) Box 8.4(D).

Junction	No. Of Exceedances Of 24-Hour Mean In 2006
Britannia Corner	5.5
Ashby Road / West Common Lane / Old Brumby St	4.2
Monument Roundabout	3.2
Messingham Rd / Burringham Rd / Priory Rd	3.4
Ferriby Rd / Holydyke / Hungate	2.9
Ashby High St / Grange Lane South	3.7
Barnard Avenue / Wesley Rd / Old Courts Road	2.9
Messingham Road / Chancel Road / Willoughby Road	3.2
Barrow Road / Whitecross Street	2.6

8.4 (E) Roads With High Flow Of Buses And/Or HGVs

The roads in North Lincolnshire that met the following criteria were identified through the use of GIS and data obtained from North Lincolnshire Council's Traffic & Road Safety Team and are detailed in Appendix 10.6.

- Flow of HDVs greater than 20%
- 2,000 HDVs or more per day
- Relevant public exposure within 10m of the kerb

Relevant exposure was considered for the 24-hour objective of 50 μg/m^3 not being exceeded more than 35 times per year.

The DMRB screening model was used to predict the number of exceedances of the 24-hour mean in 2006; the results of which are shown in Table 17. The screening model calculated that Humber Road in South Killingholme would not exceed the 24-hour mean of 50μg/m^3 more than 10 times in 2006 and as such a detailed assessment for PM_{10} will not be required at this location.

Table 17 Number of Exceedances of the 24-hour Mean PM_{10} Objective In 2006 For Roads With High Flow Of Buses And/Or HGVs As Specified In LAQM.TG(03) Box 8.4(E).

Road			No. Of Exceedances Of 24-Hour Mean In 2006
Humber Road	South Killingholme	A160	9.9

8.4 (F) New Roads Constructed Or Proposed Since The Last Round Of R&A

There have been no new roads constructed or proposed since the last round of Review and Assessment with a predicted daily traffic flow of over 10,000 vehicles per day.

8.4 (G) Roads With Significantly Changed Traffic Flows

There are no roads in North Lincolnshire with more than 10,000 vehicles per day annual average daily traffic (AADT) that have experienced a greater than 25% increase in AADT traffic flow.

8.4 (H) Roads Close To The Objective During The Second Round Of R&A

None of the roads considered during the second round of review and assessment were predicted to exceed the 24-hour mean objective of 50μg/m^3 more than 25 times per year. Therefore, the DMRB screening model does not need to be re-run for these roads.

8.4 (I) New Industrial Sources

One new major industrial process with the potential to emit significant amounts of PM_{10} has commenced operation within North Lincolnshire since the last round of review and assessment. This process is Immingham CHP Plant, which commenced full commercial operation on 1st November 2004.

This CHP station has an electrical output of 735MW generated through the operation of two gas turbines, two heat recovery steam generators and two steam turbines.

8.4 (J) Industrial Sources With Significantly Increased Emissions

- **Existing Industrial Sources Within North Lincolnshire**

With reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) there are 11 industrial processes identified with the potential to emit PM_{10}. The PM_{10} emissions for these 11 processes were obtained from the Environment Agency's Pollution Inventory and also from the site operators themselves. Operator and emission details are contained in Table 18.

Three of the processes contained in Table 18, Caparo Merchant Bar Plc, Corus UK Ltd and Cemex, have reduced their emissions of PM_{10} between 2000 and 2005 and therefore need not be considered further.

For the remainder of the processes considered, accurate emissions data was either not available from the Environment Agency website or no comparable data could be found. Therefore the maximum reported emissions data for these industrial processes was entered into the IEST in order to calculate acceptable individual annual emission limits for these sites. The data inputted for these nine individual processes can be found in Appendix 10.9, whilst the results are contained within Table 18. The maximum emission rates calculated by the screening tool for these eight processes were all in excess of their respective 2005 emission rates and therefore none need be considered further.

