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, to build on and update the Authority's earlier first round Air Quality Review and Assessment.

The Updating and Screening Assessment reconsiders all potential sources of pollution (primarily industry and traffic related sources) with respect 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. However, the Council has also taken the opportunity to review all the areas previously addressed to ensure that the conclusions drawn at the time are still valid.

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). The Design Manual for Roads and Bridges (DMRB) 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 a further detailed assessment of PM_{10} will be conducted in relation to the following: -

- Industrial emissions of PM_{10} in Scunthorpe.
- Emissions of PM_{10} from quarries and landfills in Barnetby.
- Emissions of PM_{10} and SO_2 from domestic solid fuel burning in Keadby.
- Industrial emissions of SO_2 in Killingholme
- Industrial emissions of benzene in Killingholme and Scunthorpe

North Lincolnshire Council will undertake appropriate dispersion modelling studies and further monitoring in these areas to determine if it is necessary to declare any Air Quality Management Areas.

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1. 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 December 2008. There are also proposed new objectives for $PM_{10,}$ which will be considered in this report although they are not yet part of the Regulations. 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 *(1) PM_{10}	50μg/m^3 *(2)	24-Hour Mean not to be exceeded more than 35 times a year.	31/12/2004
	50μg/m^3	***24-Hour Mean not to be exceeded more than 7 times a year***	***31/12/2010***
	40μg/m^3	Annual Mean	31/12/2004
	20μg/m^3	***Annual Mean***	***31/12/2010***
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 *(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	31/01/2010
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) "PM_{10}" - Particulate Matter less than 10 microns in diameter.
*(2) "μg/m^3" - micrograms per cubic metre.
*(3) "mg/m^3" - milligrams per cubic metre.

Proposed new objectives

1.2 Conclusions and Recommendations from First Round of Air Quality Review and Assessment (Stages 1, 2 & 3)

Stages 1 & 2 for each Pollutant

- **Carbon Monoxide** A Stage 3 Review & Assessment was not required.
- **Benzene** A Stage 3 Review & Assessment was not required.
- **1, 3-Butadiene** A Stage 3 Review & Assessment was not required.
- **Lead** A Stage 3 Review & Assessment was not required.
- **Nitrogen Dioxide** A Stage 3 Review & Assessment was required for the following locations and processes:

    a) The area in the town centre around Britannia Corner, Mary Street and Oswald Road in Scunthorpe;

    b) The vicinity of Brigg Road and Station Road in Scunthorpe;

    c) Ashby Road in Scunthorpe; and

    d) Scunthorpe Steelworks.

- **Sulphur Dioxide** A Stage 3 Review & Assessment was not required.
- **PM_{10}** A Stage 3 Review & Assessment was not required.

Stage 3 Review & Assessment for Nitrogen Dioxide

It was concluded that no Air Quality Management Areas needed to be designated within North Lincolnshire. However, due to the closeness of the modelling results for nitrogen dioxide to the annual average objective (taking into account the uncertainty limits of the model), it was recommended that further monitoring and assessment should be carried out to aid the second round of air quality review and assessment.

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. North Lincolnshire is well positioned to take advantage of water transport. Along the banks of the Humber and the Trent there are several wharf facilities.

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.

The purpose of this report is to identify those aspects that have changed since completion of the last round. However, the Council has taken the opportunity to review all the areas previously addressed to ensure that the conclusions drawn at the time are still valid.

A review of air quality means a consideration of the levels of pollutants in the air for which objectives are prescribed in Regulations, and estimations 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 exceedences 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.

In light of the recommendations made by DEFRA, in relation to the last review and assessment process, some additional areas were also considered including domestic solid fuel burning and the impact of traffic emissions at junctions.

This Updating and Screening Assessment has been completed in accordance with the technical guidance LAQM.TG(03). 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 April 2004.

2. 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

North Lincolnshire Council does not carry out any ambient air quality monitoring of carbon monoxide. Reference was therefore made to the NETCEN background concentration maps. 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, the correction factor of 0.826 detailed in 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 10 mg/m^3, measured as a running 8-hour mean.

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. Updating & Screening Assessment of Benzene

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 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

- **Killingholme diffusion tube survey**

Listed in Table 2 are the results from the diffusion tube monitoring carried out in the Killingholme area from August 1998 to July 1999 (A map showing their locations can be found in Appendix 1).

Table 2- diffusion tube data for annual mean benzene concentrations

SITE	Annual Mean (ppb)	Annual Mean (mg/m^3)
1 Top Road, E. Halton	0.46	**1.5**
2 Clough Lane, S.Killingholme	0.39	**1.3**
4 Rosper Rd, S.Killingholme	0.76	**2.5**
5 Church Lane, N.Killingholme	0.49	**1.6**
6 Staple Rd, S.Killingholme	0.36	**1.2**
7 Humber Rd, S.Killingholme	0.62	**2.0**
8 Baptist Chapel, S.Killingholme	0.36	**1.2**
9 Homestead Park , Immingham	0.32	**1.0**
10 St Andrews Court, Immingham	0.29	**0.9**
NL3 FP Station Rd, S.Killinghlome	0.89	**2.9**

The diffusion tube data indicates that the Air Quality Objective for benzene of 16.25$\mu g/m^3$, expressed as a running annual mean, is likely to be achieved by 2003. The diffusion tube data also indicates that the 2010 Air Quality Objective for benzene of 5$\mu g/m^3$, expressed as an annual mean, is likely to be achieved.

- **South Killingholme - Real Time Monitoring**

To further quantify and support the information gained from the diffusion tube survey of benzene, the previous review considered the data from the "OPSIS" monitor located at South Killingholme since February 1997 (See Appendix 2 for the location). The equipment measures benzene concentrations along a 230 metre path. The annual means and calculated maximum running annual means are given in Table 3.

Table 3 - benzene concentrations at South Killingholme

Year	Mass Emission Lindsey Oil Refinery 2000 (tonnes)	Mass Emission Conoco 2000 (tonnes)	Annual Mean Concentration ($\mu g/m^3$)	Running Annual Mean Conc^n ($\mu g/m^3$)
1997	No Data	No Data	6.8	7.5
1998	180	150	9.9	10.9
1999	140	140	8.2	9.0
2000	91	140	7.2*	7.9*
2001	82	90	No Data	No Data
2002	88	101	No Data	No Data

* Up to October.

The above data shows much higher concentrations than those measured by the diffusion tube survey. However, taking the most cautious approach and considering the "OPSIS" data to be the most accurate, it can be seen that the Air Quality Objective of 16.25$\mu g/m^3$, expressed as a running annual mean, is very unlikely to be breached.

However, in relation to the objective for 2010, historical data suggests that there is a potential for exceedance of 5μg/m^3 annual mean objective in this location. It is therefore appropriate, to consider benzene further as part of a detailed assessment.

3.2 (B) Traffic sources of Benzene

- **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.

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 (C) Industrial sources of benzene

- **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 industrial processes identified with the potential to emit benzene.

- Lindsey Oil Refinery
- ConocoPhillips Ltd
- Total Oil Petrol Terminal
- Koppers UK
- Corus UK Ltd Coke Ovens

- **Lindsey Oil Refinery**

A report produced by Enviros Aspinwall in July 2000 for Lindsey Oil Refinery, entitled Lindsey Oil Refinery: Atmospheric Dispersion Modelling, indicates that the objective will be achieved by the target date of 2003.

- **ConocoPhillips Ltd**

A modelling report produced by ConocoPhillips Ltd. did indicate that there was a potential to exceed the benzene objective. However, the company referred to the results of the diffusion tube survey conducted by the Council and suggested that the objective will be achieved by the target date of 2003.

