



**ENVIRONMENT
AGENCY**

Air Quality Report for the Anglian Region of the Environment Agency

**Report Compiled by
Cortex Consultants
on behalf of the
Environment Agency**

27 July 1999

ENVIRONMENT AGENCY



119260

Environment Agency - Anglian Region

Kingfisher House, Goldhay Way, Orton Goldhay, Peterborough, PE2 5ZR

DX 701640 Orton Goldhay, Tel 01733 464458, Fax 01733 464472, GTN 7-50 X 1000

g:\PIRRSR\1999\August\Report\AQRPfrAR10Aug



**ENVIRONMENT
AGENCY**

AIR QUALITY REPORT FOR THE ANGLIAN REGION OF THE ENVIRONMENT AGENCY

Foreword

This report has been prepared to help inform on air quality and the collective impact of Integrated Pollution Control (IPC) processes within the Region regulated by the Environment Agency. It builds on the work reported in "Anglian Region State of the Environment Report – The IPC Perspective" prepared in April 1997 and also the Anglian Regional Conference on Air Quality (co-sponsored by Government Office Eastern Region) which was held in March 1999. The report forms part of the Anglian Region's environmental strategy on air quality, and also reflects the Agency's goal of focussing on environmental outcomes from regulation.

The report concentrates on the pollutants identified in the National Air Quality Strategy. The lead for implementing the National Air Quality Strategy lies with Local Authorities, and it is hoped that this report would be helpful to both Local Authorities and to the industries concerned in providing information to assist with discussion and decision making.

The report has been prepared by Cortex Consultants on behalf of the Environment Agency. They have used the standard dispersion modelling approach for all the releases from the IPC processes. It has been prepared by examining releases from the Chemical Release Inventory (CRI) returns made in 1997. It should be noted that since that time there will be a number of new processes coming on line (and that the names of some of the operators of existing processes may have changed since that time.)

The report details the results of modelling analysis for all IPC processes that reported discharges of the eight pollutants listed under the National Air Quality Strategy. These eight pollutants are benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, particles less than 10 μ , and sulphur dioxide. The outputs from the model show the estimated annual mean concentrations for these pollutants geographically. In order to help assess the results, Table 1 attached shows the relevant standards for each of the key pollutants.

Consistent with expectations and the determination of individual applications of IPC processes, the annual contribution to pollution levels is confirmed as small, especially when compared with background levels across the Region.

It should however, be noted that the report does not deal with short-term air quality issues which are much more complex to model and are heavily influenced by particular weather conditions which only occur with low frequency.

As part of its National response on air quality issues, the Environment Agency has sought to identify Zones of Industrial Polluting Sources (ZIPS). These were designed to identify

Cont'd

concentrations of IPC industries that could conceivably have an effect on air quality given the number of processes operating in a small geographical area. For Anglian Region, two possible ZIPS were identified:

1. around the River Humber
2. on the Thames Estuary.

Anglian Region is taking the lead with examining the ZIPS around the River Humber, while Thames Region is taking the lead for the one in the Thames Estuary. The report confirms the choice of the Humberside area as the appropriate Regional choice for its ZIPS. Their report has therefore looked in more detail at the area on both sides of the Humber to seek to give further information on the extent of the ZIPS.

As an annex to the main report, Cortex have also prepared a database, based on the data used in the main report, of NAQS substance emissions and release details from IPC processes within the Region. This is available in electronic form from Colin Trendall in the Regional PIR section at the address below.

I believe this report will provide useful information and will help inform the discussions on air quality within the Region. I believe it will be particularly helpful in seeking to address the balance that needs to be struck between all the potential sources of pollutants that impact on the air that we breath.

INNES GARDEN

Regional Process Industry Regulations/Radioactive Substances Regulations Manager
Anglian Region

12/08/99

Air Quality Standards – Summary of Revised Limits and Proposed Objectives

Pollutant	NAQS			EU Air Quality Daughter Directives	Proposals for objectives in review of NAQS as in DETR consultation document Jan 99
	Existing concentration	measured as	Objective – based on EPAQS or WHO standards	Provisional limit values	
Benzene	5ppb	running annual mean	5ppb	1.66ppb by 2010	5ppb mean by 31/12/03 – provisional objective of 1ppb by 31/12/05
1,3-Butadiene	1ppb	running annual mean	1ppb		1ppb by 31/12/03
Carbon Monoxide	10ppm	running 8 hr mean	10ppm	8.5ppm by 2005	10ppm by 31/12/03
Lead	0.5µg/m ³	annual mean	0.5µg/m ³	0.5µg/m ³ annual mean by 1/1/05 OR by 1/1/10 if within 1000m ind source	0.5µg/m ³ by 31/12/04 0.25µg/m ³ by 31/12/08
Nitrogen Dioxide	150ppb	1 hr mean	150ppb hourly mean (provisional)	104.6ppb hourly mean 18 exceedences per year by 1/1/10	104.6ppb by 31/12/05, 18 exceedences
	21ppb	annual mean	21ppb annual mean (provisional)	21ppb annual mean by 1/1/10	provisional objective of 21ppb by 31/12/05. 15.7ppb annual obj by 31/12/00
Ozone	50ppb	running 8 hr mean	50ppb (10 exceedences per year) (provisional)		provisional objective of 50ppb by 31/12/05
Particles (as PM10)	50µg/m ³	running 24 hr mean	50µg/m ³ (4 exceedences per year) (provisional)	50µg/m ³ 24 hr limit, 35 exceedences per year and 40 µg/m ³ annual limit by 1/1/05	40µg/m ³ annual objective. 50µg/m ³ , 35 exceedences, 24 hour objective. by 31/12/04. provisional objective of 50µg/m ³ , 4 exceedences, by 31/12/05. provisional annual objective of 20µg/m ³ , by 31/12/09. provisional 24 hour objective of 50µg/m ³ , 7 exceedences, by 31/12/09.
Sulphur Dioxide	100ppb	15 min mean	100ppb (35 exceedences of 15 mins, per year) (provisional)	131ppb, 1 hr limit value, 24 exceedences per year and 48.6ppb 24 hr limit, 3 exceedences per year by 1/1/05	100ppb, 15 min mean, 4 exceedences, by 31/12/05 131ppb, 1 hour objective, 24 exceedences, by 2004. 46.8ppb, 24 hour objective, 3 exceedences, by 31/12/04. 7ppb annual & winter objectives by 31/12/00.

**AIR QUALITY
MANAGEMENT**

Source – derived from a chart produced as a supplement to *Air Quality Management*, January 1999 edition (published by Information for Industry, 4 Valentine Place, London SE1 8RB. The original wallchart is published by Air Quality Management available from 0171 654 7117

CONTENTS

PREFACE

1.0	INTRODUCTION	1
1.1	<u>Objective</u>	1
1.2	<u>Structure</u>	1
2.0	STUDY METHODOLOGY	2
2.1	<u>Pollutants Considered</u>	2
2.2	<u>Anglian Region Ambient Air Quality</u>	2
3.0	AIR DISPERSION MODELLING	3
3.1	<u>Selection Criteria for Air Dispersion Modelling</u>	3
3.2	<u>The Dispersion Model</u>	3
3.3	<u>Emission Details</u>	3
	3.3.1 Release Rates	4
	3.3.2 Pollutants Modelled	4
3.4	<u>Meteorological Data</u>	4
3.5	<u>Modelling Options</u>	7
4.0	AIR QUALITY MAPS	8
4.1	<u>Nitrogen Dioxide</u>	9
4.2	<u>Sulphur Dioxide</u>	15
4.3	<u>Particulates</u>	21
4.4	<u>Carbon Monoxide</u>	27
4.5	<u>Lead</u>	33
4.6	<u>1,3-Butadiene</u>	39

Appendix A - Emission details for the air dispersion modelling of the Part A Processes

PREFACE

The aim of this study is to indicate the contribution of IPC regulated Part A Processes to air pollution within the Anglian Region of the Environment Agency (EA).

This document concentrates on air pollution arising from releases of the eight priority pollutants defined under the National Air Quality Strategy (NAQS). The concentrations of the NAQS pollutants in the local environment due to the operation of the Part A Processes have been predicted using air dispersion modelling. The contribution of the Part A Processes to air pollution may then be assessed by comparing the air dispersion modelling results with Ambient Air Quality data derived from the national network of air quality monitoring stations by NETCEN.

Air quality maps are used as the means of data presentation in this document. Air quality maps showing the whole of the Anglian Region are provided along with air quality maps of Humberside, which has been defined as a zone of industrial polluting sources (ZIPS).

Project Management

This document has been compiled by Cortex, Coventry under contract from the Environment Agency. The project manager at the Environment Agency was Adrian Young.

1. INTRODUCTION

1.1 Objective

The objective of this report is to provide an indication of the contribution of IPC regulated Part A Processes to air pollution within the Anglian Region of the Environment Agency (EA). The contribution to pollution will be established through comparison with Ambient Air Quality data. It is not the intention of this report to compare the emissions from the Part A Processes against the air quality standards set under the National Air Quality Strategy (NAQS).

1.2 Structure

This document comprises a main body of text and an Appendix. The main body of text details the approach adopted during this study and contains air quality maps depicting Ambient Air Quality and the predicted air quality as the result of Part A Processes. Appendix A presents the information used to generate the maps of air quality as the result of Part A Processes.

2. STUDY METHODOLOGY

The objective of this report is to provide an indication of the contribution of IPC regulated Part A Processes to air pollution within the Anglian Region of the Environment Agency (EA).

In this study, pollutant concentrations in the local environment resulting from the Part A Process emissions have been predicted using air dispersion modelling. The contribution to air pollution from the Part A Processes may then be assessed by comparing the results from the air dispersion modelling with Ambient Air Quality data. With the exception of the Humberside zone of industrial polluting sources (ZIPS), this study has not considered the effects on air quality due to Part A Processes operating outside the Anglian Region of the EA.

2.1 Pollutants Considered

The pollutants considered in this study are the eight priority pollutants defined under the National Air Quality Strategy (NAQS):

- Benzene;
- 1,3-Butadiene;
- Carbon monoxide;
- Lead;
- Nitrogen dioxide;
- Ozone;
- Fine particles (PM₁₀);
- Sulphur dioxide.

2.2 Anglian Region Ambient Air Quality

In this report Ambient Air Quality within the Anglian Region of the Environment Agency is presented in the form of concentration maps. These maps have been derived from the Department of Environment's Air Quality Monitoring Network by NETCEN (AEA Technology).

All of the Ambient Air Quality data provided in this report is displayed in terms of annual mean concentrations.

3. AIR DISPERSION MODELLING

3.1 Selection Criteria for Air Dispersion Modelling

The Anglian Region of the Environment Agency contains approximately 250 IPC regulated Part A Processes covering a wide range of industry sectors e.g. chemical, power, pharmaceutical & petrochemical. Each Part A Process has a different impact on local air quality, with some having a more significant impact than others e.g. an oil refinery compared against a timber treating process. In this study, air dispersion modelling has only been performed on those Part A Processes which make a "significant impact" on local air quality. The term "significant impact" has been taken to mean releasing an NAQS pollutant in quantities greater than the *de minimus* ⁽¹⁾ reporting level.

3.2 The Dispersion Model

The air dispersion model ADMS 2 has been used for predicting ground level concentrations. ADMS 2, developed by Cambridge Environmental Research Consultants, is a "New Generation" air dispersion model and characterises the earth's boundary layer in terms of measurable physical parameters: the boundary layer depth and the Monin-Obukhov length. ADMS 2 was selected as the dispersion model because it represented the 'best available technology' at the time this study began.

3.3 Emission Details

The emission details for the facilities modelled in this study have been taken from the report "NAQS Emissions from IPC Part A Processes Operating Within the Anglian Region of the Environment Agency" ⁽²⁾. Based on 1997 Chemical Release Inventory (CRI) data, this report gives details on the release points from the Part A Processes operating within the Anglian Region of the Environment Agency which release NAQS pollutants in quantities greater than the *de minimus* reporting level.

Copies of the emission details used to perform this study are given as Appendix A.

⁽¹⁾ The *de minimus* reporting level is the level below which a company need not report the release of the chemical substance on their ISR (Inventory of Sources and Releases) reporting form.

⁽²⁾ Cortex, C0662, NAQS Emissions from IPC Part A Processes Operating Within the Anglian Region of the Environment Agency

3.3.1 Release Rates

The Ambient Air Quality data produced by NETCEN provides estimates of annual mean background concentrations. To allow comparison between the dispersion modelling results and the NETCEN data, annual emission rates have been used.

Emission rates in grams per second have been approximated from the kilograms per annum values contained in the 1997 CRI. It is acknowledged that this approach does not take into account batch processing, intermittent/campaign releases or seasonal activities e.g. sugar refining. However, it is the intention of this report to provide an indication of the contribution of IPC regulated Part A Processes to air pollution and not a definitive assessment. This approach is consistent with the aims of the study.

3.3.2 Pollutants Modelled

Based on 1997 CRI data, there are no facilities within the Anglian Region of the Environment Agency that release Benzene or Ozone in quantities greater than the *de minimus* reporting level. In addition, the 1997 CRI data does not contain release figures for fine particles (PM₁₀). In the absence of PM₁₀ data, this study has used the CRI release information for particulates, which covers all types of particulate releases, including fine particles.

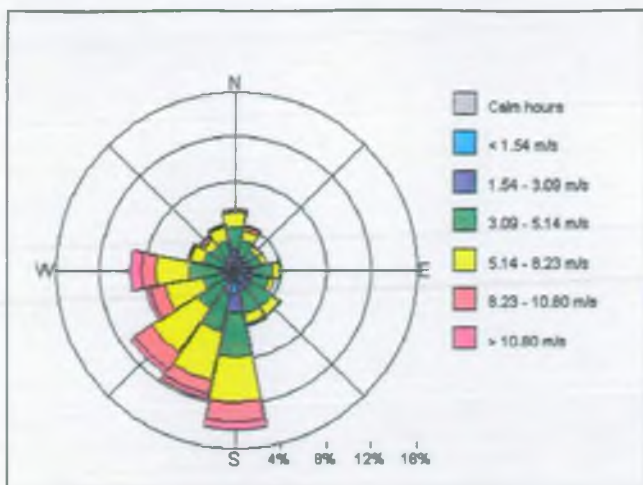
The pollutants modelled in this study are:

- Nitrogen Dioxide;
- Sulphur Dioxide;
- Carbon Monoxide;
- Particulates;
- Lead;
- 1,3-Butadiene.

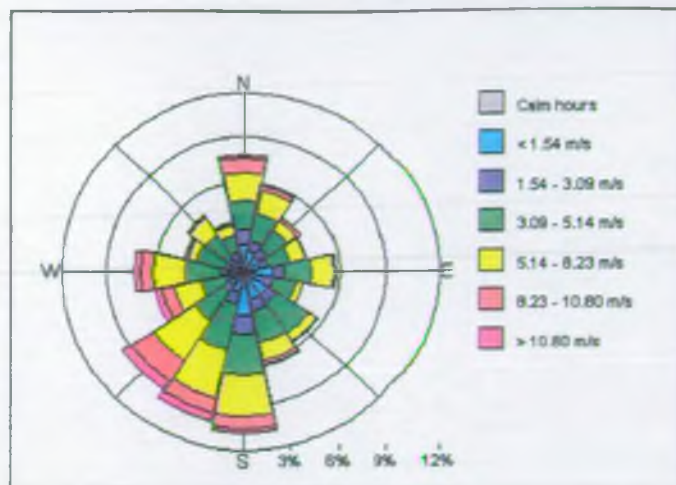
3.4 Meteorological Data

The UK Met Office provided representative meteorological data for the Anglian Region. Due to the size of the Anglian Region, meteorological data from two different weather stations were used: Kilnsea (Weather Station Number 03396) and Marham (Weather Station Number 03482). The most appropriate weather station for each facility was selected based upon its location.