Table 18 Part A(1) Industrial Processes Within North Lincolnshire With The Potential To Emit Significant Levels of PM_{10}

Type of process	Operator	Permit Ref	NGR	Receptor distance	Mass Emission (T)		Variation	Max Emission Rate
					Year 2000	Year 2005		
1.3 Combustion Processes	Immingham CHP	BJ8802IZ	516512 / 416981	28m	N/A	<10	Data Not Comparable	[2] 2,966
1.3 Combustion Processes	Regional Power Generators Ltd	AA6904	498700 / 406200	780m	0	<10	Data Not Comparable	[2] 228
1.3 Combustion Processes	Centrica KPS Ltd	AF0920	513500 / 417500	510m	0	<10	Data Not Comparable	[2] 210
1.3 Combustion Processes	Keadby Power	AB4745	483500 / 411500	280m	<1	22	Data Not Comparable	[2] 277
1.3 Combustion Processes	E.ON UK Plc	AB5873	514000 / 418800	510m	<10	<10	Data Not Comparable	[2] 277
1.3 Combustion Processes	National Grid Gas Plc	AF7410	488900 / 404200	83m	-	0	Data Not Comparable	[2] 18
2.1 Ferrous Metals	Corus UK Ltd	BL3838IW	492000 / 409500	260m	[1] 1,266	950	-25%	N/A
2.1 Ferrous Metals	Caparo Merchant Bar PLC	BR8832IJ	491305 / 410305	680m	1.8	0	-100%	N/A
3.1 Cement & Lime	Cemex	AH8743	497300 / 420900	95m	160	79	-51%	N/A
3.1 Cement & Lime	Singleton Birch	BL880512	508300 / 411200	457m	2	<10	Data Not Comparable	[2] 21
6.3 Tar & Bitumin	Koppers UK Ltd	BV1356IQ	490200 / 411600	214m	<1	<10	Data Not Comparable	No Calculation Possible

[1] Combined PM_{10} emissions from Corus UK Ltd installations in 2000
[2] Industrial Emissions Screening Tool acceptable emission limit (Tonnes per annum)

- **Existing Industrial Sources Outside North Lincolnshire**

The following authorities were contacted with regard to obtaining information about Part A and B processes within their boundaries which have the potential to emit PM_{10} and which may as a result impact on air quality within North Lincolnshire.

- Bassetlaw Council
- Doncaster City Council
- East Riding of Yorkshire Council
- East Lindsey District Council
- Hull City Council
- North East Lincolnshire Council
- West Lindsey District Council

Information received from these authorities indicates that there have been no significant increases in emissions since the previous review and assessment. Therefore, it is concluded that those processes with the potential to emit PM_{10} within neighboring authorities are unlikely to have a significant impact on air quality within North Lincolnshire.

8.4 (K) Areas Of Domestic Solid Fuel Burning

The village of Keadby was identified in the "Updating and Screening Assessment 2003" as an area with a significant level of domestic coal burning. During the USA 2003 a residential survey was conducted on this area to assess the extent of domestic coal burning, the results of which led to a detailed assessment for PM_{10} in this location.

An automatic monitoring station was installed at Station Road, Keadby from 12th January 2004 to 15th February 2005 to monitor PM_{10} levels in the Keadby area. After reviewing the data recorded by this monitoring station in the "Air Quality Progress Report 2005" submitted by this authority it was concluded that there was no need to declare an air quality management area for PM_{10} in Keadby.

As domestic coal burning within Keadby was covered in previous reports and as there have been no other areas of domestic coal burning identified since these reports this authority concludes that a detailed assessment into PM_{10} regarding domestic coal burning will not be required.

8.4 (L) Quarries, Landfill Sites, Open-Cast Coal, Handling Of Dusty Cargoes At Ports, etc.

All potential sources of significant dust emission from processes such as quarrying, handling of dusty materials etc. in North Lincolnshire were identified in the "Updating and Screening Assessment 2003". During the

course of this assessment enquiries were made to identify any processes of this type that had been commissioned since this report, but none were found.

For those sites identified during the "Updating and Screening Assessment 2003" further investigations were conducted to determine if any of the parameters regarding these sites, such as receptor distance, receipt of complaints etc. had changed in the interim period (Appendix 10.8). No variations could be identified for any of these processes.