- **Koppers UK Ltd**

The mass emission of benzene from Koppers UK in the year 2000 was 1.45 tonnes. If it is assumed that the total emission is fugitive and a height of zero metres, then reference to the nomogram in fig 3.3 indicates that benzene will only require further assessment if receptors are present within 175m. The closest receptors are located at a distance of 260m and consequently the 2003 objective will be achieved.

However, in relation to the objective for 2010 and assuming the same parameters, reference to the nomogram in fig 3.4 indicates that receptors within 500m will prompt further consideration as part of a detailed assessment.

- **Corus UK Ltd Coke Ovens**

The mass emission of benzene from the Coke Ovens at Corus in the year 2000 was 33 tonnes from both the Appleby Coke Ovens and the Dawes Lane Coke Ovens. The IPPC application for the Corus plant indicates that the total emission is fugitive. The closest receptor to the Appleby and Dawes Lane Coke Ovens is 1310 metres and 1000 metres respectively. The nomogram in fig 3.3 indicates that benzene will only require further assessment if the mass emission exceeds 50 tonnes and 40 tonnes respectively. Consequently the 2003 objective will be achieved.

However, in relation to the objective for 2010 and assuming the same parameters, reference to the nomogram in fig 3.4 indicates that benzene will require further consideration as part of a detailed assessment.

- **Industrial sources outside of North Lincolnshire**

Again, with reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) and the Environment Agency's Pollution Inventory, there are three Part A1 and three Part B industrial processes located in neighbouring Authorities with the potential to emit significant levels of benzene that could impact on air quality within North Lincolnshire.

These processes are:

Part A1

- BP Chemicals Ltd, Saltend (manufacture and use of organic chemicals)
- Associated Petroleum Terminals (Immingham) Ltd (petroleum process)
- Acordis UK Ltd, Great Coates (manufacture and use of organic chemicals)

Part B

- Global Shipping, Kiln Lane, Stallingborough (petrol storage)
- Immingham Storage (petrol storage)
- Grimsby and Immingham Stevedores (petrol storage)

Taking into account the separation distances of these processes to the nearest receptors in North Lincolnshire and that there have been no significant increases from these sources following the previous review and assessment, these processes are unlikely to have a significant impact on air quality within North Lincolnshire.

3.2 (D) 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 (E) Major fuel storage depots (petroleum only)

The three major fuel storage depots in North Lincolnshire were identified and their proximity to the nearest relevant exposure determined with reference to GIS.

Table 4 – major fuel storage depots

Process	Distance from receptor	Annual emissions (2000)
Lindsey Oil Refinery	460m	91 tonnes
ConocoPhillips Ltd.	210m	140 tonnes
Total Oil Ltd	690m	2.4kg

A report produced by Enviros Aspinwall in July 2000 for Lindsey Oil Refinery entitled Lindsey Oil Refinery: Atmospheric Dispersion Modelling Study indicates that the benzene objective is unlikely to be exceeded by the target date of 2003.

A modelling report produced by ConocoPhillips Ltd. also indicates that the benzene objective is unlikely to be exceeded by the target date of 2003.

Total Oil Ltd only emits 2.4kg of benzene per annum. This is a negligible amount, which is unlikely to have a significant impact on either the 2003 or 2010 objectives.

3.3 Conclusions of the updating & screening assessment for benzene

A detailed assessment with respect to the 2010 Air Quality Objective for benzene will be conducted in relation to the following: -

- Industrial emissions of benzene in Killingholme.
- Industrial emissions of benzene in Scunthorpe.

4. 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 leukemia.

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:

2.25$\mu g/m^3$ (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

There are no industrial processes in North Lincolnshire with significantly increased emissions of 1,3-butadiene.

4.2 (D) Existing industrial sources of 1,3-butadiene

- **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 three industrial processes identified with the potential to emit 1,3-butadiene. The annual ISR information was then considered with reference to the nomograms and the outcome detailed in Table 5.

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

Industrial Process	Category	Annual Emission 2000	Outcome
Edinburgh Oil & Gas, Scunthorpe	Part A	< 0.1 tonnes	Detailed assessment not required. Fig 4.1 indicates that this emission is negligible.
Lindsey Oil Refinery, Killinghome	Part A	0.45 tonnes	Having regard to closest receptor, the max permissible emission is 1 tonne (Fig 4.1).
ConocoPhillips Ltd.	Part A	< 0.1 tonnes	Having regard to closest receptor, the max permissible emission is 1 tonne (Fig 4.1).

- **Industrial Sources outside North Lincolnshire**

Again, with reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) and the Environment Agency's Pollution Inventory, there are three Part A(1) industrial processes located in neighbouring Authorities with the potential to emit significant levels of 1, 3-butadiene that could impact on air quality within North Lincolnshire.

These processes are:

Part A (1)

- Associated Petroleum Terminals (Immingham) Ltd (petrochemical process)
- Synthomer Ltd, Stallingborough (AK3757) (petrochemical process)

- Synthomer Ltd, Stallingborough (AK4117) (petrochemical process)

Taking into account the separation distances of these processes to the nearest receptors in North Lincolnshire and that there have been no significant increases from these sources following the previous review and assessment, it is believed that they 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 not proceed to a detailed assessment for 1,3-butadiene.

5. 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

4.2 (A) Lead monitoring data outside an AQMA

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

4.2 (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.

4.2 (C) Industrial sources with significantly increased emissions

There are no industrial sources within North Lincolnshire with significantly increased emission of lead.

4.2 (D) Existing industrial sources of lead

- **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 8 industrial processes identified with the potential to emit lead. The annual ISR information was then considered with reference to the nomograms and the outcome detailed in Table 6.

Table 6 – significant point sources of lead within North Lincolnshire

Industrial Process	Category	Annual Emission 2000	Outcome
Corus UK Ltd. Scunthorpe Coke Production	Part A (AF7193)	0.824 tonnes (2 Coke Ovens)	Detailed assessment not required. Fig 5.2 no receptors within 900m.
Corus UK Ltd. Scunthorpe Iron & Steel	Part A (AR0080)	4.2 tonnes	Detailed assessment not required. Fig 5.1 Allowable emission 10 tonnes.
Lindsey Oil Refinery, Killinghome	Part A	0.033 tonnes	Detailed assessment not required. LOR Modelling Report
ConocoPhillips Ltd.	Part A	<0.01 tonnes	Detailed assessment not required. Conoco Modelling Report
Rugby Cement, South Ferriby	Part A	0.062 tonnes	Detailed assessment not required refer to point source spreadsheet
Fibrogen, Flixborough, Scunthorpe	Part A	0.0116 tonnes	Detailed assessment not required refer to point source spreadsheet
Firth Rixson Castings Ltd, Scunthorpe	Part B	No lead used in the process	No need to progress to full review
Ductile Castings Ltd, Scunthorpe	Part B	No lead used in the process	No need to progress to full review

Considering the above information it is unlikely that there will be an exceedance of the Air Quality Objective for lead in 2004 and 2008. Lead emissions will therefore not be considered further in this report.

- **Industrial sources outside North Lincolnshire**

Again, with reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) and the Environment Agency's

Pollution Inventory, there are two Part A(1) and seven Part B industrial processes located in neighbouring Authorities with the potential to emit significant levels of lead that could impact on air quality within North Lincolnshire.