The meteorological data used in this study are shown in Figures 1 & 2 as Windrose diagrams. Each Windrose is based on one years of hourly sequential meteorological data.



Marham 1990



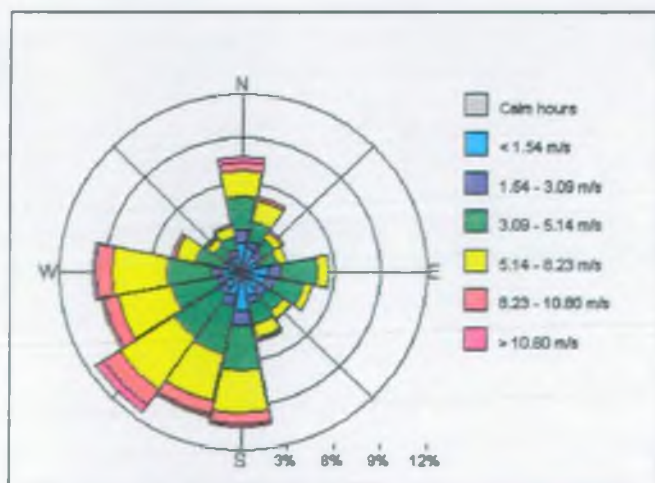
Marham 1991

Figure 1 – Windrose: Marham 1990 to 1993

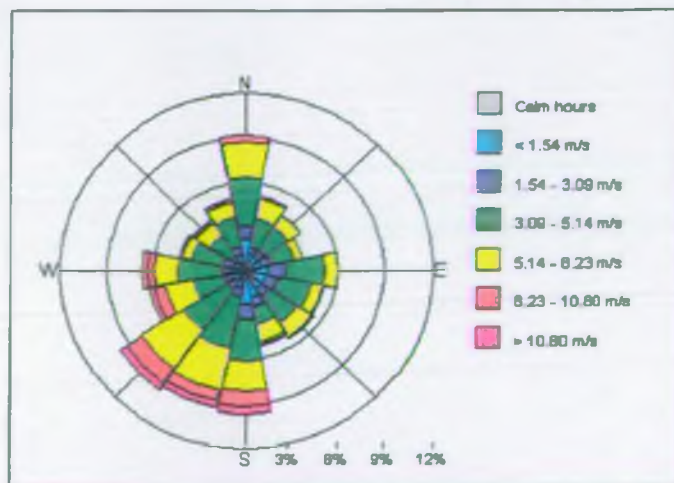
Weather Station No: 03482

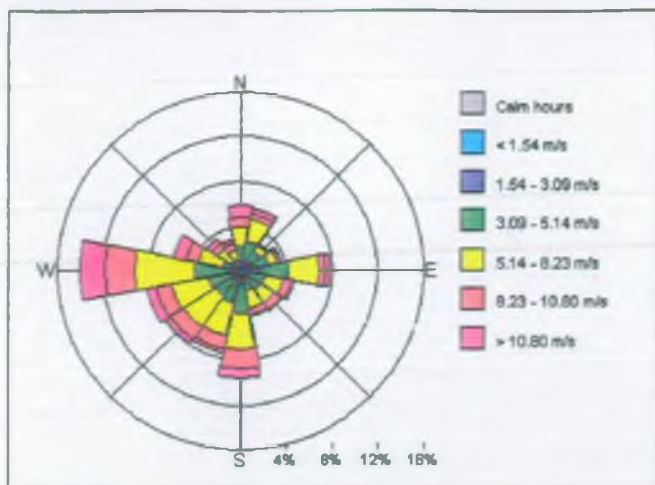


Marham 1992

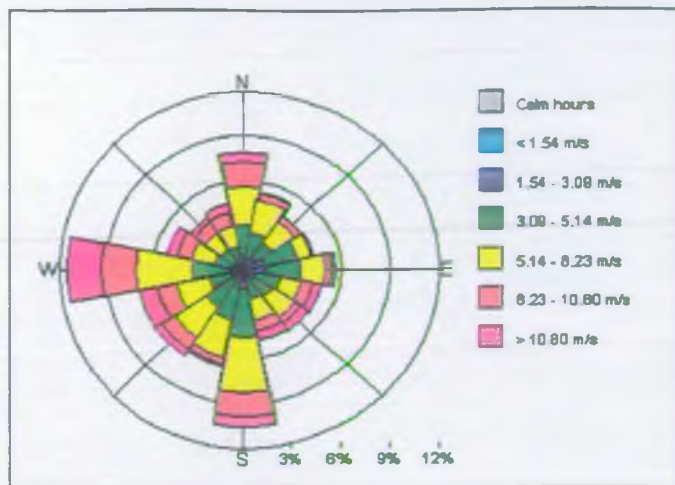


Marham 1993





Kilnsea 1983



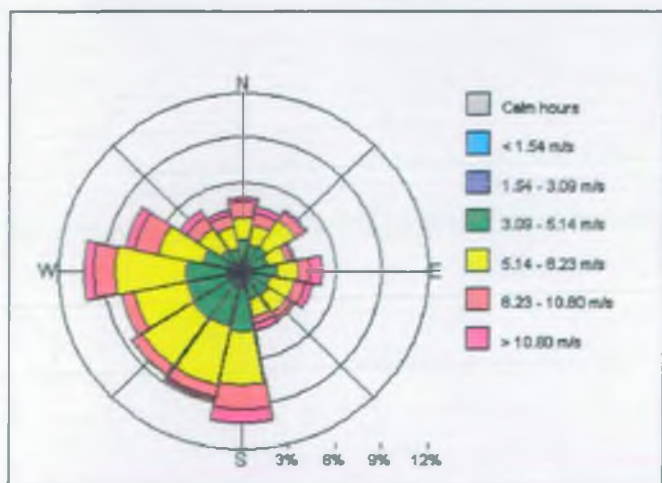
Kilnsea 1984

Figure 2 – Windrose: Kilnsea 1983 to 1986

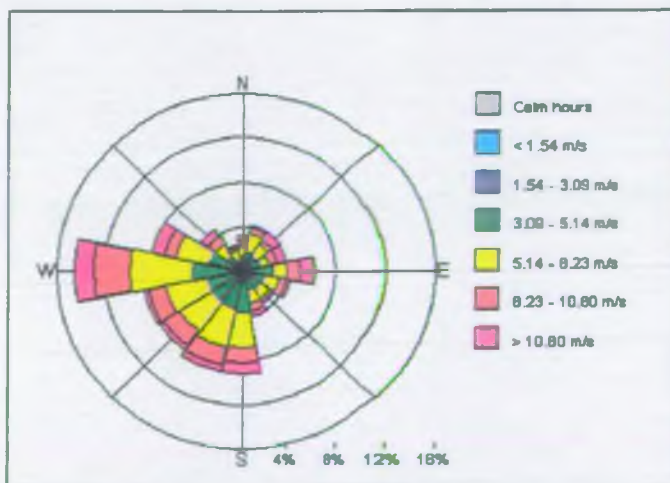
Weather Station No: 03396



Kilnsea 1985



Kilnsea 1986



To minimise the run times of the dispersion model, the four years of meteorological data from each weather station were screened to establish the year that gave rise to the highest ground level concentrations. These single years of meteorological data were then used in the modelling, generating worst case predictions of ground level pollutant concentration. The years of meteorological data used in the modelling were Kilnsea 1986 and Marham 1990.

3.5 Modelling Options

ADMS 2 was run without complex effects i.e. no buildings or terrain, to predict annual average ground level concentrations. Each facility was modelled using a receptor grid spacing of 500m. A protocol was agreed with the EA to establish the area over which ground level concentrations were modelled. Initially, ground level concentrations were modelled over 9 square kilometres centred on the facility. If this modelling predicted concentrations greater than 10% of the substances long term Environmental Assessment Level (EAL) at the extremities of the modelled area, the modelling area was increased until the concentrations fell below the 10% cut-off.

Note: None of the facilities modelled generated concentrations greater than 10% of the substances long term EAL at the extremities of the initial 9 square kilometre grid.

Maps showing the extent of the area over which air dispersion modelling has been performed are given in Section 4.

4. AIR QUALITY MAPS

In this section five maps are presented for each of the six NAQS substances modelled. The maps are:

- A view of the Anglian Region showing the extent of the area over which air dispersion modelling has been performed. This map also details the number of facilities modelled for that particular pollutant.
- A view of the Anglian Region showing the Ambient Air Quality based on 1998 NETCEN Data.
- A view of the Anglian Region showing the air quality as a result of the Part A Processes based on air dispersion modelling of the data contained in the 1997 CRI.
- A view of the Humberside zone of industrial polluting sources (ZIPS) showing the Ambient Air Quality based on 1998 NETCEN Data.
- A view of the Humberside zone of industrial polluting sources (ZIPS) showing the air quality as a result of the Part A Processes based on air dispersion modelling of the data contained in the 1997 CRI.

Andy Pascoe

Cortex

~~012~~

01203 862500

Eoin Trendle

→ Pete office
got data from Twerton
→ '96 data.

NITROGEN DIOXIDE

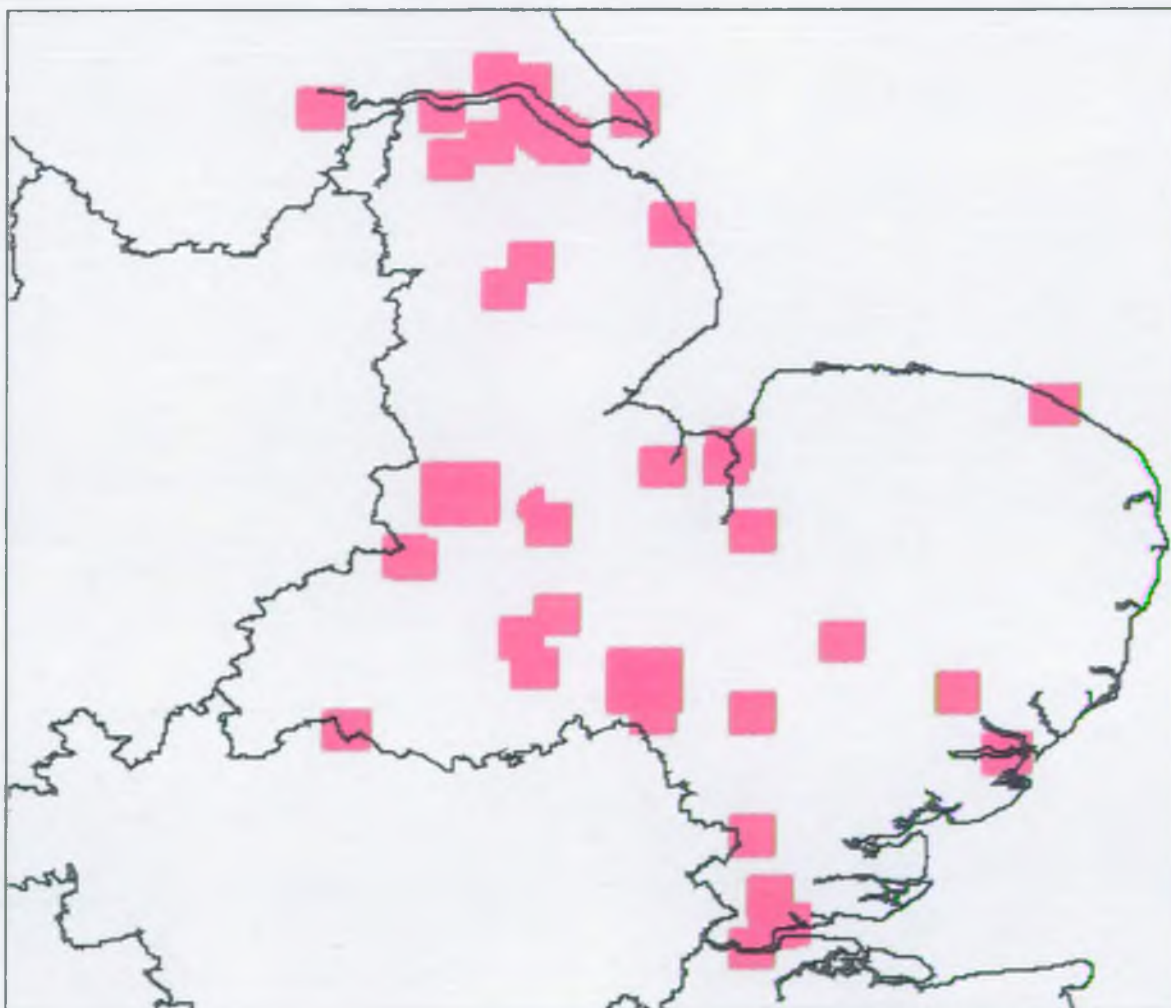
PART A PROCESSES

Extent of area over which air dispersion modelling performed for

Nitrogen Dioxide

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Number of Facilities Modelled: 53

Area Modelled:



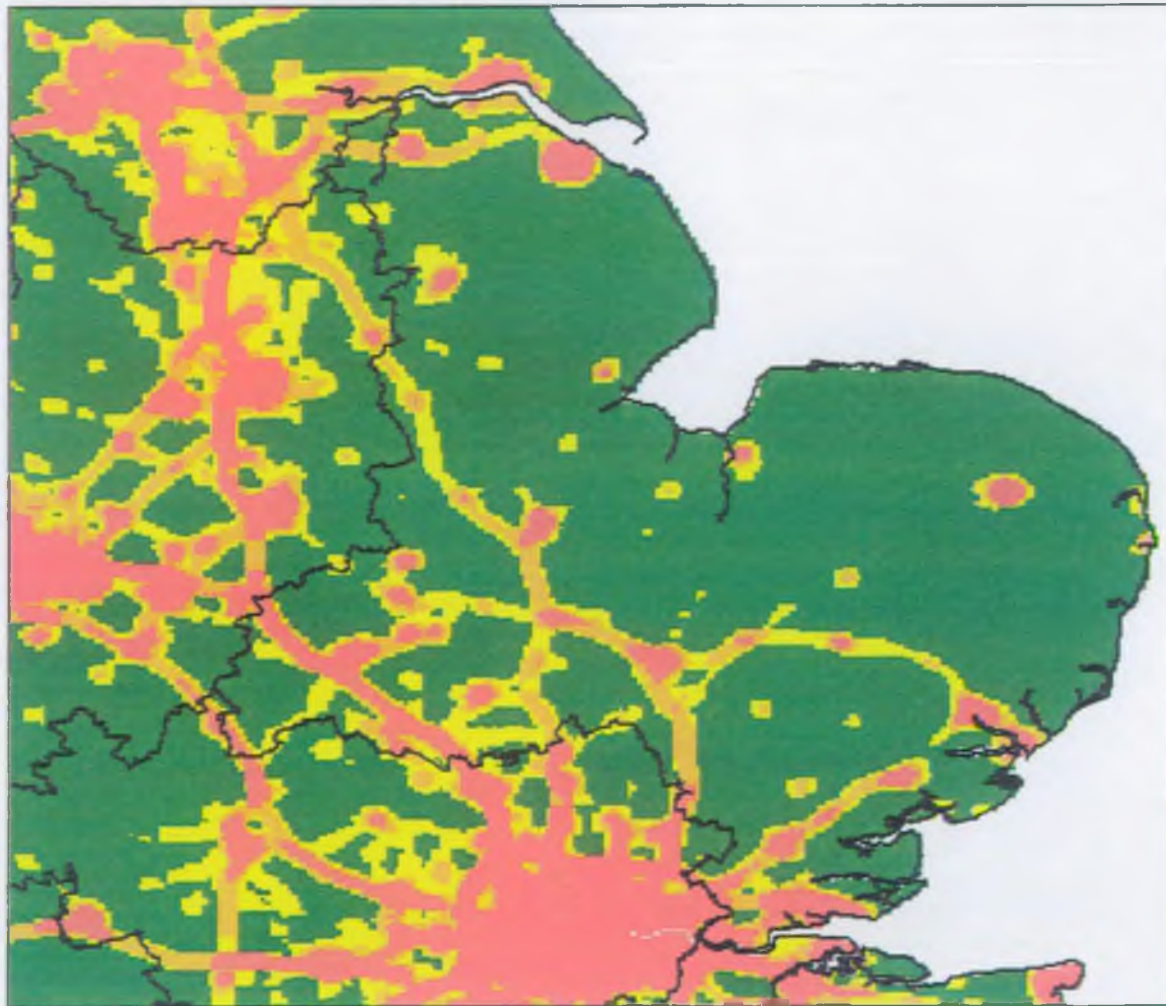
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