Therefore, a detailed assessment will not be carried out for PM_{10} at any of these processes.

8.4 (M) Aircraft

- **Humberside International Airport**

Humberside International Airport is located within North Lincolnshire. Concentric circles were drawn on GIS to identify any possible receptors (see Appendix 10.26) within a 500m radius of the airfield. Several residential properties were identified. With reference to the information contained in Annex 2 of LAQM.TG(03) on the throughput of passengers and freight through Humberside Airport in 2005, the total equivalent number of passengers per annum was calculated.

Air transport movements	12,392
Terminal passengers	464,662
Freight lifted	2700 tonnes

100,000 tonnes freight = 1 million passengers per annum (mppa)

2700 tonnes freight = 0.027 mppa
464,662 terminal passengers = 0.46 mppa

The total equivalent number of passengers per annum is: 0.487 mppa

The total equivalent number of passengers per annum is well below the threshold of 10 mppa. The throughput of the airport has not increased considerably over recent years and is not expected to do so in the near future. Humberside International Airport will not have a significant effect on PM_{10} concentrations.

- **Robin Hood Airport**

On the 28th of April 2005 both passenger and freight flights began operating out of the new Robin Hood Airport (Doncaster / Sheffield). This airport is outside of North Lincolnshire but is considered due to its proximity to the county and therefore it has the potential to impact on the air quality within North Lincolnshire.

As Robin Hood Airport was not in operation for the entirety of 2005, a 12-month period, from May 2005 until May 2006, has been considered in order to calculate the total equivalent number of passengers per annum as per the information contained in Appendix C, Annex 2 of Technical Guidance LAQM.TG(03).

Air transport movements	7,561
Terminal passengers	837,000
Freight lifted	590 tonnes

100,000 tonnes freight = 1 million passengers per annum (mppa)

590 tonnes freight = 0.0059 mppa
837,000 terminal passengers = 0.837 mppa

The total equivalent number of passengers per annum is: 0.843 mppa.

The total equivalent number of passengers per annum for Robin Hood Airport is 0.843; this is well below the threshold of 10 mppa. This low figure, combined with the out of area location of Robin Hood Airport enables this Council to confidently predict that Robin Hood Airport will not have a significant effect on PM_{10} concentrations within North Lincolnshire. However, comments on the likely future throughput at the airport cannot be made, as this is the first year of operation.

8.5 Conclusions Of The Updating & Screening Assessment For PM_{10}

Further assessment work, as required by Section 84(1) of the Environment Act 1995, will continue throughout Scunthorpe and the surrounding villages in order to confirm that the boundaries of the AQMA are accurate and whether they need to be refined. The Council will identify the relative contributions of PM_{10} from different sources including industry, traffic and natural sources.

An action plan will also be produced working with other stakeholders in order to reduce levels of PM_{10} within the area.

9.0 Recommendations for Each Pollutant

9.1 Carbon Monoxide

A detailed assessment is not required.

9.2 Benzene

A detailed assessment is not required.

9.3 1,3-Butadiene

A detailed assessment is to be conducted at the following locations:

- In the vicinity of the Conoco Phillips and Total UK Ltd Oil Refineries, North Killingholme

9.4 Lead

A detailed assessment is to be conducted at the following locations:

- In the vicinity of the Corus Integrated Steelworks, Scunthorpe.

9.5 Nitrogen Dioxide

A detailed assessment is to be conducted at the following locations:

- Doncaster Rd / Hilton Avenue, Scunthorpe
- Junction of Brigg Road and A18, Mortal Ash, Scunthorpe

9.6 Sulphur Dioxide

A detailed assessment is not required.

9.7 PM_{10}

Further assessment work, as required by Section 84(1) of the Environment Act 1995, will continue throughout Scunthorpe and the surrounding villages in order to confirm that the boundaries of the AQMA are accurate and whether they need to be refined. The Council will identify the relative contributions of PM_{10} from different sources including industry, traffic and natural sources.

An action plan will also be produced working with other stakeholders in order to reduce levels of PM_{10} within the area.