These processes are:

Part A (1)

- Premier Profiles Ltd, Warmsworth (inorganic chemical process)
- Pegler Ltd, Doncaster (non-ferrous metals process)

Part B

- Shipham and Co Ltd, Hull (Non-ferrous metals)
- MFI UK Ltd, Hull (Non-ferrous metals)
- T H Dick and Co Ltd, Hull (Iron and steel)
- Fabricast Ltd, Hull (Non-ferrous metals)
- Caradon Ideal Ltd, Hull (Non-ferrous)
- Starkeys Technicast, Hull (Iron and steel)
- Kingston Metal and Alloys, Hull (Non-ferrous metals)

Taking into account the separation distances of these processes to the nearest receptors in North Lincolnshire and that there have been no significant increases from these sources following the previous review and assessment, it is believed that they 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 not proceed to a detailed assessment for lead.

6. Updating & Screening Assessment of Nitrogen Dioxide

6.1 Introduction

Nitrogen dioxide (NO_2) and nitrogen oxide (NO) are commonly referred to as oxides of nitrogen (NO_x) 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:

- 200$\mu g/m^3$ (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 200$\mu g/m^3$).

- 40$\mu g/m^3$, 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

- **Scunthorpe – Britannia Corner**

In order to quantify the effect of pollution generated by traffic in the area of Oswald Road/Doncaster Road, a monitoring station was placed at the Britannia Corner public conveniences in 1999. It was equipped with a NO_x analyser using the chemiluminesence method of detection. A summary of this data is listed in Table 7.

Table 7 - number of exceedences recorded at Britannia Corner

Year	Annual Mean Concentration ($\mu g/m^3$)	No. of Exceedences of 1-Hour Mean Concentration of 200$\mu g/m^3$
2000	28 (C)	0 (E)

(C) – Concentration (E) – Exceedences

From the continuous monitoring data the authority is satisfied that the Air Quality Objectives for the annual mean and the 1-hour mean are unlikely to be exceeded in 2005 in this location.

- **Scunthorpe – Bottesford Youth Club, Grange Lane South**

Due to continual vandalism the monitoring facility at Britannia Corner was relocated to Bottesford Youth Club. The facility has been in place for approximately six months. The data has therefore been considered as one period rather than on a calendar year basis.

Table 8 - number of exceedences recorded at Bottesford Youth Club, Grange Lane South

Period	Calculated Annual Mean Concentration ($\mu g/m^3$)	No. of Exceedences of 1-Hour Mean Concentration of 200$\mu g/m^3$
1.11.02 - 30.4.03	22 (C)	0 (E)

(C) – Concentration (E) – Exceedences

From the continuous monitoring data the authority is satisfied that the Air Quality Objectives for the annual mean and the 1-hour mean are unlikely to be exceeded in 2005 in this location.

- **Scunthorpe – Bottesford Youth Club, Grange Lane South**

Prior to location of the Councils monitoring station at Bottesford Youth Club the Environment Agency's National Compliance Assessment Service (NCAS) deployed its mobile monitoring facility (MMF) at the site. The MMF was on site between 25 February 2002 and 27 May 2002 (92 days) to investigate ambient air quality in the vicinity of the Corus integrated steelworks in Scunthorpe. The monitoring site (grid reference 490200 407900) was approximately 2.5km south-west of the main emission points at Corus and 1.5km to the north of the M180.

The MMF was equipped with a NO_x analyser using the chemiluminescence method of detection. A summary of this data is listed in Table 9.

Table 9 – MMF monitoring - number of exceedences recorded at Bottesford Youth Club

Year	Annual Mean Concentration over monitoring period ($\mu g/m^3$)	No. of Exceedences of 1-Hour Mean Concentration of 200$\mu g/m^3$
25.2.02 - 7.5 .02	20 (C)	0 (E)

(C) – Concentration (E) – Exceedences

From the continuous monitoring data the authority is satisfied that the Air Quality Objectives for the annual mean and the 1-Hour mean are unlikely to be exceeded in 2005 in this location.

- **Corus UK Ltd., Scunthorpe**

The Environment Agency's National Compliance Assessment Service (NCAS) deployed its mobile monitoring facility (MMF) on the Corus Site between 9 July 2001 and 30 October 2001 (114 days). The MMF was located to the south-west of the main emission points to investigate ambient air quality in the vicinity of the Corus integrated steelworks in Scunthorpe. The monitoring site (grid reference 492300 408600) was approximately 1km west of the BOS plant and 0.25km to the north of the busy A18.

Table 10 – MMF monitoring - number of exceedences recorded at Corus, Scunthorpe

Period	Annual Mean Concentration over monitoring period ($\mu g/m^3$)	No. of Exceedences of 1-Hour Mean Concentration of 200$\mu g/m^3$
9.7.01 - 30.10.01	20 (C)	0 (E)

(C) – Concentration (E) – Exceedences

From the continuous monitoring data, the authority is satisfied that the Air Quality Objectives for the annual mean and the 1-Hour mean are unlikely to be exceeded in 2005 in this location.

- **Killingholme – Killingholme West Fire Station**

In July 2001 a NO_x analyser using the chemiluminescence method of detection was installed at the Killingholme West Fire Station, Rosper Road, South Killingholme. The monitoring site was located close to the busy A160. Data is available for the calendar year 2002. The site was subsequently relocated at Killingholme Primary School, School Road, South Killingholme, as the new site was considered more representative of local exposure.

Table 11- Number of Exceedences Recorded at Killingholme

Year	Annual Mean Concentration ($\mu g/m^3$)	No. of Exceedences of 1-Hour Mean Concentration of 200$\mu g/m^3$
2002	28 (C)	0 (E)

(C) – Concentration (E) – Exceedences

From the continuous monitoring data the authority is satisfied that the Air Quality Objectives for the annual mean and the 1-Hour mean are unlikely to be exceeded in 2005 in this location.

- **Diffusion tube monitoring data for nitrogen dioxide**

North Lincolnshire Council currently has a nitrogen dioxide diffusion tube network consisting of 32 sites, details of which, including the full results, are contained in Appendix 3.

Table 12 below lists the results for six sites that indicate potential exceedences of the air quality objectives for 2005, based on extrapolation from 2002 data.

Table 12 – summary of NO_x diffusion tube survey

Location	Site	Site Type	1999	2000	2001	2002	2005[2]
Britannia Corner, Scunthorpe	SC/W/1	Kerbside	57	56	53[1]	46[1]	42
Britannia Corner, Scunthorpe	F/1	Kerbside	N/A	33[1]	47	46	42
Britannia Corner, Scunthorpe	F/3	Kerbside	N/A	37	45	49	45
Mary Street, Scunthorpe	E/1	Kerbside	55	58	55	46	42
Brigg Road, Scunthorpe	E/2	Kerbside	52	55	52	45	41
Fire Station, S. Killingholme	K/12	Kerbside	55	55	45	44	41

[1] – estimated annual mean from short-term data in accordance with Box 6.5 of Technical Guidance LAQM. TG(03).
[2] – estimated annual mean using correction factors detailed in Box 6.6 of Technical Guidance LAQM. TG(03).

From consultation with the supplier/analyst of the diffusion tubes, it would appear that there is no long-term data available at this time in relation to the co-location of the diffusion tubes used by North Lincolnshire with a chemiluminesence monitor. As such, the above estimates for 2005 have not been bias adjusted in accordance with Box 6.3 of Technical Guidance LAQM. TG(03). However, a co-location study is currently being undertaken by North Lincolnshire Council, the results of which will be used in further reviews.

The reductions in nitrogen dioxide estimated for 2005, although showing likely exceedences of the annual means, arise from the likely reduction in road traffic emissions in future years.

As part of the North Lincolnshire's previous Air Quality Review and Assessment – Stage Three Report, the area covering Britannia Corner and Mary Street, Scunthorpe, was specifically modelled to assess likely compliance with the 2005 objectives. From that modelling exercise, it was concluded that "..this area should be viewed as being at little risk of exceeding the annual mean air quality objective 2005."