Nitrogen Dioxide, ppb

Data Source: NETCEN 1998

View: Anglian Region



Nitrogen Dioxide, ppb



PART A PROCESSES

Estimated annual mean concentration for

Nitrogen Dioxide, ppb

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Nitrogen Dioxide, ppb



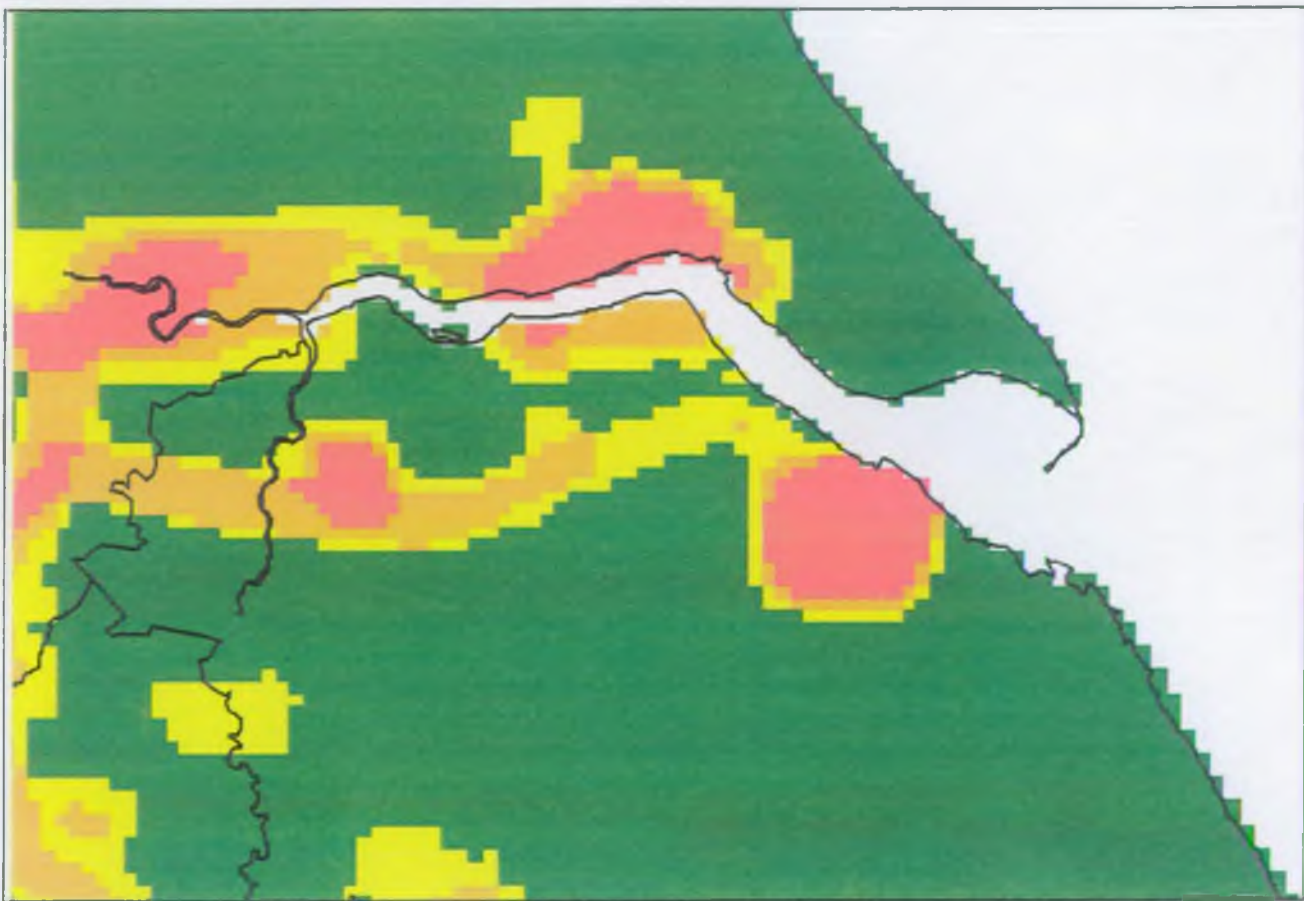
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

Nitrogen Dioxide, ppb

Data Source: NETCEN 1998

View: Humberside ZIPS



Nitrogen Dioxide, ppb



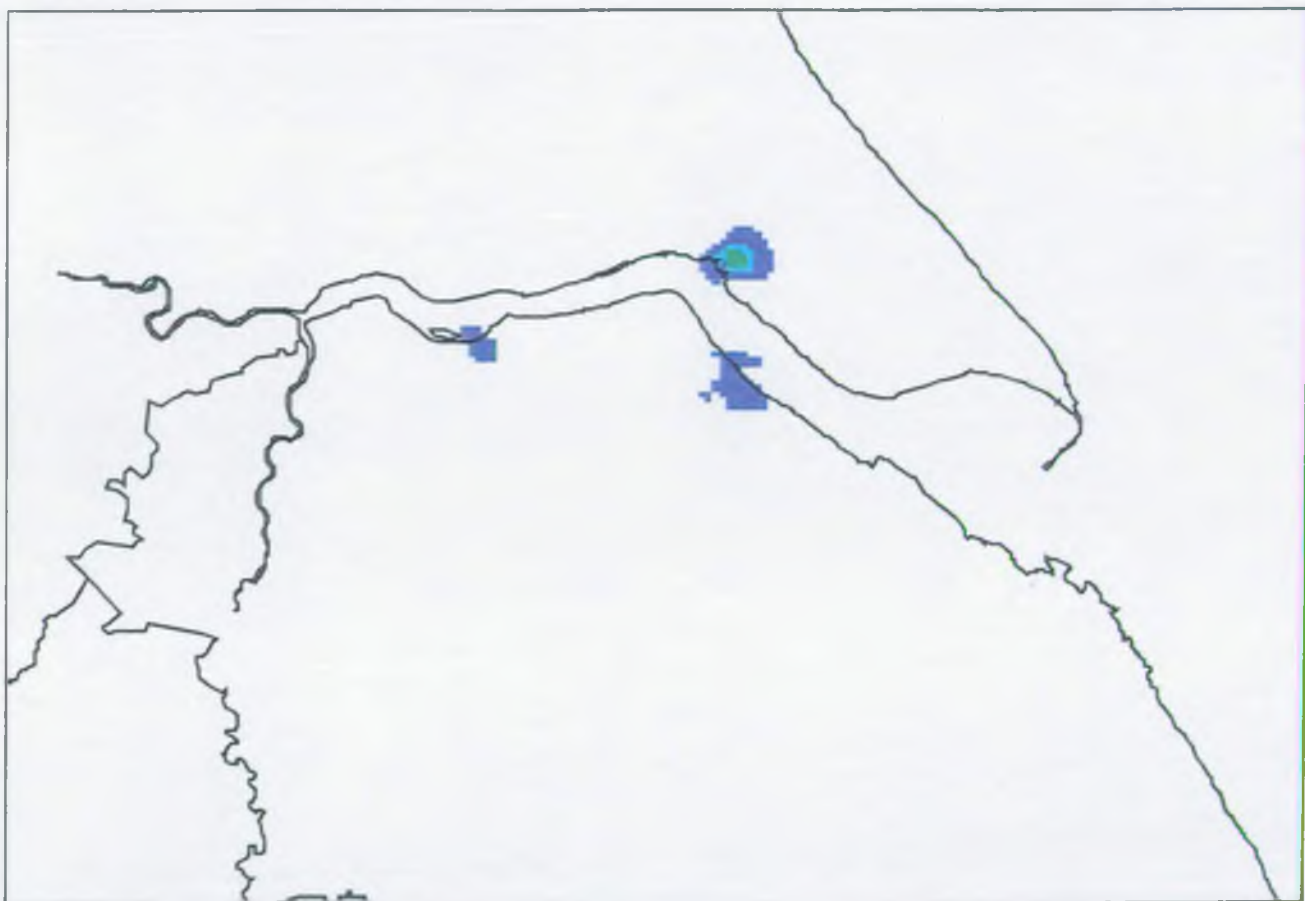
PART A PROCESSES

Estimated annual mean concentration for

Nitrogen Dioxide, ppb

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Humberside ZIPS



Nitrogen Dioxide, ppb



SULPHUR DIOXIDE

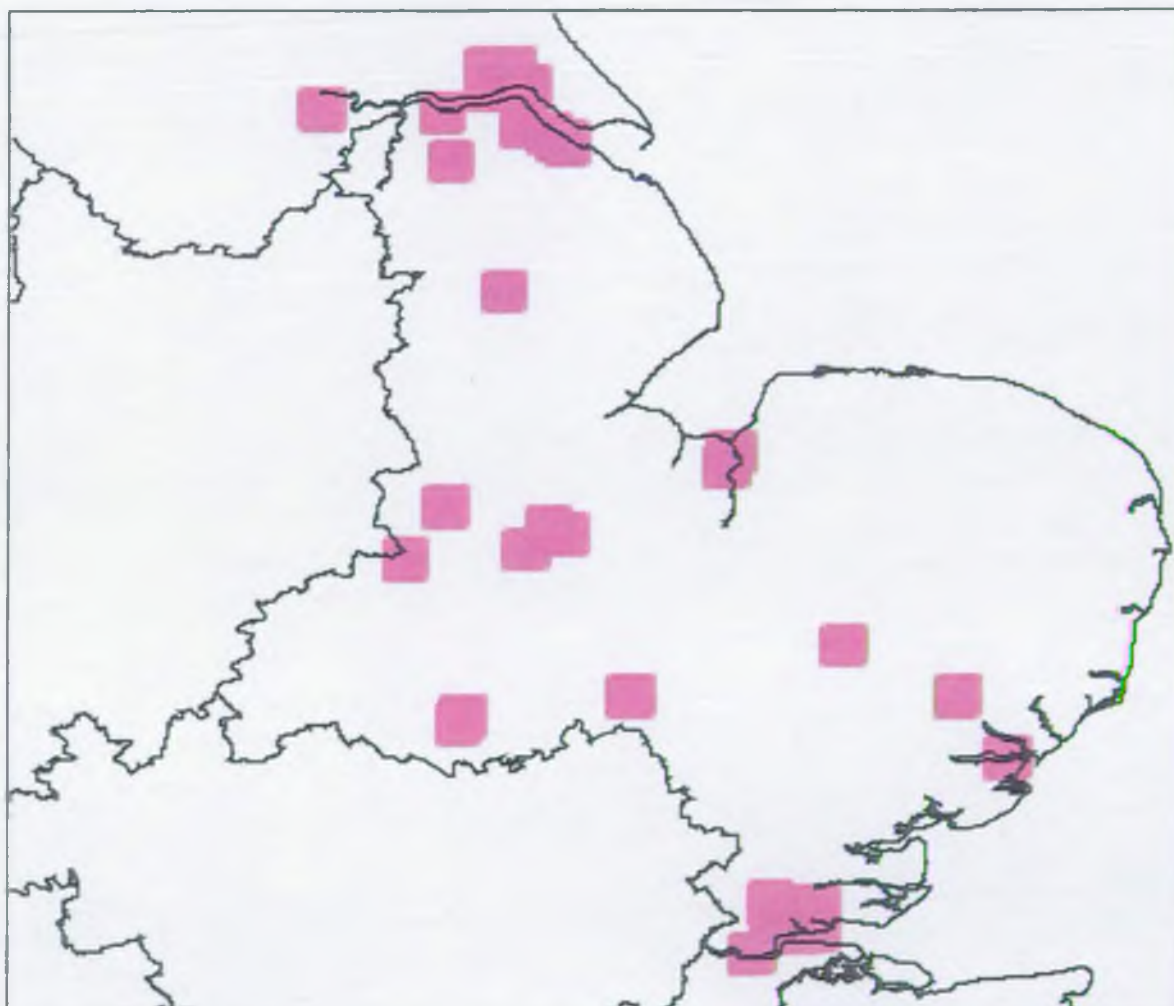
PART A PROCESSES

Extent of area over which air dispersion modelling performed for

Sulphur Dioxide

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Number of Facilities Modelled: 34

Area Modelled:



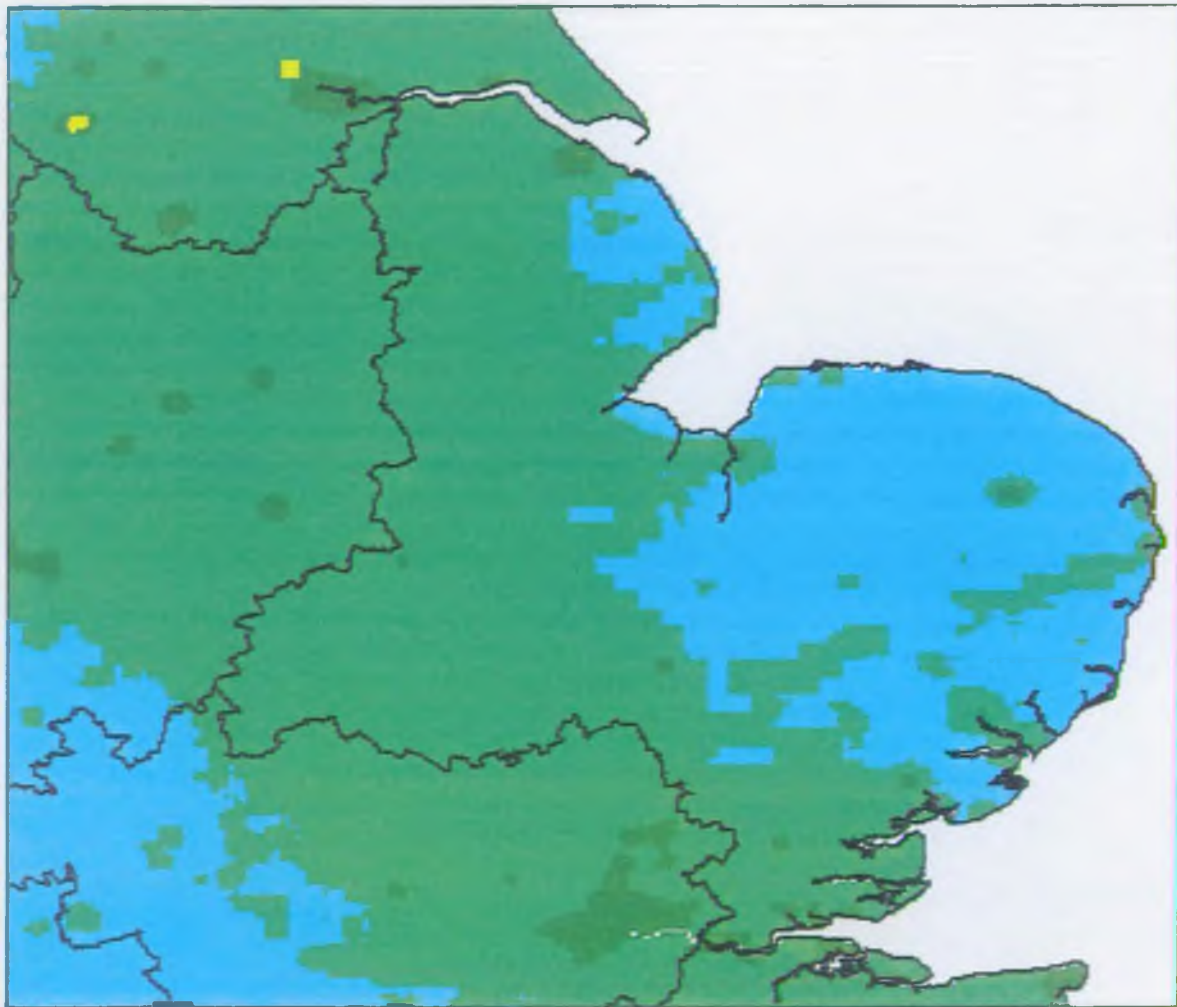
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

Sulphur Dioxide, ppb

Data Source: NETCEN 1998

View: Anglian Region



Sulphur Dioxide, ppb



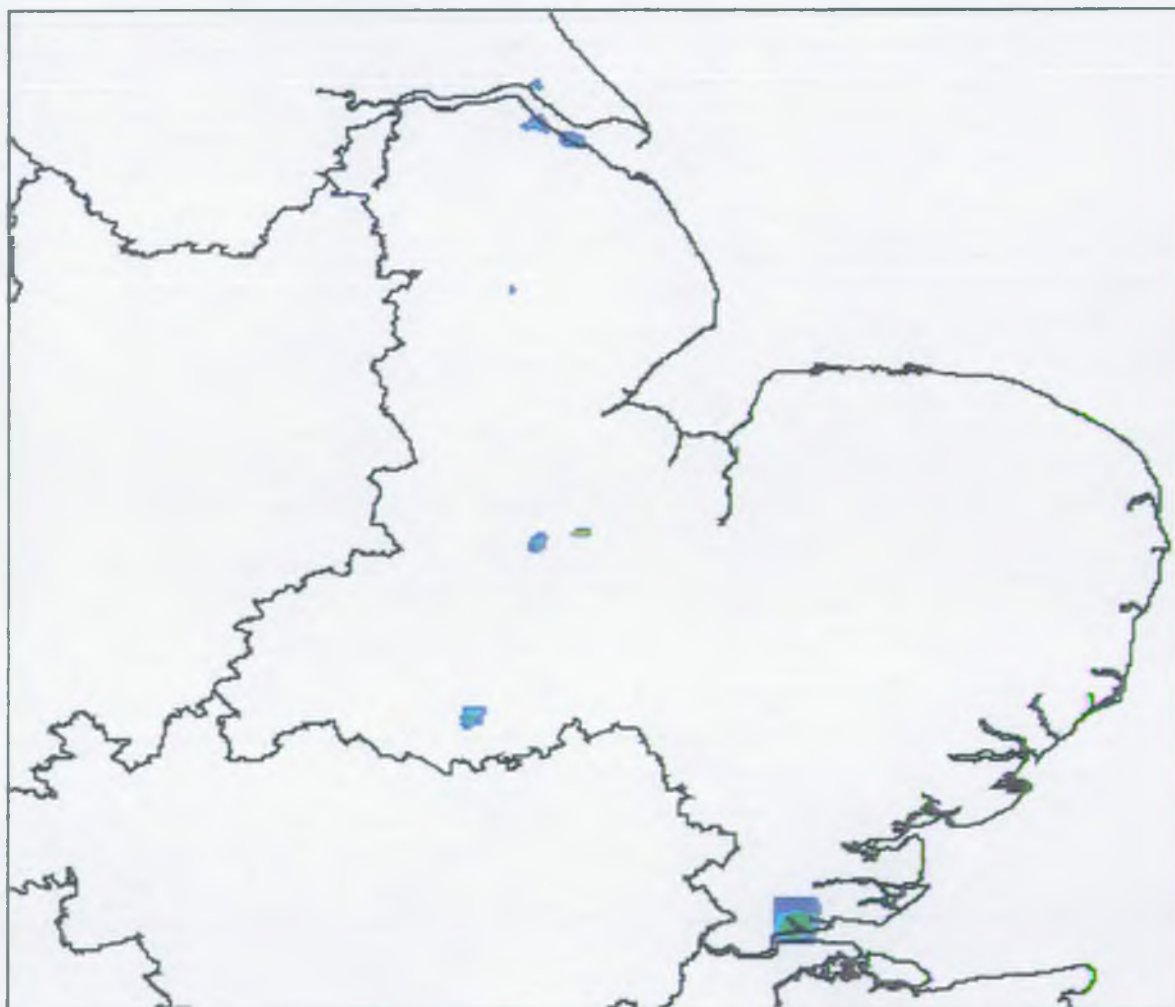
PART A PROCESSES

Estimated annual mean concentration for

Sulphur Dioxide, ppb

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Sulphur Dioxide, ppb



AMBIENT AIR QUALITY

Estimated annual mean background concentration for

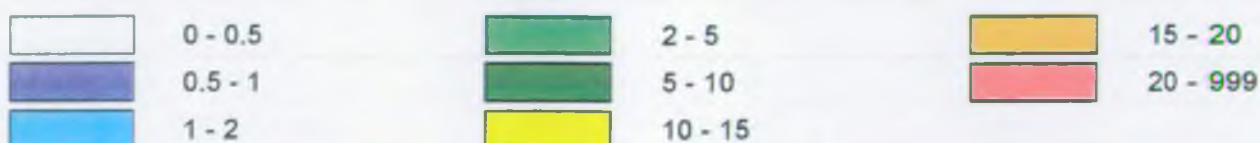
Sulphur Dioxide, ppb

Data Source: NETCEN 1998

View: Humberside ZIPS



Sulphur Dioxide, ppb



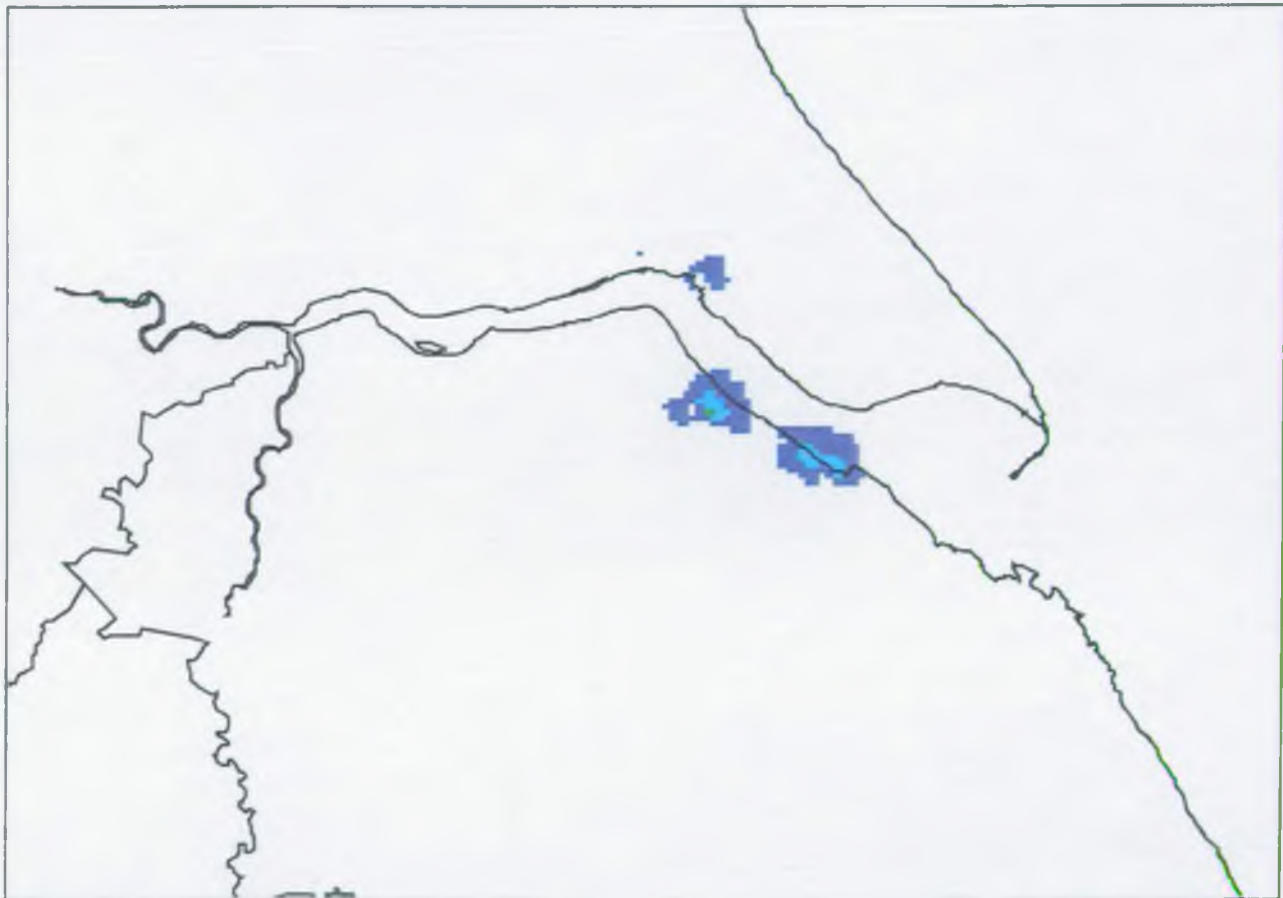
PART A PROCESSES

Estimated annual mean concentration for

Sulphur Dioxide, ppb

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Humberside ZIPS



Sulphur Dioxide, ppb



PARTICULATES

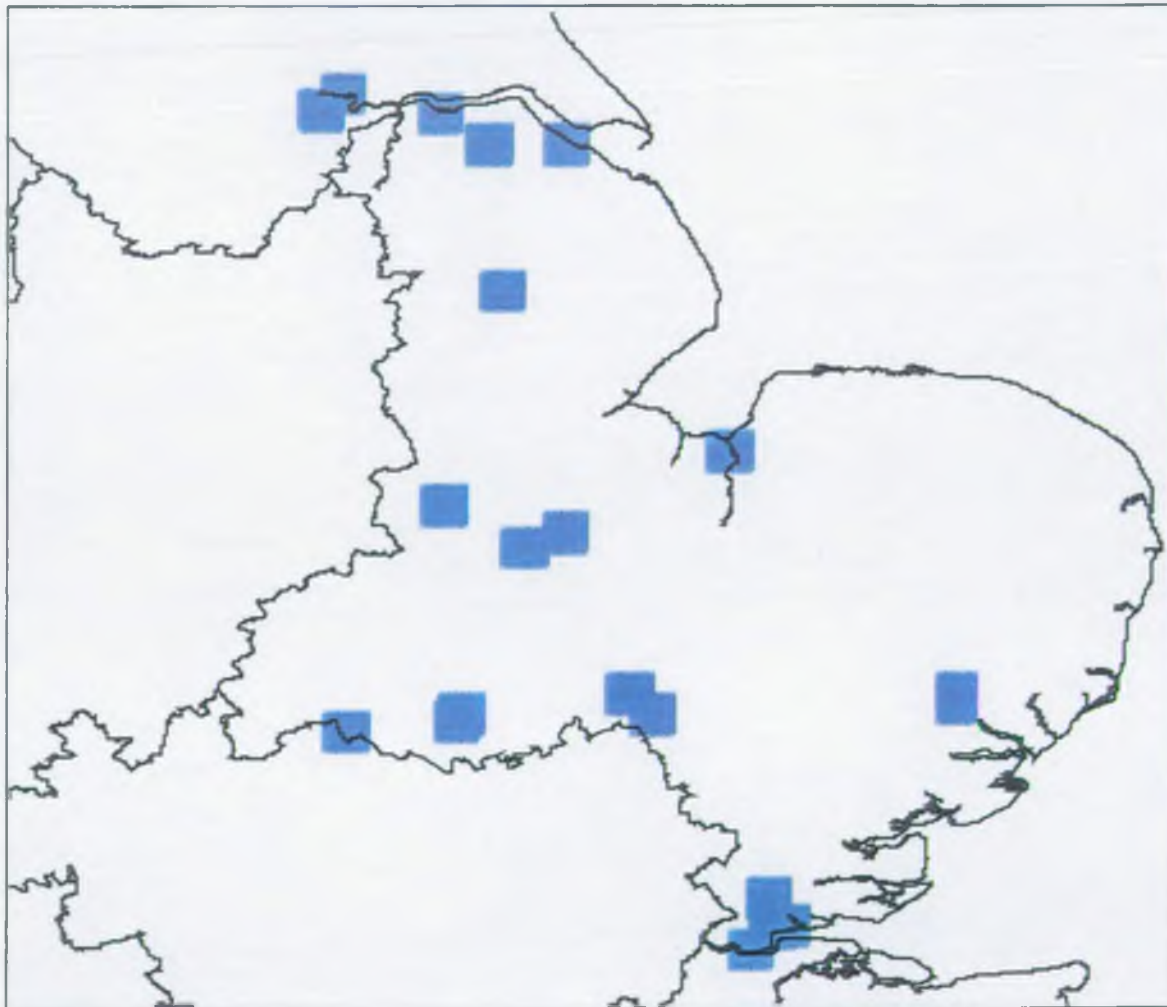
PART A PROCESSES

Extent of area over which air dispersion modelling performed for

Particulates

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Number of Facilities Modelled: 23

Area Modelled:



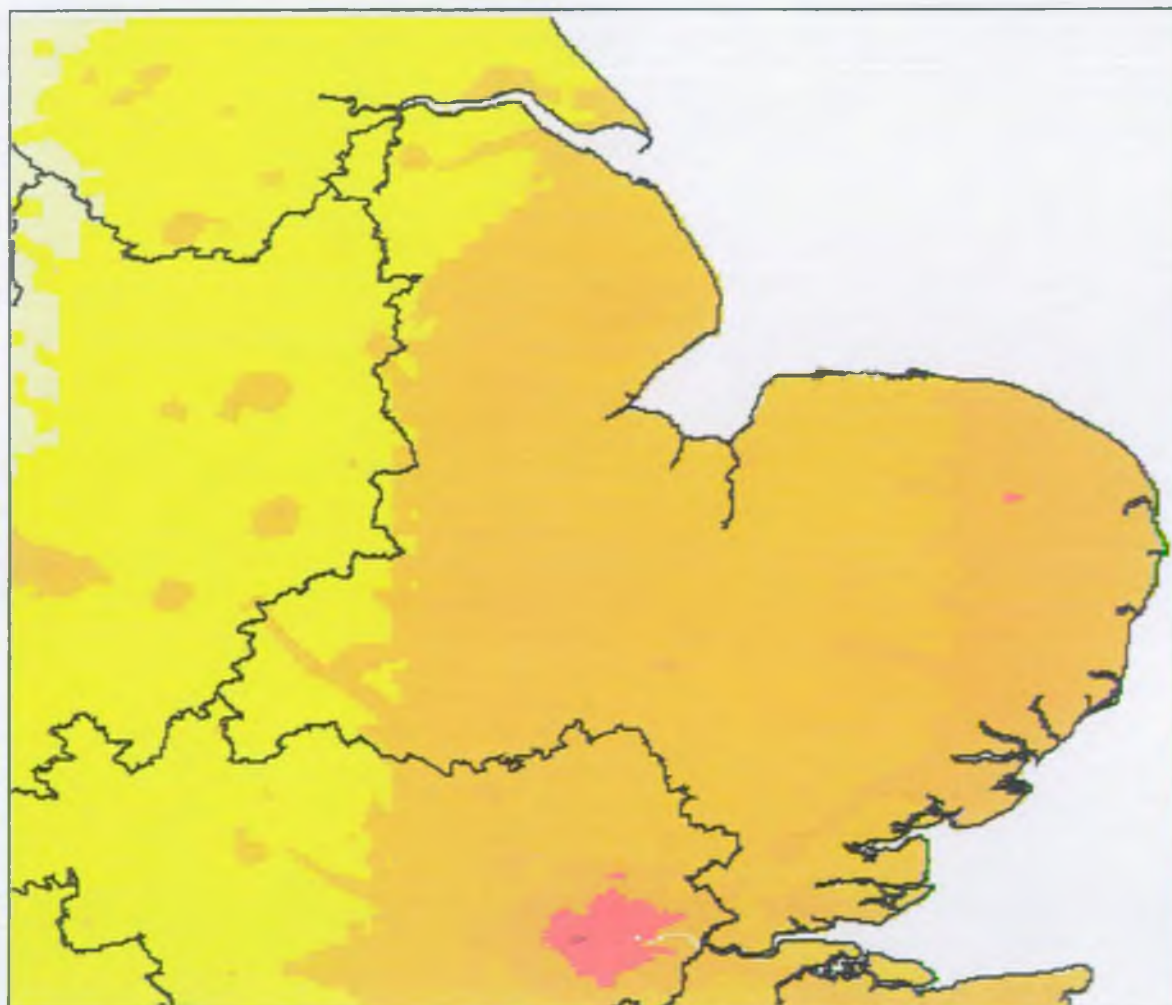
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