The area covering Brigg Road, Scunthorpe, was also modelled as part of the last Stage Three Report. The modelling indicated that there was a medium to low risk of exceedences of 40$\mu g/m^3$ (taking into account the uncertainties of the model). However, it was also noted that there was no relevant exposure to members of the public at those points where there was a risk of exceedence. This situation remains the same and, as such, the conclusion of the modelling report that ".. this area should be viewed as being at low risk of exceeding the air quality objective in 2005." is still held to be applicable.

The area around the Fire Station, South Killingholme, site (K12), has not been subject to a modelling exercise for nitrogen dioxide, as part of any earlier air quality review and assessment. However, at this location there is currently no relevant exposure, with reference to LAQM. TG(03). Also, the results of the chemiluminesence monitor located at Killingholme (see above), shows that there is unlikely to be an exceedence of the nitrogen dioxide air quality objectives for 2005.

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 4(a). 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 2005. The screening model showed that there were no locations with a predicted annual mean of greater than 40ug/m^3.

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 by 2005.

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 4(b).

- 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 2005. The screening model showed that there were no locations with a predicted annual mean of greater than 40ug/m^3.

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 by 2005.

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 4(c).

- 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 2005. The screening model showed that there were no locations with a predicted annual mean of greater than 40ug/m^3.

As the annual mean objective is not being exceeded at any location, it can be reasonably assumed that the 1-hour objective will also be met by 2005.

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 close to the objective during the first round of R&A

All roads in North Lincolnshire have been reconsidered during this Updating and Screening Assessment, including all those considered in the first round of Review and Assessment.

6.2 (I) 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 (J) Bus stations

The average number of buses using the Scunthorpe bus station is 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 (K) New industrial sources

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

6.2 (L) Industrial sources with significantly increased emissions

There are no industrial sources within North Lincolnshire with significantly increased emission of nitrogen dioxide.

6.2 (L) Existing Industrial sources of nitrogen dioxide

- **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 15 industrial processes identified with the potential to emit nitrogen dioxide. The processes are detailed in Appendix 8(a). Using the local authority point source spreadsheet the number

of processes requiring further consideration was reduced to 9. These processes are detailed below:-

- Brigg Power Station
- Powergen
- National Power plc
- Corus UK Ltd. Coke Ovens
- Corus UK Ltd. Iron & Steel Making
- Singleton Birch
- ConocoPhillips Ltd.
- Lindsey oil Refinery
- Koppers UK Ltd

Modelling submissions within the Part A public register or IPPC applications from the above companies were considered. All reports concluded that there is unlikely to be any exceedence of the 2005 Air Quality Objective for nitrogen dioxide.

- **Industrial Sources outside North Lincolnshire**

Again, with reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) and the Environment Agency's Pollution Inventory, there are twenty-five Part A(1), one Part A(2) and five Part B industrial processes located in neighbouring Authorities with the potential to emit significant levels of nitrogen dioxide that could impact on air quality within North Lincolnshire.

These processes are:

Part A (1)

- Vesuvius Premier Refractories Ltd, Austerfield (Carbonisation and associated processes) – possible significant source.
- Vesuvius Premier Refractories Ltd, Austerfield (Tar and bitumen processes)
- BP Chemicals Ltd, Saltend (AK4567) (manufacture and use of organic chemicals)
- BP Chemicals Ltd, Saltend (AK4591) (manufacture and use of organic chemicals)
- BP Chemicals Ltd, Saltend (AK5709) (manufacture and use of organic chemicals)
- BP Chemicals Ltd, Saltend (AN9816) (inorganic chemical process)
- Croda Leek Ltd, Hull (Inorganic chemical process)
- John L Seaton & Co Ltd, Hull (manufacture and use of organic chemicals)
- Clariant Life Science Molecules (UK) Ltd, Hull (manufacture and use of organic chemicals)
- Holliday Pigments Ltd, Hull (processes involving halogens)

- Holliday Pigments Ltd, Hull (acid processes)
- Acordis Uk Ltd, Great Coates (Combustion processes)
- CPL Products Ltd, Immingham (carbonisation and associated processes)
- BOC Group plc, Stallingborough (Incineration)
- Humber Power Ltd, Stallingborough (Combustion process)
- Novartis Grimsby Ltd, Grimsby (manufacture and use of organic chemicals)
- Synthomer Ltd, Stallingborough (petrochemical processes)
- Tioxide Europe Ltd, Grimsby (acid processes)
- Millenium Inorganic Chemicals Ltd, Grimsby (processes involving halogens) significant
- Stallingborough CHP Ltd, Grimsby (combustion processes)
- Acordis UK Ltd, Great Coates (inorganic chemical processes)
- Ciba Speciality Chemicals Ltd, Grimsby (manufacture and use of organic chemicals)
- Tioxide Europe Ltd, Grimsby (acid processes)
- Pentex Oil and Gas Ltd, Gainsborough (petroleum processes)
- Tullow Exploration Ltd, Spridlington (petroleum process)

Part A(2)

- Guardian Industries UK Ltd, Goole (glass manufacture)

Part B

- Shipham and Co Ltd, Hull (Non-ferrous metals)
- T H Dick and Co Ltd, Hull (Iron and Steel)
- Fabricast Ltd, Hull (Non-ferrous metals)
- Caradon Ideal Ltd, Hull (Non-ferrous metals)
- Starkeys Technicast, Hull (Iron and Steel)

Taking into account the separation distances of these processes to the nearest receptors in North Lincolnshire and the fact that no significant increases in emissions have occurred since the previous review and assessment, it is concluded that the majority of these processes are unlikely to have a significant impact on air quality within North Lincolnshire.

There is one Part A(1) process (Vesuvius Premier Refractories Ltd), which has the potential to affect North Lincolnshire. However, from information provided by the Environment Agency and with reference to the local authority's Updating and Screening Assessment in who's area this process is located, there would appear to be little risk of nitrogen dioxide from this source affecting relevant receptors within North Lincolnshire. It is deemed, therefore, that no further assessment of this source is required.

6.2 (M) Aircraft

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 Figure 1, Appendix 5). 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 2000 the total equivalent number of passengers per annum was calculated.

Air transport movements	14,691
Terminal passengers	445,765
Freight lifted	130,000 tonnes

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

130,000 tonnes freight = 1.3 mppa
445,765 terminal passengers = 0.45 mppa

The total equivalent number of passengers per annum is: 1.75 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.

6.3 Conclusions of the updating & screening assessment for nitrogen dioxide

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

7. Updating & Screening Assessment of Sulphur Dioxide

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. An increase 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:

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

7.2 Assessment of sulphur dioxide

7.2 (A) Monitoring data outside an AQMA

- **Scunthorpe – Cottage Beck Road**

To investigate ambient air quality in the vicinity of the Corus integrated steelworks in Scunthorpe a monitoring station was placed at North Lincolnshire Council's Commercial Services Depot on Cottage Beck Road at the end of 1997. It was equipped with a continuous SO_2 monitor, using the chemiluminesence

principle of detection. This site is part of the Automated Urban and Rural Network (AURN). A summary of this data is listed in the Table 13.

Table 13 - sulphur dioxide concentrations recorded at Cottage Beck Road

Year	No. of Exceedences of 15 Minute Mean of 266μg/m^3 (E)	No. of Exceedences of 1 Hour Mean of 350μg/m^3 (E)	No. of Exceedences of 24 Hour Mean of 125μg/m^3 (E)
1998	25	1	0
1999	18	2	0
2000	27	1	0
2001	5	0	0
2002	4	0	0

(C) – Concentration (E) – Exceedences

From the continuous monitoring data the authority is satisfied that the Air Quality Objectives for sulphur dioxide are unlikely to be exceeded in 2005 in this location.

- **Corus UK Ltd., Scunthorpe**

The Environment Agency's National Compliance Assessment Service (NCAS) deployed its mobile monitoring facility (MMF) on the Corus Site between 9 July 2001 and 30 October 2001 (114 days). The MMF was located to the south-west of the main emission points to investigate ambient air quality in the vicinity of the Corus integrated steelworks in Scunthorpe. The monitoring site (grid reference 492300 408600) was approximately 1km west of the BOS plant and 0.25km to the north of the busy A18.

Table 14 - sulphur dioxide concentrations recorded at Corus, Scunthorpe

Period	No. of Exceedences of 15 Minute Mean of 266μg/m^3	No. of Exceedences of 1 Hour Mean of 350μg/m^3	No. of Exceedences of 24 Hour Mean of 125μg/m^3
9.7.01 - 30.10.01	0 (E)	0 (E)	0 (E)

(C) – Concentration (E) – Exceedences

From the continuous monitoring data, the authority is satisfied that the Air Quality Objectives for sulphur dioxide are unlikely to be exceeded in 2005 in this location.

- **Scunthorpe – Bottesford Youth Club, Grange Lane South**

The Environment Agency's National Compliance Assessment Service (NCAS) deployed its mobile monitoring facility (MMF) at Bottesford Youth Club, Scunthorpe. The MMF was on site between 25 February 2002 and 27 May 2002 (92 days) to investigate ambient air quality in the vicinity of the Corus integrated steelworks in Scunthorpe. The monitoring site (grid reference 490200 407900) was approximately 2.5km south-west of the main emission points at Corus and 1.5km to the north of the M180.

The MMF was equipped with a SO_2 analyser using the chemiluminescence method of detection. A summary of this data is listed in Table 15.

Table 15 - sulphur dioxide concentrations recorded at Bottesford Youth Club, Scunthorpe

Period	No. of Exceedences of 15 Minute Mean of 266μg/m^3	No. of Exceedences of 1 Hour Mean of 350μg/m^3	No. of Exceedences of 24 Hour Mean of 125μg/m^3
22.2.02 – 27.5.02	1 (E)	0 (E)	0 (E)

(C) – Concentration (E) – Exceedences

From the continuous monitoring data the authority is satisfied that the Air Quality Objectives for sulphur dioxide are unlikely to be exceeded in 2005 in this location.

- **Killingholme – Killingholme West Fire Station**

In October 2002 the Council added an SO_2 analyser using the chemiluminescence method of detection to its Rollalong unit situated at Killingholme West Fire Station.

Table 16 - sulphur dioxide concentrations recorded at Killinghome West Fire Station

Period	No. of Exceedences of 15 Minute Mean of 266μg/m^3	99.9th percentile of 15 min Means (ppb)	No. of Exceedences of 1 Hour Mean of 350μg/m^3	No. of Exceedences of 24 Hour Mean of 125μg/m^3
26.10.02 – 13.3.03	8 (E)	94 (C)	0 (E)	0 (E)

(C) – Concentration (E) – Exceedences

Whilst the data indicates that the 2004 objectives for sulphur dioxide are likely to be met in this location, reference must be made to paragraph 7.15 of LAQM TG(03) which recommends that monitoring should be carried out for a period of 12 months particularly for the assessment of the 15 minute objective. Where the monitoring period is less than 12 months the 99.9th percentile is considered to be approximately equivalent to the number of permitted exceedences of the 15-minute objective of 100ppb.

This monitoring facility has now been relocated at the local school where monitoring of SO_2 will continue for the foreseeable future. A review of the results of SO_2 monitoring at the school will comprise the detailed assessment for Killingholme.

7.2 (B) Monitoring data within an AQMA

There are no designated AQMAs within North Lincolnshire.

7.2 (C) New industrial sources

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

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%.

7.2 (D) Existing industrial sources of sulphur dioxide

- **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 processes are detailed in Appendix 8(a). Using the local authority point source spreadsheet the number of processes requiring further consideration was reduced to five. These processes are detailed below:-

- Corus UK Ltd. Coke Ovens
- Corus UK Ltd. Iron & Steel Making
- ConocoPhillips Ltd.
- Lindsey oil Refinery
- Immingham CHP

From a review of modelling studies submitted through the IPPC application process, both the Corus UK Ltd. processes and the Immingham CHP process are not deemed to require further consideration.

Lindsey Oil Refinery and ConocoPhillips Ltd., situated in Killingholme, are both complex sites with multiple stacks. Consequently, the use of the nomograms in the Technical Guidance LAQM.TG(03) is not appropriate.

A report produced by Enviros Aspinwall in July 2000 for Lindsey Oil Refinery entitled Lindsey Oil Refinery: Atmospheric Dispersion Modelling Study indicates that there is the potential for exceedences of the Air Quality Objectives for sulphur dioxide.

A modelling report produced by ConocoPhillips Ltd. also indicates that the sulphur dioxide objective is likely to be exceeded by the target date of 2005 (15

min mean). However exceedences are likely to occur close to the refinery boundary rather than in areas of population, further refinement of the modelled data is necessary to clarify likely exceedences.

A detailed assessment will therefore be carried out for sulphur dioxide in this area.

- **Industrial sources outside North Lincolnshire**

With reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) and the Environment Agency's Pollution Inventory, there are eighteen Part A(1), one Part A(2) and eleven Part B industrial processes located in neighbouring Authorities with the potential to emit significant levels of SO_2 that could impact on air quality within North Lincolnshire.

These processes are:

Part A(1)

- Vesuvius Premier Refractories Ltd, Austerfield (Carbonisation and associated processes) – possible significance.
- Vesuvius Premier Refractories Ltd, Austerfield (Tar and bitumen processes) – possible significance.
- BP Chemicals Ltd, Saltend (AK4567) (manufacture and use of organic chemicals)
- BP Chemicals Ltd, Saltend (AK4591) (manufacture and use of organic chemicals)
- BP Chemicals Ltd, Saltend (AK5709) (manufacture and use of organic chemicals)
- John L Seaton & Co Ltd, Hull (manufacture and use of organic chemicals)
- Clariant Life Science Molecules (UK) Ltd, Hull (manufacture and use of organic chemicals)
- Holliday Pigments Ltd, Hull (acid processes)
- Acordis Uk Ltd, Great Coates (Combustion processes)
- CPL Products Ltd, Immingham (carbonisation and associated processes)
- Humber Power Ltd, Stallingborough (Combustion process)
- Novartis Grimsby Ltd, Grimsby (manufacture and use of organic chemicals)
- Synthomer Ltd, Stallingborough (petrochemical processes)
- Tioxide Europe Ltd, Grimsby (acid processes)
- Millenium Inorganic Chemicals Ltd, Grimsby (processes involving halogens) significant
- Acordis UK Ltd, Great Coates (inorganic chemical processes)
- Ciba Speciality Chemicals Ltd, Grimsby (manufacture and use of organic chemicals)
- Tullow Exploration Ltd, Spridlington (petroleum process)

Part A(2)

- Guardian Industries UK Ltd, Goole (glass manufacture)

Part B

- RMC Roadstone - Eastern, Melton (roadstone coating)
- Appleby Abrasives Ltd, Melton (Mineral Process)
- Omya UK Ltd, North Ferriby (Mineral Process)
- Vesuvius UK Ltd, Goole (Heavy Clay Goods)
- Sandtoft Roof Tiles Ltd, Broomfleet (Heavy Clay Goods)
- Shipham and Co Ltd, Hull (Non-ferrous metals)
- MFI UK Ltd, Hull (Non-ferrous metals)
- T H Dick and Co Ltd, Hull (Iron and steel)
- Fabricast Ltd, Hull (Non-ferrous metals)
- Caradon Ideal Ltd, Hull (Metal)
- Starkey's Technicast Ltd, Hull (Iron and steel)

Taking into account the separation distances of these processes to the nearest receptors in North Lincolnshire and that there have been no significant increases from these sources following the previous review and assessment, it is concluded that the majority of these processes are unlikely to have a significant impact on air quality within North Lincolnshire.