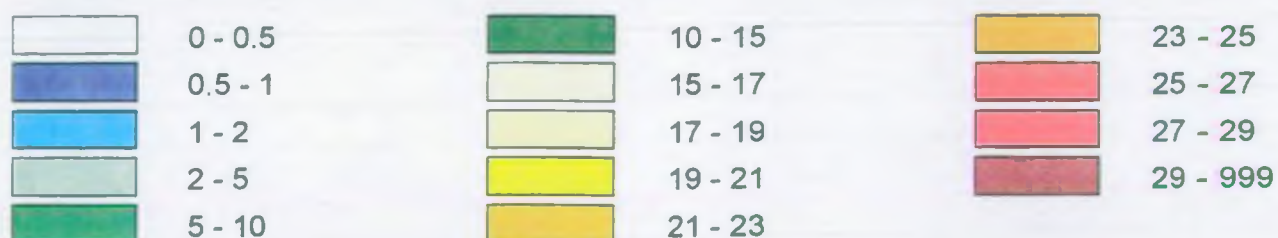
Fine Particulates, $\mu\text{g.m}^{-3}$

Data Source: NETCEN 1998

View: Anglian Region



Fine Particulates, $\mu\text{g.m}^{-3}$



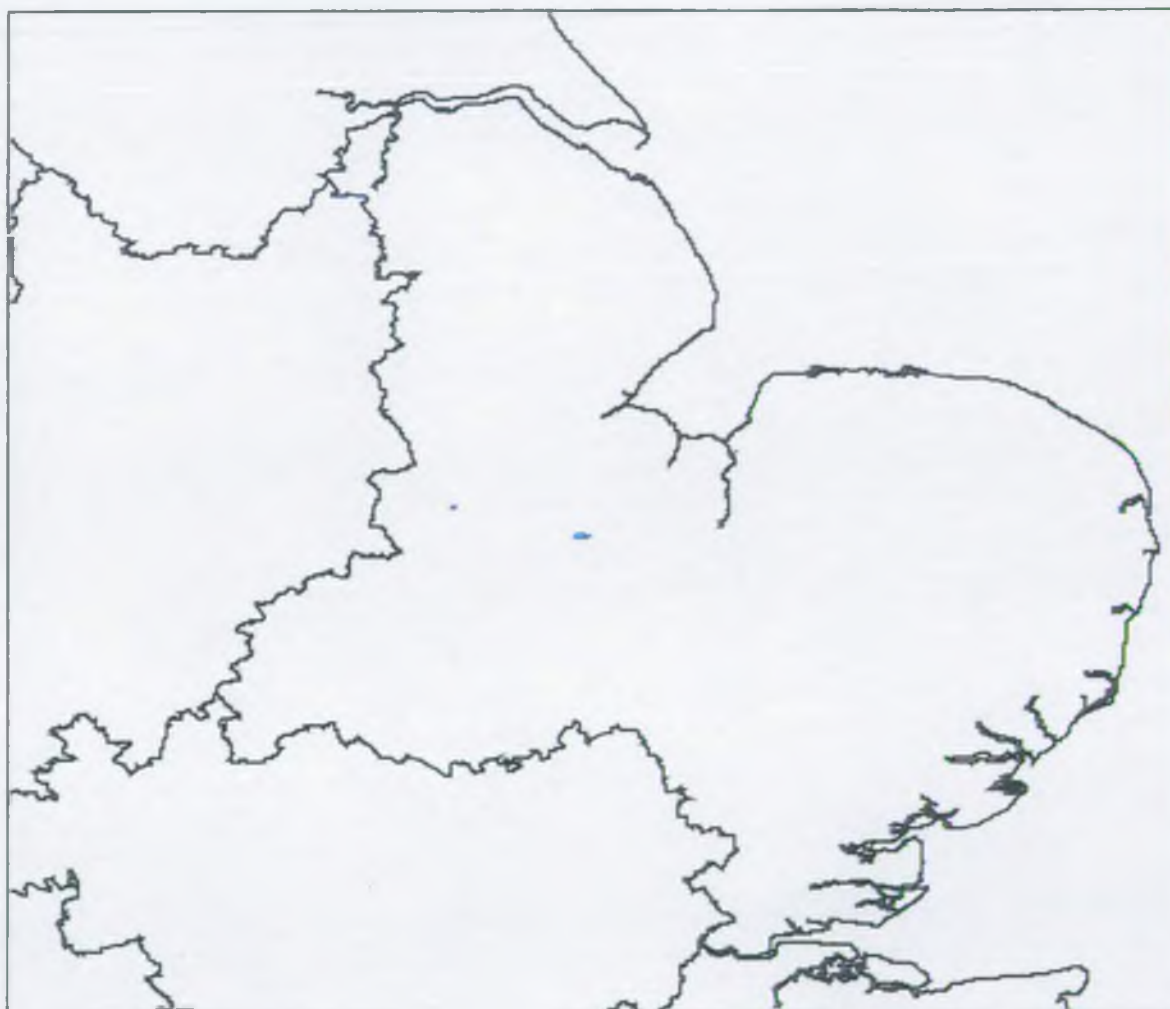
PART A PROCESSES

Estimated annual mean concentration for

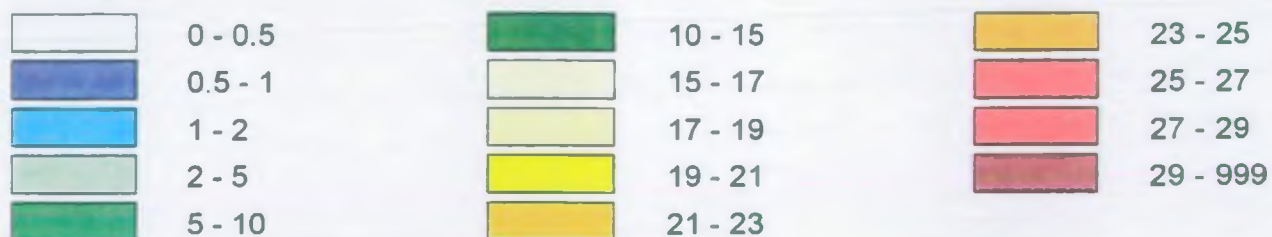
Particulates, $\mu\text{g.m}^{-3}$

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Particulates, $\mu\text{g.m}^{-3}$



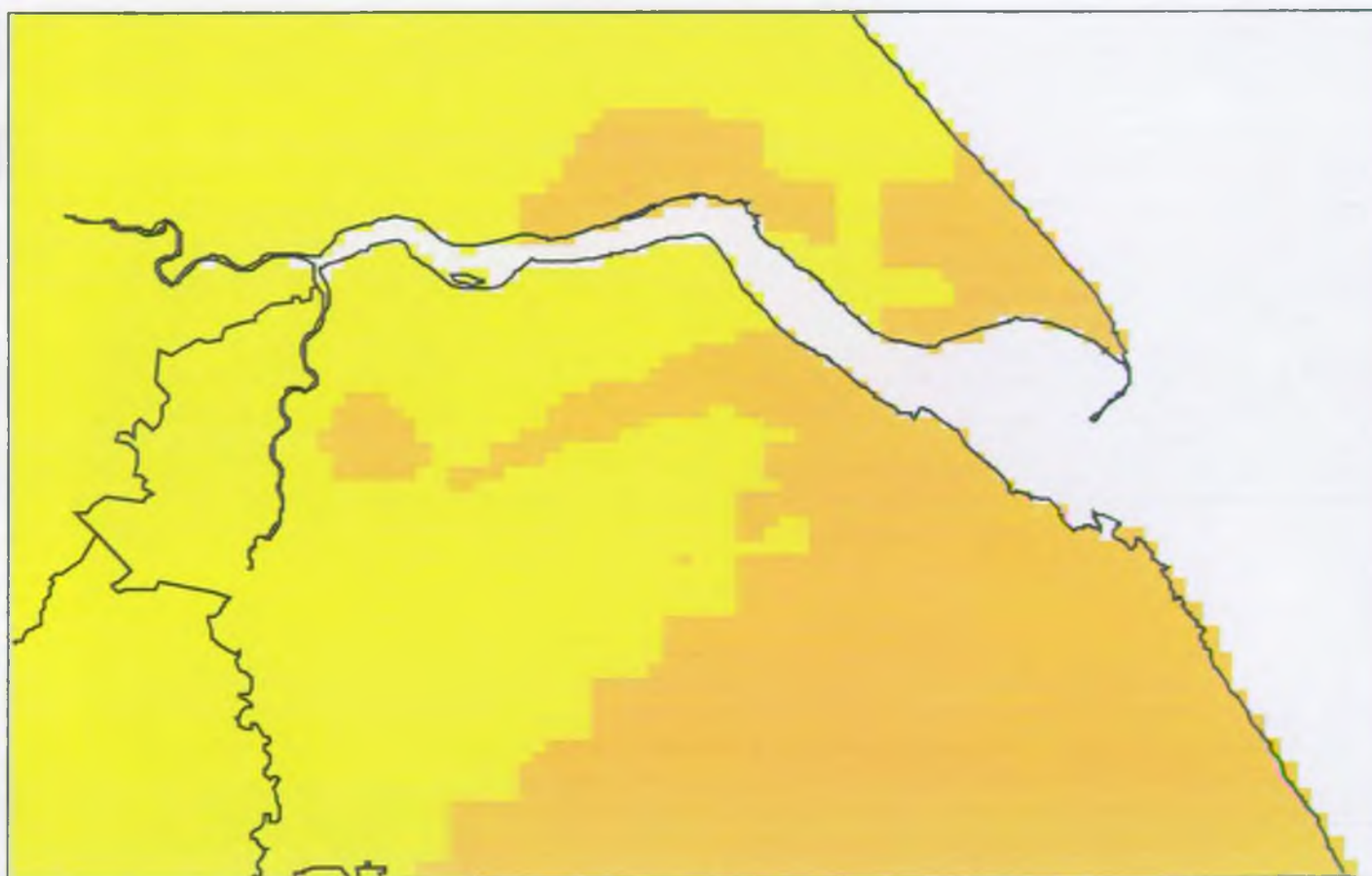
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

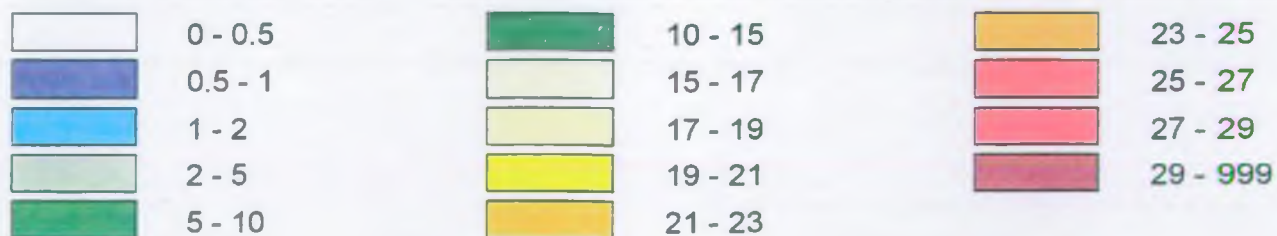
Fine Particulates, $\mu\text{g.m}^{-3}$

Data Source: NETCEN 1998

View: Humberside ZIPS



Fine Particulates, $\mu\text{g.m}^{-3}$



PART A PROCESSES

Estimated annual mean concentration for

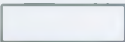
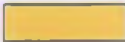
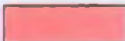
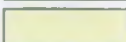
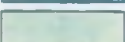
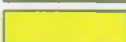
Particulates, $\mu\text{g.m}^{-3}$

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Humberside ZIPS



Particulates, $\mu\text{g.m}^{-3}$

	0 - 0.5		10 - 15		23 - 25
	0.5 - 1		15 - 17		25 - 27
	1 - 2		17 - 19		27 - 29
	2 - 5		19 - 21		29 - 999
	5 - 10		21 - 23		

CARBON MONOXIDE

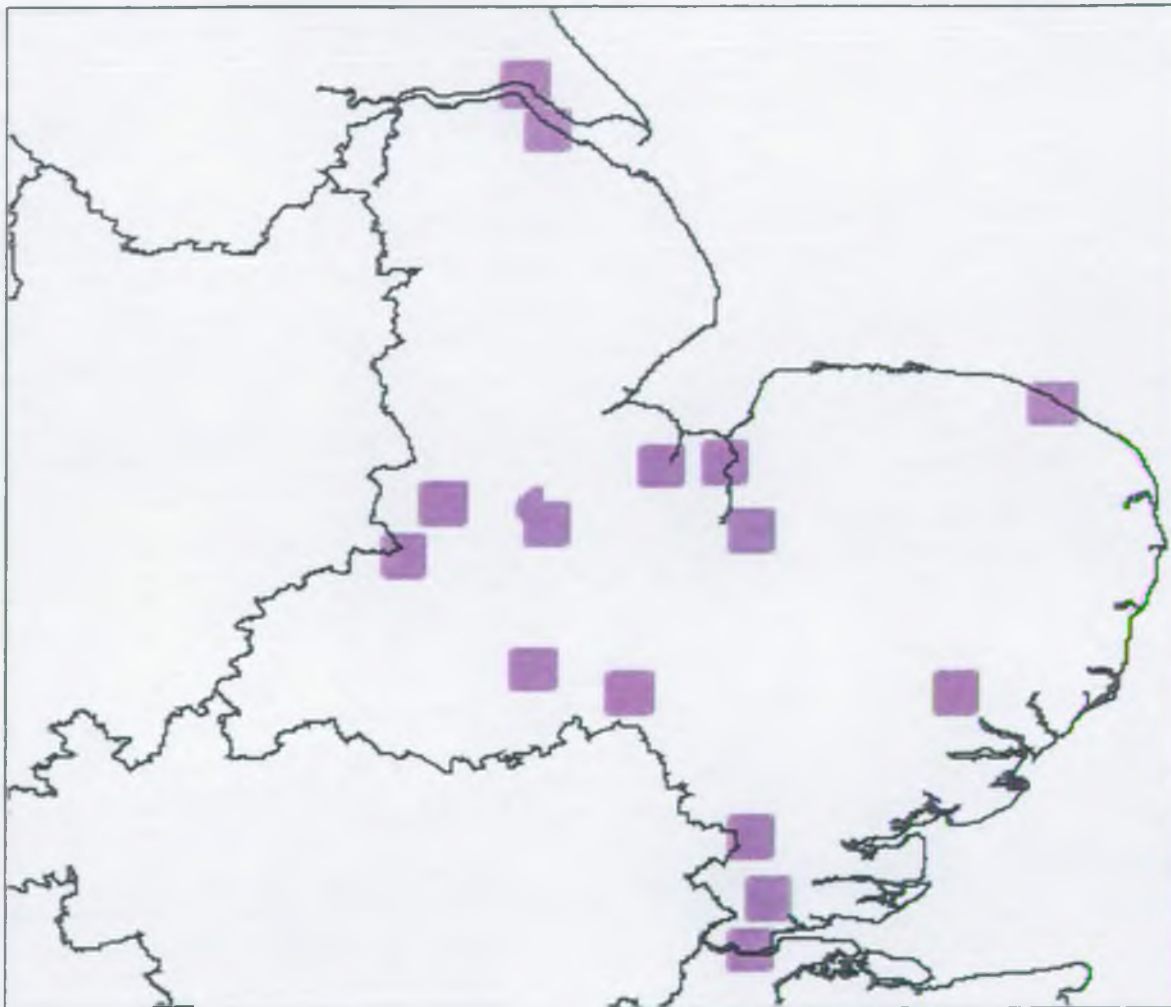
PART A PROCESSES

Extent of area over which air dispersion modelling performed for

Carbon Monoxide

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Number of Facilities Modelled: 19