There are two Part A(1) processes that may have significant emissions of sulphur dioxide (both at Vesuvius Premier Refractories Ltd, Austerfield) with the potential to affect North Lincolnshire. However, from information provided by the Environment Agency and with reference to the local authority's Updating and Screening Assessment in who's area these processes are located, there would appear to be little risk of sulphur dioxide from this source affecting relevant receptors within North Lincolnshire. It is deemed, therefore, that no further assessment of these sources is required.

7.2 (E) Areas of domestic coal burning

Liaison with local coal merchants identified that the village of Keadby was an area of significant coal burning. It still has a high dependence on solid fuel in the absence of a mains gas supply. Significant is defined as an area of 500m x 500m where there may be more than 100 houses burning solid fuel as their primary source of heating. From Appendix 6 it can be seen that approximately all of the 540 houses in Keadby are situated in an area of 500m x 500m.

A survey was distributed to 540 houses in Keadby to determine the extent of solid fuel use and the type of solid fuel used. In total 131 surveys were returned indicating that 66 properties used solid fuel as their primary heating source. This, coupled with information supplied by the Councils Housing Department, suggests

that the total number of dwellings using solid fuel is 128. Where the number of properties exceeds 100, a detailed assessment must be conducted.

It is intended to proceed to a detailed assessment for sulphur dioxide in this location.

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 2 shipping terminals in North Lincolnshire which have movements of large ships.

- Humber International Terminal
- North Killingholme Haven

Using GIS, no relevant exposure was identified within 1km of either of the terminals. It is therefore not proposed to conduct a detailed assessment.

7.2 (H) Railway locomotives

From discussion with the local passenger service provider, it would appear that there is only one location within North Lincolnshire where there is likely to be a passenger train standing for periods of 15 minutes or longer, more than twice per day. This is at Scunthorpe Railway Station, Station Road, Scunthorpe, in a siding to the north of the main platforms. The sensitive receptors would be those members of the public using the station platform. A formal request has been made to the operator for the locomotive to be shut down, when it is likely that the train will be stationary for 15 minutes or more at this location. The response to this request will be incorporated into the next stage of the review and assessment.

With respect to freight rail traffic, the freight service provider has confirmed that it is standard practice for locomotives to be shut down if they are likely to be stationary for periods of 15 minutes or greater. As such, there should be no occurrences of freight locomotives giving rise to significant relevant exposure within North Lincolnshire.

7.3 Conclusions of the updating & screening assessment for sulphur dioxide

A detailed assessment of sulphur dioxide will be conducted in relation to the following: -

- Industrial emissions of sulphur dioxide in Killingholme.
- Domestic solid fuel burning in Keadby.

In addition, further consideration will be given to stationary railway locomotives at Scunthorpe Railway Station taking into account further information from the passenger service provider.

8. 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 U.K. 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, biological 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 exceedences in a year. Conversely, this may be defined as the 90th percentile of less than 50μg/m^3.
- An annual mean not exceeding 40μg/$m^{3.}$

8.1.3 Air quality objective for PM_{10}: 2010

Proposed new objectives for PM_{10} will be incorporated into the Regulations and subsequently replace the existing objectives. The proposed new objectives are: -

- A measured 24-hour mean of 50μg/m^3, which allows for 7 exceedences in a year. Conversely the 98th percentile can represent this.
- An annual mean not exceeding 20μg/m^3.

The proposed objectives will be considered in this report as an indication of whether or not North Lincolnshire will be able to meet the objectives when they become part of the Regulations.

8.2 Assessment of PM_{10}

8.2 (A) PM_{10} monitoring data outside an AQMA

- **Scunthorpe – Cottage Beck Road**

To investigate ambient air quality in the vicinity of the Corus integrated steelworks in Scunthorpe a monitoring station was placed at North Lincolnshire Council's Commercial Services Depot on Cottage Beck Road at the end of 1997. It was equipped with a PM_{10} monitor using the TEOM method of detection. This site is part of the Automated Urban and Rural Network (AURN) and the data from this site can be viewed on the Internet (www.airquality.co.uk). A summary of this data is listed in Table 17.

Table 17 - annual mean concentration of PM_{10} & number of exceedences recorded at Cottage Beck Road, Scunthorpe

Year	Ann Mean (μg/m^3, grav) Conc	No. of Exceedences 24-Hr Mean Conc^n of 50μg/m^3, grav	Adjustment to 2004 (Conc)	Adjustment to 2010 (Conc)
1998	28 (C)	41 (E)	21 (C)	19 (C)
1999	29 (C)	46 (E)	24 (C)	21 (C)
2000	27 (C)	33 (E)	23 (C)	20 (C)
2001	32 (C)	51 (E)	30 (C)	26 (C)
2002	25 (C)	48 (E)	31 (C)	27 (C)

C – Concentration E - Exceedence

The data highlighted exceeds the air quality objectives. The data indicates that the number of exceedences of the 24 hour objective for PM_{10} will be greater than 35 in 2004, although the annual mean objective is likely to be achieved.

However, the 2010 annual mean objective for PM_{10} is unlikely to be met. It should be noted that this monitoring station is classed as an 'urban industrial' site and is some 220m from the nearest residential dwelling.

- **Corus UK Ltd., Scunthorpe**

The Environment Agency's National Compliance Assessment Service (NCAS) deployed its mobile monitoring facility (MMF) on the Corus Site between 9 July 2001 and 30 October 2001 (114 days). The MMF was located to the south-west of the main emission points to investigate ambient air quality in the vicinity of the Corus integrated steelworks in Scunthorpe. The monitoring site (grid reference 492300 408600) was approximately 1km west of the BOS plant and 0.25km to the north of the busy A18.

Table 18 – MMF monitoring of PM_{10} & number of exceedences recorded at Scunthorpe

Period	Period Mean ($\mu g/m^3$ grav) (Conc)	Estimated Annual Mean (Conc)	No. of Exceedences of 24hr Mean 50$\mu g/m^3$, grav	Predicted 2004 (Conc)	Predicted 2010 (Conc)
9.7.01 30.10.01	40.6 (C)	40 (C)	25 (E)	37 (C)	33 (C)

C – Concentration E – Exceedence

The data highlighted exceed the air quality objectives. The data indicates that the 2004 and the 2010 annual mean objective for PM_{10} is unlikely to be met.

- **Scunthorpe – Britannia Corner**

In order to quantify the effect of pollution generated by traffic in the area of Oswald Road/Doncaster Road, a monitoring station was placed at the Britannia Corner public conveniences in 1999. It was equipped with a PM_{10} monitor using the TEOM method of detection. A summary of this data is listed in Table 19.

Table 19 – annual mean concentration of PM_{10} & number of exceedences recorded at Britannia Corner, Scunthorpe

Year	Ann Mean ($\mu g/m^3$ grav)	90th % 24hr Means (2004 obj) ($\mu g/m^3$ grav)	98th % 24hr Means (2010 obj) ($\mu g/m^3$ grav)	No. of Exceedences of 24hr Mean 50$\mu g/m^3$ grav	Predicted 2004 (	Predicted 2010
2000	23 (C)	37 (C)	49 (C)	6 (E)	21 (C)	18 (C)
2001	20 (C)	37 (C)	48 (C)	5 (E)	19 (C)	16 (C)

February 2000 to December 2000 C – Concentration E - Exceedence
May 2001 to November 2001

From the continuous monitoring data the authority is satisfied that the Air Quality Objectives for the annual mean and the 90th and the 98th Percentile of the 24-hour means, are unlikely to be exceeded in 2004 and 2010 in this location.

- **Scunthorpe – Bottesford Youth Club, Grange Lane South**

Due to continual vandalism, the monitoring facility at Britannia Corner was relocated to Bottesford Youth Club. The facility has been in place for

approximately six months. The data has therefore been considered as one period rather than on a calendar year basis.

Table 20 - annual mean concentration of PM_{10} & number of exceedences recorded at Bottesford Youth Club, Scunthorpe

Period	Period Mean ($\mu g/m^3$ grav)	Estimated Annual Mean	90th% of 24hr Means (2004 obj) ($\mu g/m^3$ grav)	98th% of 24hr Means (2010 obj) ($\mu g/m^3$ grav)	No. of Exceedences 24hr Mean of 50$\mu g/m^3$, grav	Predi-cted 2004	Predi-cted 2010
3.10.02 31.3.03	26 (C)	21 (C)	43 (C)	79 (C)	14 (E)	20 (C)	18 (C)

C – Concentration E – Exceedence

The data highlighted exceeds the air quality objectives. The data indicates that the 2010 annual mean objective for PM_{10} is unlikely to be met and the number of exceedences of the 24-hour objective for PM_{10} will be greater than seven in 2010.

Prior to location of the Councils monitoring station at Bottesford Youth Club, the Environment Agency's National Compliance Assessment Service (NCAS) deployed its mobile monitoring facility (MMF) at the site. The MMF was on site between 25 February 2002 and 27 May 2002 (92 days) to investigate ambient air quality in the vicinity of the Corus integrated steelworks in Scunthorpe. The monitoring site (grid reference 490200 407900) was approximately 2.5km southwest of the main emission points at Corus and 1.5km to the north of the M180.

The MMF was equipped with a PM_{10} monitor using the TEOM method of detection. A summary of this data is listed in Table 21.

Table 21 – MMF monitoring of PM_{10} & number of exceedences recorded at Bottesford Youth Club, Scunthorpe

Period	Period Mean ($\mu g/m^3$grav)	Estimated Annual Mean	No. of Exceedences of 24hr Mean 50$\mu g/m^3$ grav	Predicted 2004	Predicted 2010
25.2.02 7.5 .02	28.5 (C)	29 (C)	8 (E)	28 (C)	24 (C)

C – Concentration E – Exceedence

The data highlighted exceeds the air quality objectives. The data indicates that the 2010 annual mean objective for PM_{10} is unlikely to be met at this location.

- **Killingholme – Killingholme West Fire Station**

In October 2002 the Council added a PM_{10} analyser using the TEOM method of detection to its Rollalong unit situated at Killingholme West Fire Station.

Table 22 - annual mean concentration of PM_{10} & number of exceedences recorded at Killinghome

Period	Period Mean ($\mu g/m^3$ grav)	EstAnn Mean	90^{th}% of 24hr Means (2004 obj) ($\mu g/m^3$ grav)	98^{th}% of 24hr Means (2010 obj) ($\mu g/m^3$ grav)	No. of Exceedences of 24-Hr Mean 50$\mu g/m^3$ grav	Predi-cted 2004 ($\mu g/m^3$ grav	Predi-cted 2010 ($\mu g/m^3$ grav
26.10.02 27.4.03	8.6 (C)	7.6 (C)	13 (C)	16 (C)	1 (E)	7 (C)	6 (C)

C – Concentration E – Exceedence

From the continuous monitoring data, the Authority is satisfied that the Air Quality Objectives for the annual mean, the 90^{th} and the 98^{th} Percentile of 24-hour means are unlikely to be exceeded in 2004 and 2010 in this location.

8.2 (B) Monitoring data within an AQMA

There are no designated AQMA's in North Lincolnshire.

8.2 (C) &(D) Junctions

Traffic data correlated with GIS was obtained from North Lincolnshire Council's Traffic & Road Safety Team in order to identify all junctions with a flow of over 10,000 vehicles per day and relevant exposure within 10m of the kerb. The junctions that meet the above criteria are detailed in Appendix 7(a).

The DMRB screening model was then used to predict the annual mean concentrations in 2004. The screening model showed that there were no locations where the predicted annual mean would exceed 40$\mu g/m^3$ or the 35 allowable exceedances of the 24-hour mean.

The screening model also showed that there were no locations where the predicted annual mean for 2010 would exceed 20$\mu g/m^3$ or the 7 allowable exceedances of the 24-hour mean

8.2 (E) Roads with high flow of buses and/or HGVs

Using traffic data obtained from North Lincolnshire Council's Traffic & Road Safety Team, all roads with a flow of HDV's (Heavy Duty Vehicles) over 20% of AADT (Annual Average Daily Traffic) and relevant exposure within 10m of the kerb were identified. The roads that meet the above criteria are detailed in Appendix 7(b). Any roads with a flow of less than 2000 HDV's per day were discounted.

The DMRB screening model was applied to predict annual mean concentrations in 2004. The screening model showed that there were no locations where the predicted annual mean would exceed 40$\mu g/m^3$ or the 35 allowable exceedances of the 24-hour mean.

The screening model also showed that there were no locations where the predicted annual mean for 2010 would exceed 20μg/m^3 or the 7 allowable exceedances of the 24-hour mean

8.2 (F) New roads constructed or proposed since first round of R&A

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

8.2 (G) Roads close to the objective during the first round of R&A

All roads in North Lincolnshire have been reconsidered during this Updating and Screening Assessment, including all those considered in the first round of Review and Assessment.

8.2 (H) Roads with significantly changed traffic flows

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

8.2 (I) New industrial sources

There are no new industrial sources within North Lincolnshire with the potential to emit significant levels of PM_{10}.

8.2 (J) Industrial sources with significantly increased emissions

There are no industrial sources within North Lincolnshire with significantly increased emissions of PM_{10}.

8.2 (J) Existing industrial sources of PM_{10}

- **Existing industrial sources within North Lincolnshire**

With reference to Annex 2 of the Technical Guidance LAQM.TG(03), all Part A and B processes within North Lincolnshire with a potential to emit significant quantities of PM_{10} were identified. Annual emissions of PM_{10} were found and the nomograms used to determine whether the industrial source required further assessment (see Appendix 8).

Due to the complex nature of the integrated steel works in Scunthorpe, it was considered that the screening tools were not sophisticated enough to effectively assess the potential impact of PM_{10} emissions. Therefore, taking the

precautionary approach, a detailed assessment will be carried out for sources from this site.

- **Existing industrial Sources outside North Lincolnshire**

Again, with reference to the significant point source process list in Appendix E, Annex 2 of the Technical Guidance LAQM.TG(03) and the Environment Agency's Pollution Inventory, there are eight Part A(1) and nineteen Part B industrial processes located in neighbouring Authorities with the potential to emit significant levels of PM_{10} that could impact on air quality within North Lincolnshire.