Area Modelled:



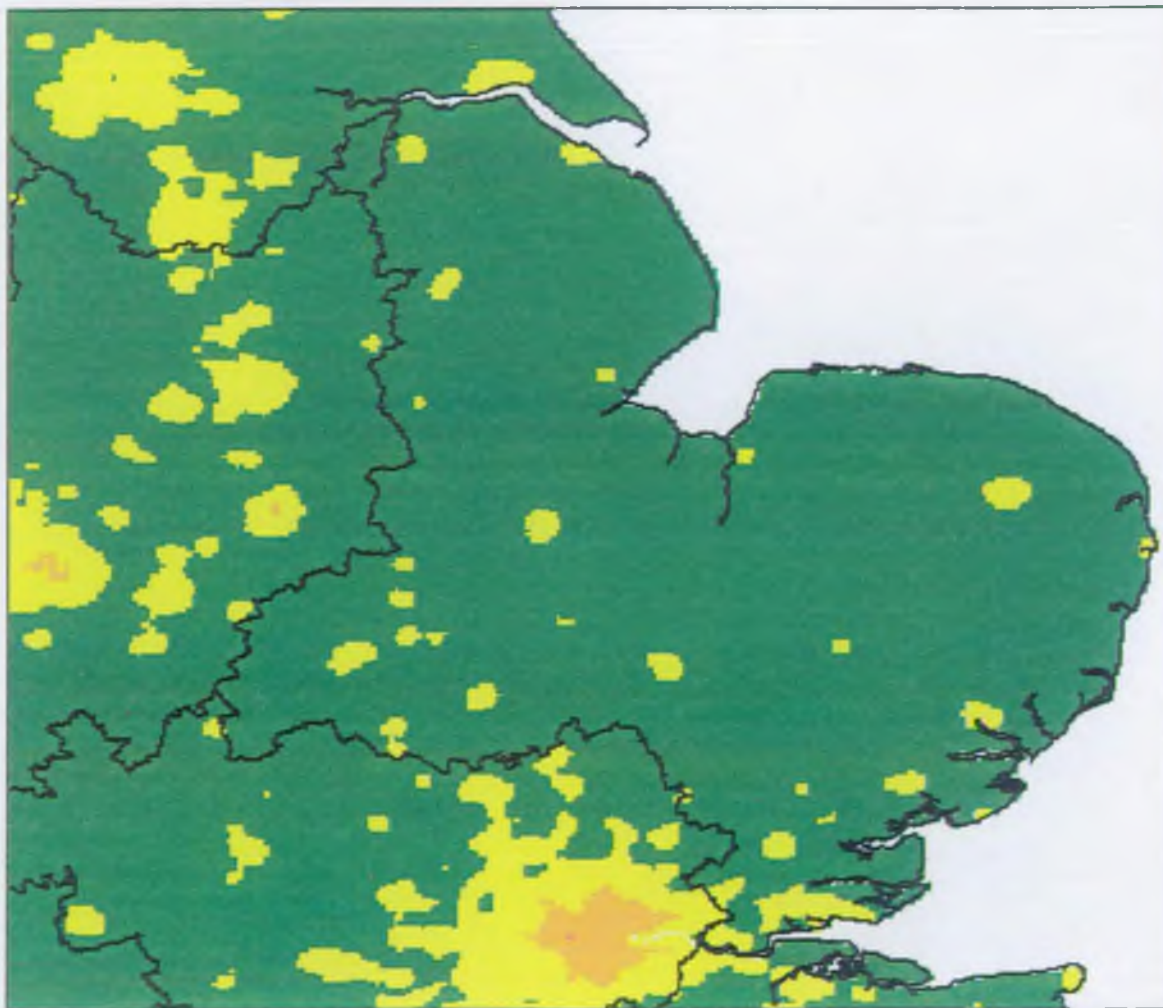
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

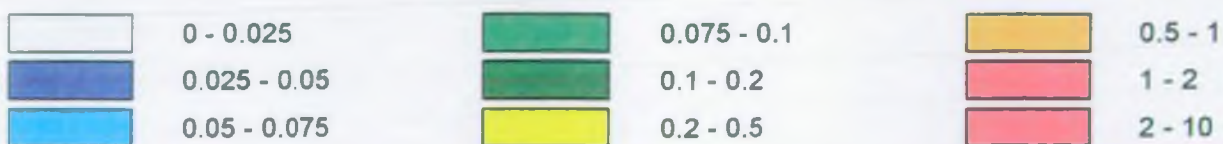
Carbon Monoxide, ppb

Data Source: NETCEN 1998

View: Anglian Region



Carbon Monoxide, ppb



PART A PROCESSES

Estimated annual mean concentration for

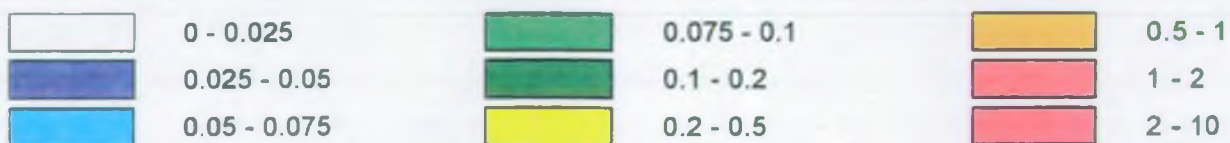
Carbon Monoxide, ppb

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Carbon Monoxide, ppb



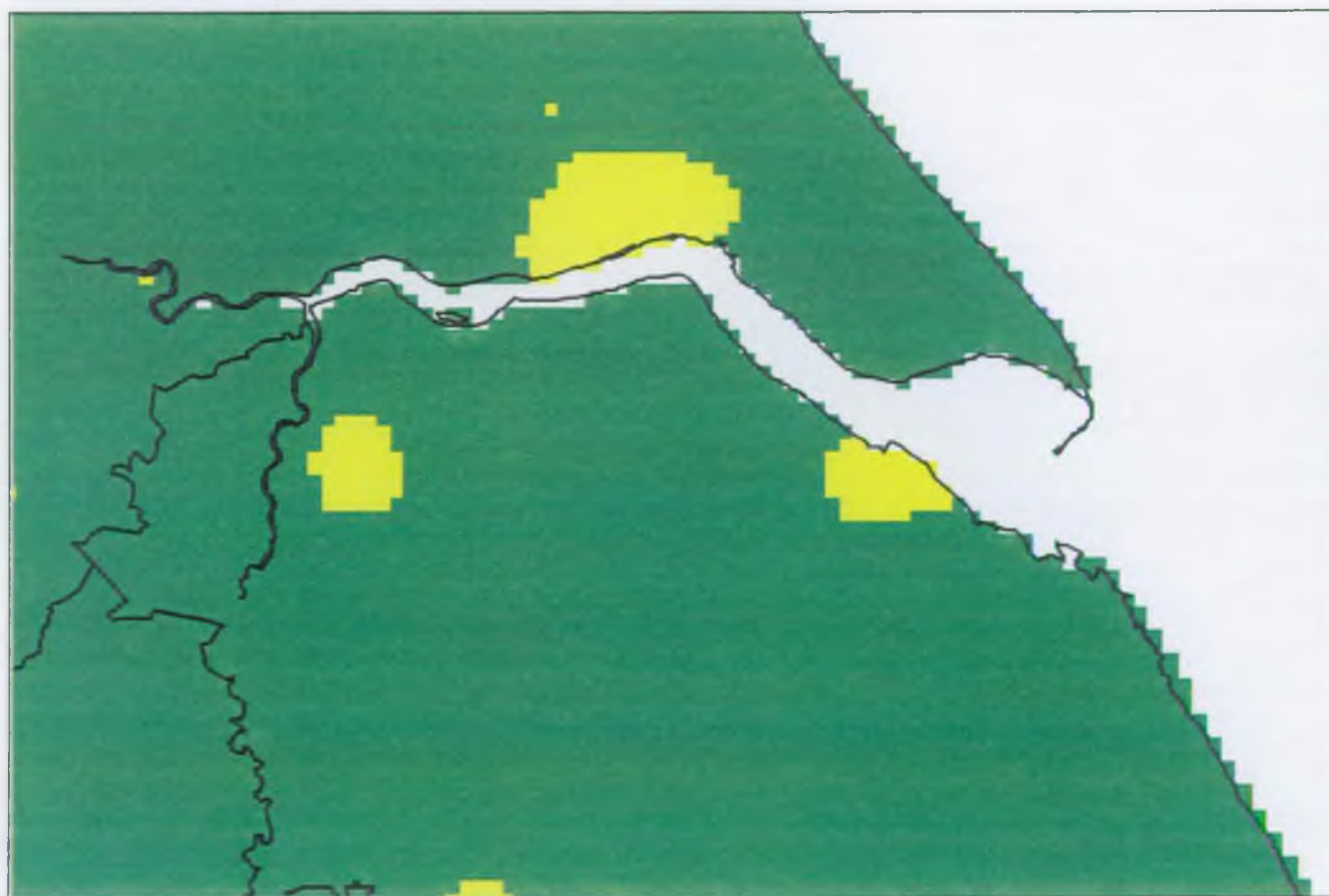
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

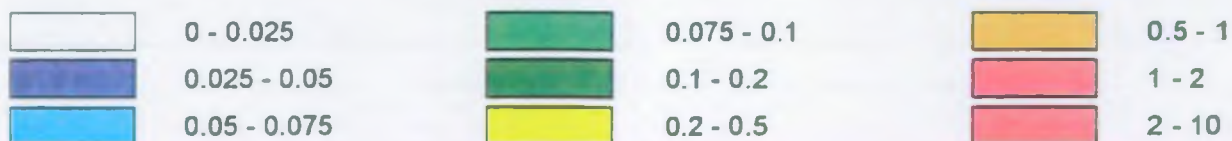
Carbon Monoxide, ppb

Data Source: NETCEN 1998

View: HumberSide ZIPS



Carbon Monoxide, ppb



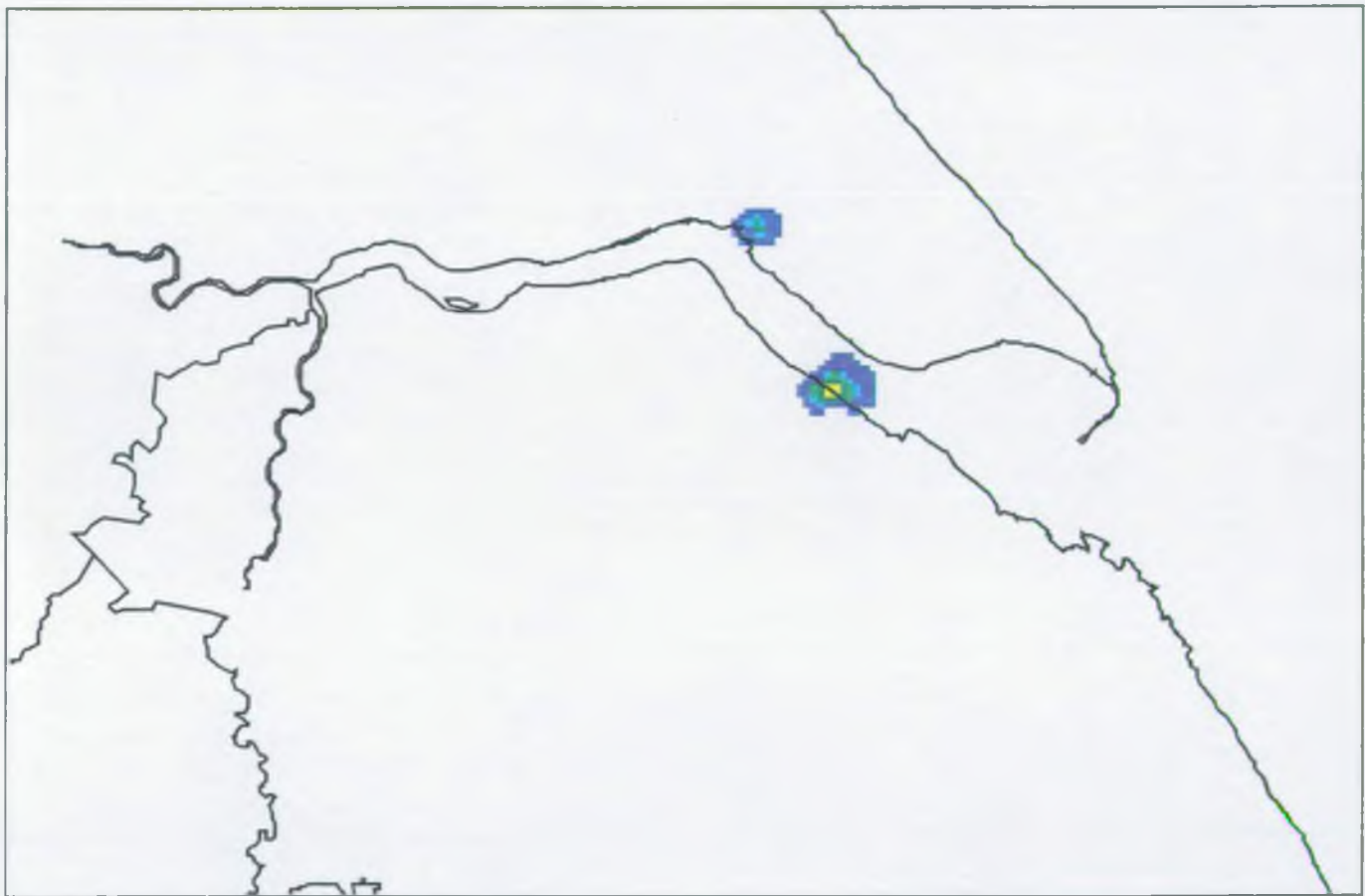
PART A PROCESSES

Estimated annual mean concentration for

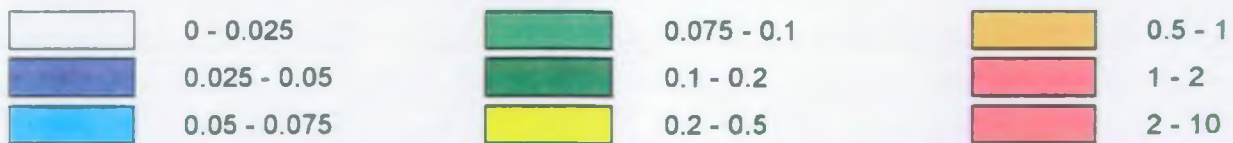
Carbon Monoxide, ppb

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Humberside ZIPS



Carbon Monoxide, ppb



LEAD

PART A PROCESSES

Extent of area over which air dispersion modelling performed for

Lead

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Number of Facilities Modelled: 2

Area Modelled:



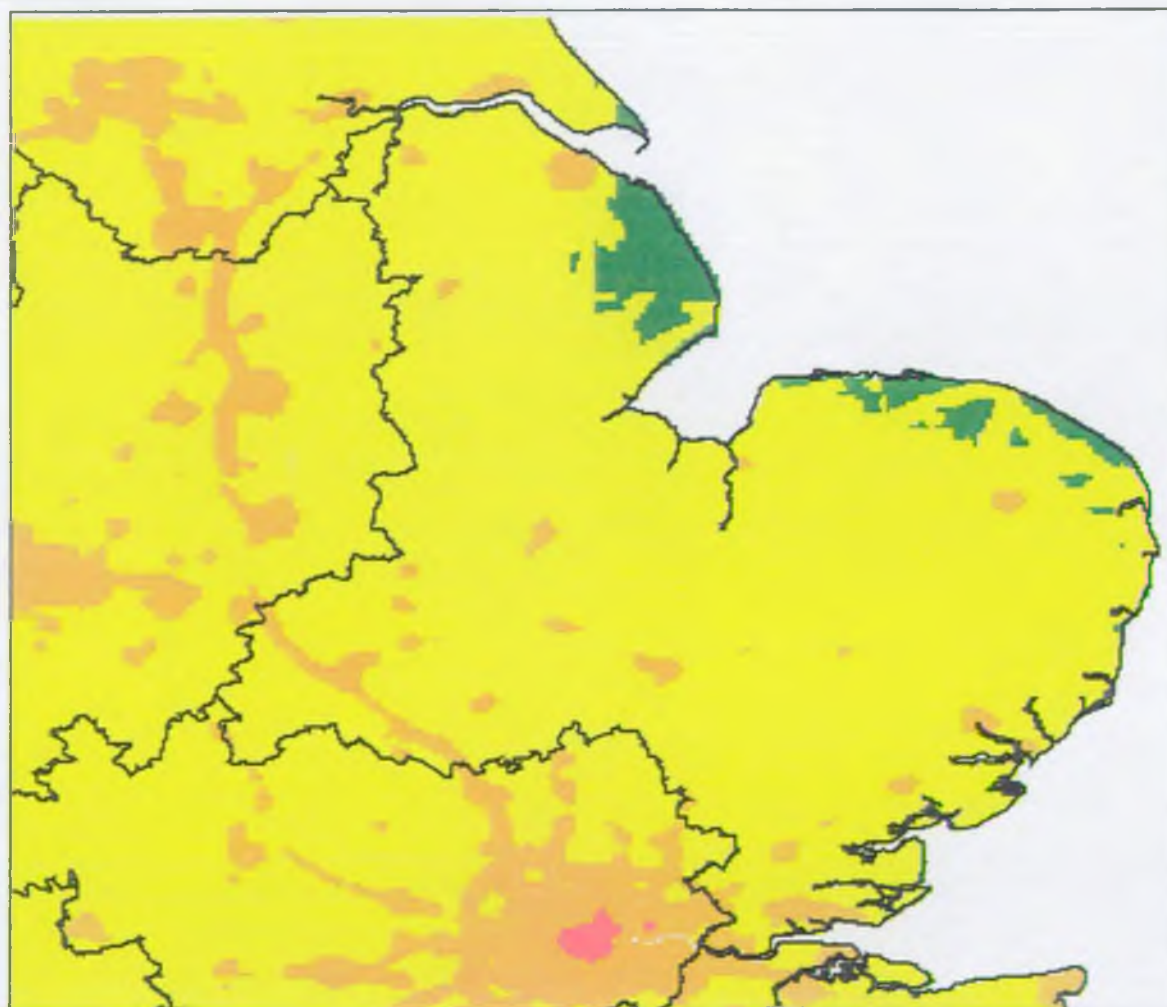
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

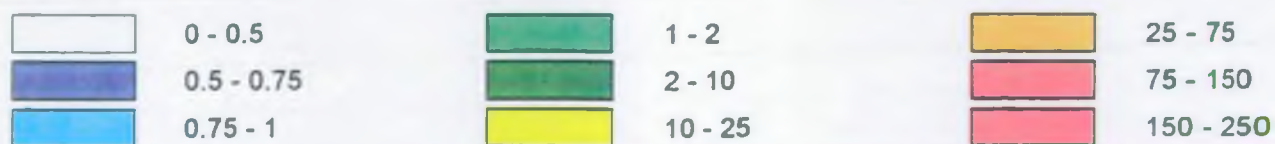
Lead, ng.m^{-3}

Data Source: NETCEN 1998

View: Anglian Region



Lead, ng.m^{-3}



PART A PROCESSES

Estimated annual mean background concentration for

Lead, ng.m^{-3}

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Lead, ng.m^{-3}



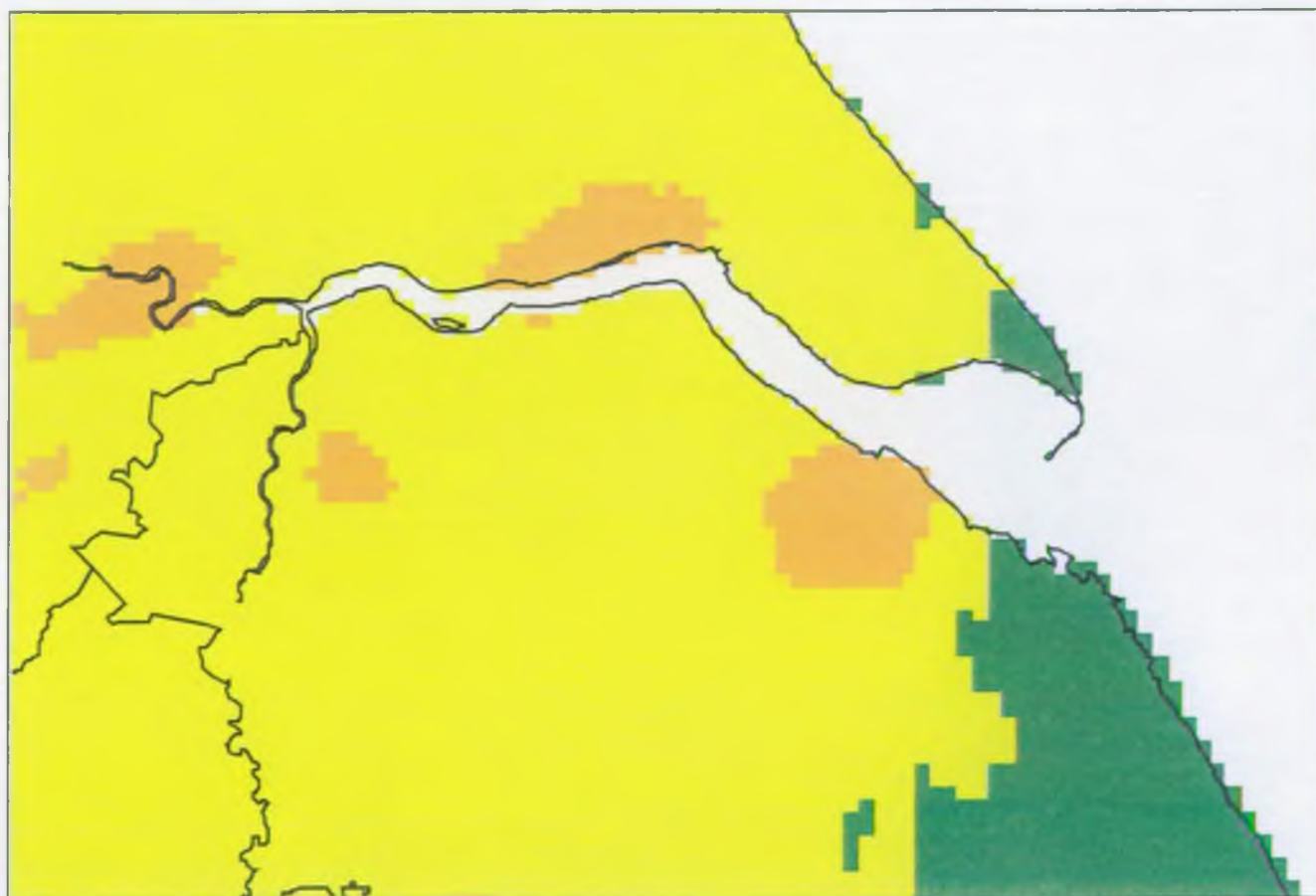
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

Lead, ng.m^{-3}

Data Source: NETCEN 1998

View: Humberside ZIPS



Lead, ng.m^{-3}



0 - 0.5

0.5 - 0.75

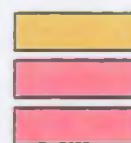
0.75 - 1



1 - 2

2 - 10

10 - 25



25 - 75

75 - 150

150 - 250

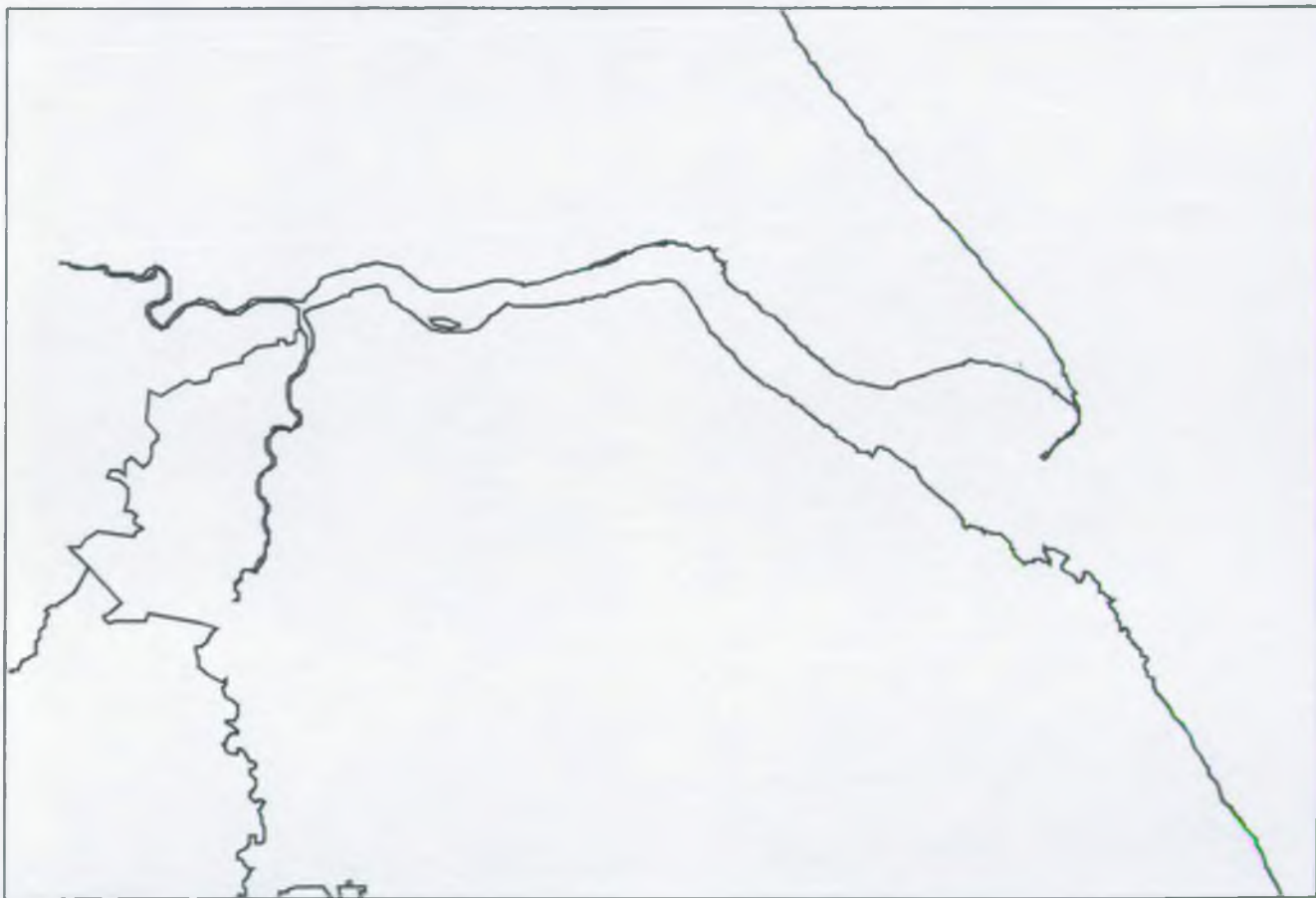
PART A PROCESSES

Estimated annual mean concentration for

Lead, ng.m^{-3}

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Humberside ZIPS



Lead, ng.m^{-3}



0 - 0.5

0.5 - 0.75

0.75 - 1

1 - 2

2 - 10

10 - 25

25 - 75

75 - 150

150 - 250

1,3-BUTADIENE

PART A PROCESSES

Extent of area over which air dispersion modelling performed for

1,3 Butadiene

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



Number of Facilities Modelled: 1

Area Modelled:



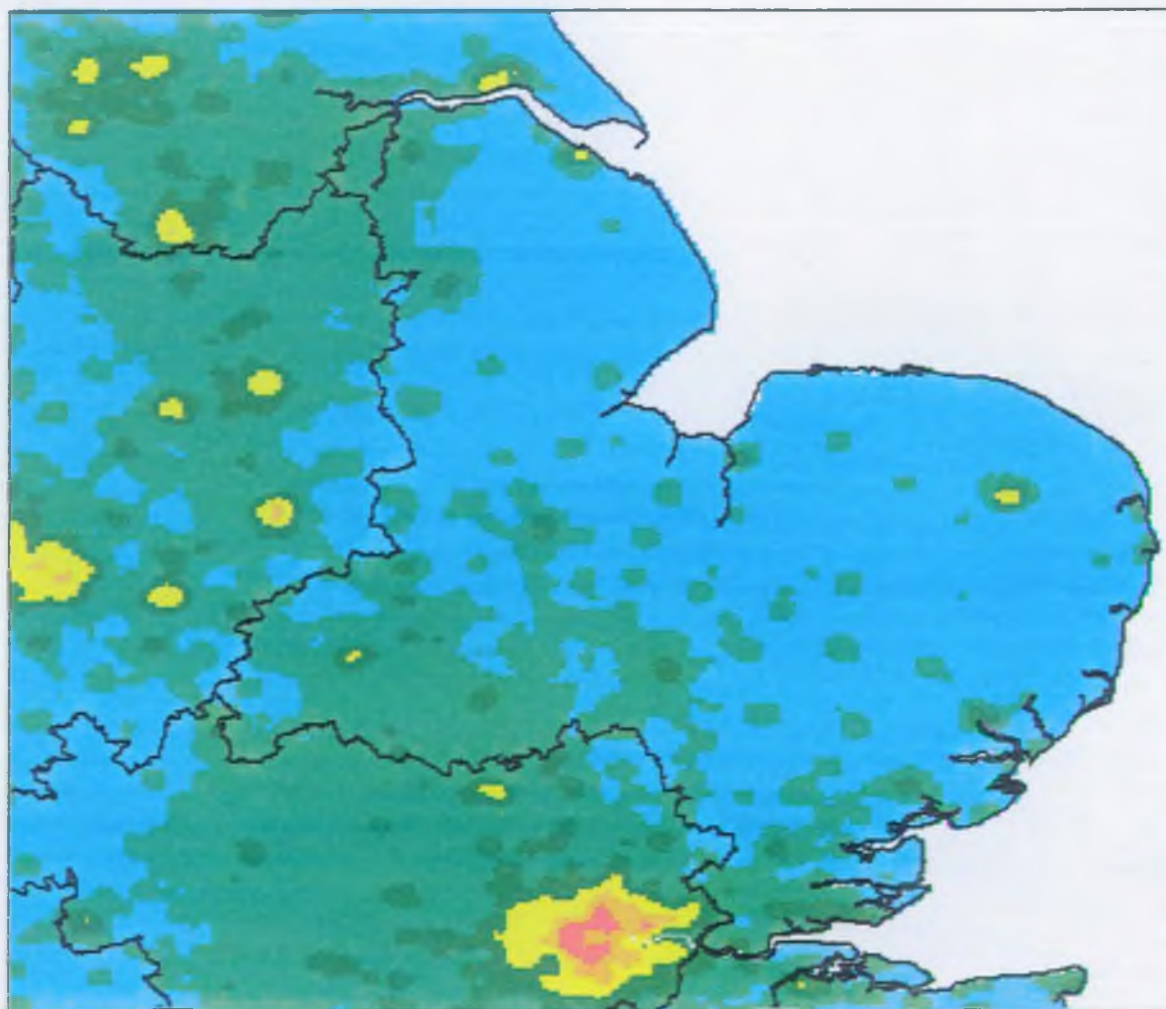
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