These processes are:

Part A(1)

- BP Chemicals Ltd, Saltend (AK4591) (manufacture and use of organic chemicals)
- CPL Products Ltd, Immingham (carbonisation and associated processes)
- BOC Special Gases Ltd, Stallingborough (incineration)
- Humber Power Ltd, Stallingborough (Combustion process)
- Novartis Grimsby Ltd, Grimsby (manufacture and use of organic chemicals)
- Tioxide Europe Ltd, Grimsby (acid processes)
- Millenium Inorganic Chemicals Ltd, Grimsby (processes involving halogens) significant
- Ciba Speciality Chemicals Ltd, Grimsby (manufacture and use of organic chemicals)

Part B

- Electro Furnace Products, Saltend (mineral process)
- RMC Roadstone - Eastern, Melton (roadstone coating)
- Appleby Abrasives Ltd, Melton (Mineral Process)
- Omya UK Ltd, North Ferriby (Mineral Process)
- Haltemprice Crematorium (crematorium)
- W. Clifford Watts Ltd, South Cave (quarry process)
- Shipham and Co Ltd, Hull (non-ferrous)
- Tarmac Topmix Ltd, Hull (iron and steel)
- T H Dick and Co Ltd, Hull (Iron and steel)
- Fabricast Ltd, Hull (Non-ferrous metals)
- Caradon Ideal Ltd, Hull (Metal)
- Starkey's Technicast Ltd, Hull (Iron and steel)
- Humberside Sea and Land, Immingham (Immingham)
- Hargreaves Industrial Services, Immingham (W) (coal, coke product and petroleum coke processes)
- Hargreaves Industrial Services, Immingham (E) (coal, coke product and petroleum coke processes)

- SSM, Immingham (coal, coke product and petroleum coke processes)
- Swallow Stevedores, Immingham (coal, coke product and petroleum coke processes)
- M G Carbon UK, Immingham (coal, coke product and petroleum coke processes)
- Immingham Storage, Immingham (Manufacture of coating powder)

Taking into account the separation distances of these processes located outside of North Lincolnshire's boundary to the nearest receptors within North Lincolnshire and that there have been no significant increases from these sources following the previous review and assessment, it is believed that they are unlikely to have a significant impact on air quality within North Lincolnshire.

8.2 (K) Areas of domestic solid fuel burning

Liaison with local coal merchants identified that the village of Keadby was an area of significant coal burning. It still has a high dependence on solid fuel in the absence of a mains gas supply. A survey was distributed to 540 houses in Keadby to identify whether solid fuel was the primary heating source and if so, what kind of fuel was used.

Significant is defined as an area of 500m x 500m where there may be more than 50 houses burning solid fuel as their primary source of heating. From Appendix 6 it can be seen that approximately all of the 540 houses in Keadby are situated in an area of 500m x 500m.

A survey was distributed to 540 houses in Keadby to determine the extent of solid fuel use and the type of solid fuel used. In total, 131 surveys were returned indicating that 66 properties used solid fuel as their primary heating source. This, coupled with information supplied by the Councils Housing Department, suggests that the total number of dwellings using solid fuel is 128.

The survey results only were used to determine the likely number of dwellings using solid fuel, this was to ensure that the additional data obtained directly from the Council's Housing Department did not skew the data. The effective number of coal burning houses and the respective density was calculated using Box 8.8 of the technical guidance. The density of effective coal burning houses was calculated as 340. Comparison of this value with the nomogram in Fig 8.8 coupled with a background PM_{10} concentration of 20ug/m^3 for a small village location suggests that the objective for 2004 will be breached. It is proposed therefore to conduct a detailed review for PM_{10} in this location.

8.2 (L) Quarries, landfill sites, open-cast coal, handling of dusty cargoes at ports, etc.

Using local knowledge and IPC authorisation information, all potential sources of significant dust emission were identified.

There are a large number of Part B processes within North Lincolnshire which handle and store petroleum coke and coal products.

These were identified, the distance to the nearest receptor measured, and the predicted 2004 background concentration calculated from the NETCEN background maps, in order to determine relevant exposure (see Appendix 9).

- **Singleton Birch Ltd**

Singleton Birch Ltd. was identified as having the potential to emit significant quantities of PM_{10}. At Melton Ross, a quarry, a landfill site and a Part A hydrated lime plant are situated in close proximity to each other. The nearest relevant receptors are within 100m of the landfill site and hydrated lime plant and, at the moment, within 550m of the quarrying activities although the process boundary lies within 200m. The background PM_{10} concentration in 2004 from the NETCEN background maps is 26.3$\mu g/m^3$, which is above the threshold suggested in the guidance. The area is also known to be very dusty and complaints have been received. Therefore, a detailed assessment will be carried out for PM_{10} at this location.

8.2 (M) Aircraft

Humberside International Airport is located within North Lincolnshire. Concentric circles were drawn on GIS to identify any possible receptors (see Figure 1 of Appendix 5) 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 2000, the total equivalent number of passengers per annum was calculated.

Air transport movements	14,691
Terminal passengers	445,765
Freight lifted	130,000T

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

130,000T freight = 1.3 mppa
445,765 terminal passengers = 0.45 mppa

The total equivalent number of passengers per annum is: 1.75 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.

8.3 Conclusions of the updating & screening assessment for PM_{10}

A detailed assessment of PM_{10} will be conducted in relation to the following: -

- Industrial emissions of PM_{10} in Scunthorpe.
- Emissions of PM_{10} from quarries and landfills in Barnetby.
- Domestic solid fuel burning in Keadby.

9.0 Recommendations for Each Pollutant

Carbon Monoxide
A detailed assessment is not required.

Benzene
A detailed assessment of benzene will be conducted in relation to:

- Industrial emissions of benzene in Killingholme
- Industrial emissions of benzene in Scunthorpe

1,3-Butadiene
A detailed assessment is not required.

Lead
A detailed assessment is not required.

Nitrogen Dioxide
A detailed assessment is not required.

Sulphur Dioxide
A detailed assessment of SO_2 will be conducted in relation to the following: -

- Industrial emissions of SO_2 in Killingholme
- Emissions of SO_2 from domestic solid fuel burning in Keadby.

In addition, further consideration will be given to stationary railway locomotives at Scunthorpe Railway Station taking into account further information from the passenger service provider.

PM_{10}
A detailed assessment of PM_{10} will be conducted in relation to the following: -

- Industrial emissions of PM_{10} in Scunthorpe.
- Emissions of PM_{10} from quarries and landfills in Barnetby.
- Emissions of PM_{10} from domestic solid fuel burning in Keadby.

References and Sources of Information

Local Air Quality Management Technical Guidance, LAQM.TG(03), issued by the DEFRA.

Local Air Quality Management Policy Guidance, LAQM.PG(03), issued by the DEFRA.

The Environment Agency Internet website, www.environment-agency.gov.uk, including the Pollution Inventory

NETCEN Air Quality Archive, www.airquality.co.uk/archive/index.php

Air Quality Review & Assessment Round 1, Stages 1, 2 & 3 - North Lincolnshire Council.

Local Transport Plan, Technical Annex - North Lincolnshire Council.

Stages 2 & 3 Air Quality Review & Assessment - North East Lincolnshire Council.

Stage 2 & 3 Air Quality Review & Assessment – Doncaster Metropolitan Borough Council.

The Environment Agency National Centre for Risk Analysis & Options Appraisal, Guidance for Estimating the Air Quality Impact of Stationary Sources (GSS). GN24, 1998.

Lindsey Oil Refinery – Atmospheric Dispersion Modelling Study, July 2000.

Conoco – Atmospheric Dispersion Modelling Study, 2000.

Corus – Scunthorpe Site Dispersion Modelling – SO_2 Emissions. April 1999.

Any requests for information about
Air Quality issues within North Lincolnshire,
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