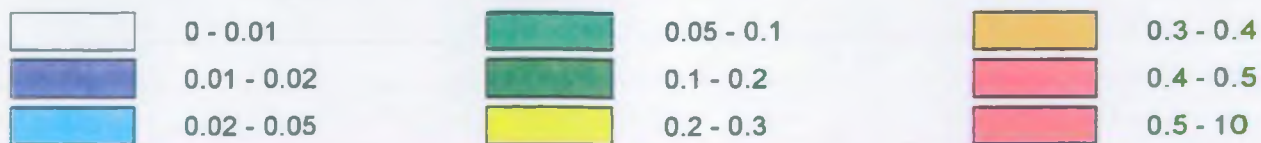
1,3 Butadiene, ppb

Data Source: NETCEN 1998

View: Anglian Region



1,3 Butadiene, ppb



PART A PROCESSES

Estimated annual mean concentration for

1,3 Butadiene, ppb

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Anglian Region



1,3 Butadiene, ppb



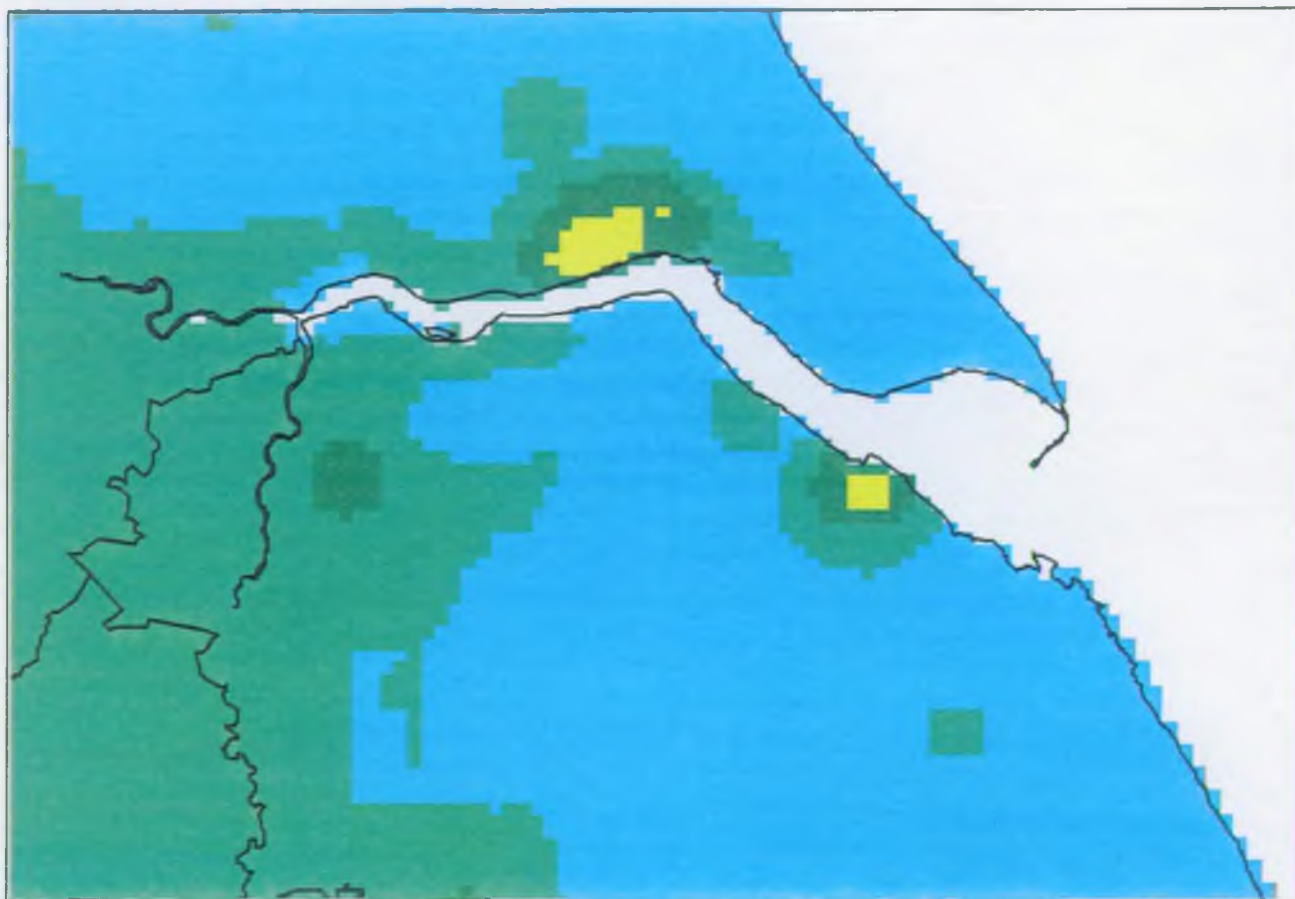
AMBIENT AIR QUALITY

Estimated annual mean background concentration for

1,3 Butadiene, ppb

Data Source: NETCEN 1998

View: Humberside ZIPS



1,3 Butadiene, ppb



0 - 0.01

0.01 - 0.02

0.02 - 0.05

0.05 - 0.1

0.1 - 0.2

0.2 - 0.3

0.3 - 0.4

0.4 - 0.5

0.5 - 10

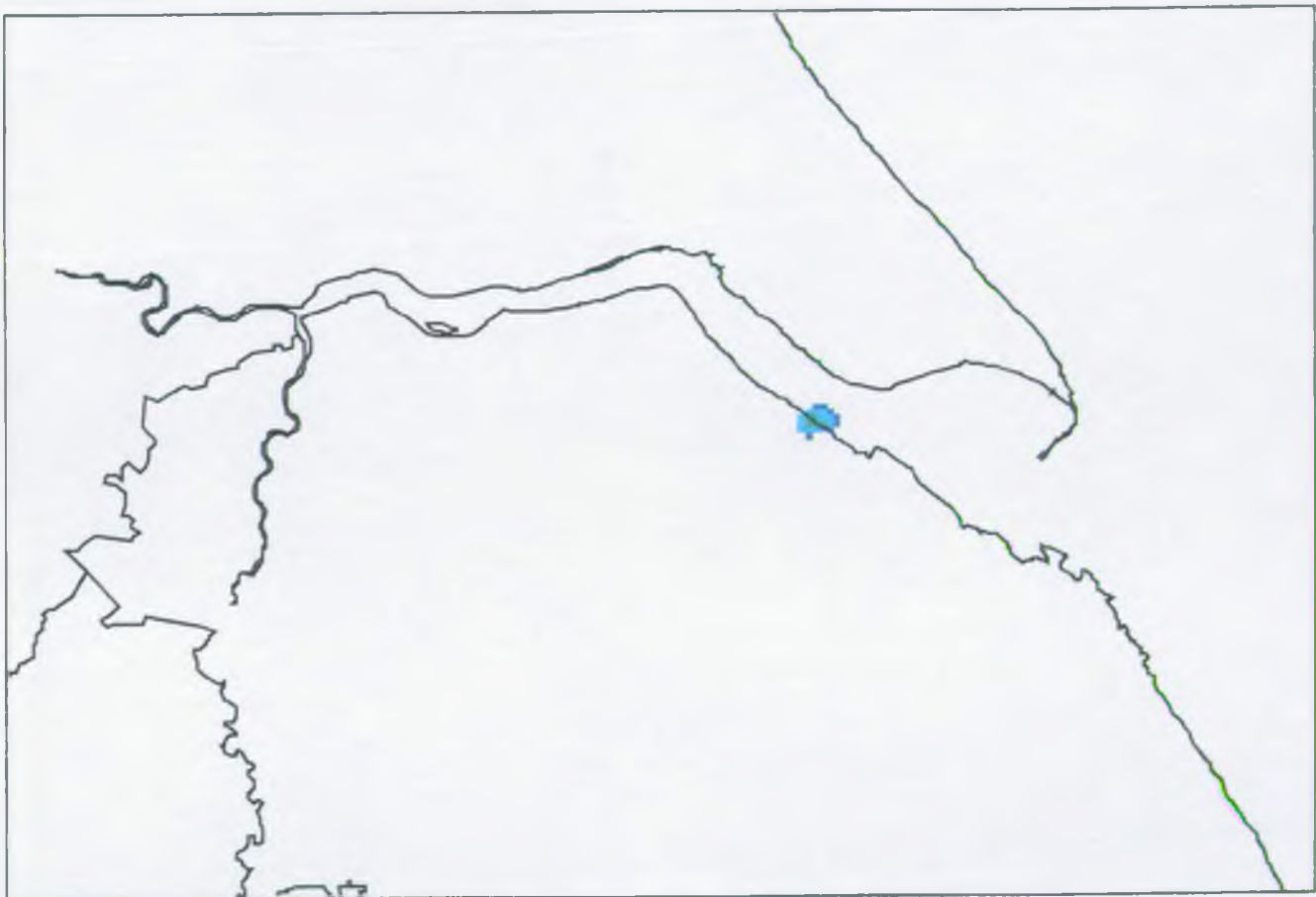
PART A PROCESSES

Estimated annual mean concentration for

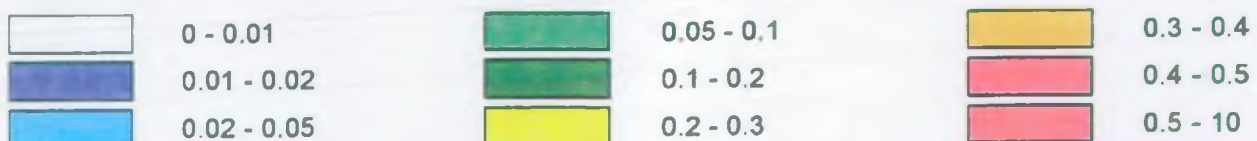
1,3 Butadiene, ppb

Data Source: Atmospheric Dispersion Modelling of 1997 CRI

View: Humberside ZIPS



1,3 Butadiene, ppb



APPENDIX A

Emission details for the air dispersion
modelling of the Part A Processes

Region	LA	Operator	Auth	Stack Parameters Stack ID	Description	OS Coordinates		Stack Height (m)	Stack Diameter (m)	Exit Vel. (m/s)	Vol. Flow (m3/s)	N A S	Gas Temp. (°C)	Benzene	1,3 Butadiene	NAQS Substances - Emissions From 1997 CRI (kg/annum)						Particulates	PM10s	Lead		
						x_coord	y_coord									CO	NOx	SOx	Ozone							
ANGLIAN REGION	CORBY	CORBY POWER LTD	AG6621	A1	No 1 Bypass Chimney	489900	290850	35.0	6.55	>15	317.00	N	853			Y - 174000	Y - 2100000	Y - 30000								
				A2	No 1 main Chimney	490000	290950	70.0	6.25	>15	317.00	N	383			Y	Y	Y								
				A3	No 2 Bypass Chimney	490000	290850	35.0	6.55	>15	317.00	N	853			Y	Y	Y								
				A4	No 2 main Chimney	489900	290950	70.0	6.25	>15	317.00	N	383			Y	Y	Y								
				A5	1.6 MWth aux. boiler																					
				A6	Emergency Generator																					
				A7	Fire water pumps																					
				A8	HCl Storage scrubber																					
ANGLIAN REGION	FENLAND	HANSON BRICK LIMITED	AH4888	A1	Kiln No 1	525570	297020	91.4	2.59	-	39.3	S	383					Y - 2296224			Y - 144302					
				A2	Kiln No 2	525520	297155	91.4	2.59	-	39.3	S	383					Y			Y					
ANGLIAN REGION	FENLAND	HANSON BRICK LIMITED	AH6554	A1	Kiln No 1	524350	297605	83.8	2.59	-	39.3	S	383					Y - 6950870			Y - 319966					
				A2	Kiln No 2	524340	297750	91.4	2.59	-	39.3	S	383								Y			Y		
				A3	Kiln No 3/4	524505	297690	121.9	3.65	-	78.7	S	383								Y			Y		
ANGLIAN REGION	NORTH BEDFORDSHIRE	HANSON BRICK LIMITED	AH8464	13	Kiln 13	501700	242800	56.8	1.99	-	35.57	S	383					Y - 4054593			Y - 125591					
				18B	Kiln 14	501700	242900	59.6	1.93	-	17.78	S	383								Y			Y		
				17	Kiln 14	501700	243100	57.9	1.85	-	17.78	S	383								Y			Y		
				19A	Kiln 19	501800	243000	68.2	2.10	-	18.42	S	383								Y			Y		
				19B	Kiln 19	501500	242900	68.3	2.06	-	18.83	S	383								Y			Y		
				21	Kiln 21	501400	243000	67.1	2.05	-	17.62	S	383								Y			Y		
				22	Kiln 22	501500	242500	70.0	3.27	-	52.32	S	383								Y			Y		
				CK1A	Kiln CK1	501700	242700	58.6	2.14	-	28.03	S	383								Y			Y		
				CK1B	Kiln CK1	501700	242800	68.8	2.35	-	28.03	S	383								Y			Y		
				CK1C	Kiln CK1	501800	242500	67.7	2.67	-	27.82	S	383								Y			Y		
				CK2A	Kiln CK2	501800	242800	68.0	2.86	-	51.47	S	383								Y			Y		
				CK2B	Kiln CK2	501800	242600	68.0	2.96	-	51.47	S	383								Y			Y		
				CK2C	Kiln CK2	501700	242500	68.3	2.90	-	51.47	S	383								Y			Y		
				CK3	Kiln CK3	501900	242800	67.9	3.33	-	52.32	S	383								Y			Y		
ANGLIAN REGION	PETERBOROUGH	HANSON BRICK LIMITED	AH7577	No 1	Kiln No 1	518965	293660	56.7	2.28	-	10.50	-	383					Y - 3233205			Y - 66597					
				No 2	Kiln No 2	516920	293635	54.2	2.28	-	10.50	-	383								Y			Y		
				No 3	Kiln No 3	516840	293600	57.9	2.28	-	21.00	-	383								Y			Y		
				No 4	Kiln No 4	518710	293530	57.9	2.28	-	21.00	-	383								Y			Y		
ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	TIOXIDE (EUROPE) LTD	AA3065	A1	Boiler 1 & 2 Muffle	525470	411390	78.2	1.94	-	18.00	A	483			2	173400	778800								
ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	TIOXIDE (EUROPE) LTD	AL8282	A1.1	E/212/006	525500	411400	28.8	0.61	12.4	5.30	N	-													
				A2.1	W/212/006/1			16.8	0.60	12.0	3.00	N	-													
				A2.2	W/212/006/2			16.8	0.60	12.0	3.00	N	-													
				A3.1	E/213/003/1			27.4	0.32	13.8	1.00	N	-													
				A3.2	E/213/003/2	525780	411375	29.9	0.50	7.6	1.40	N	293										270			
				A3.3	E/213/003/3	525785	411375	29.9	0.50	7.6	1.40	N	293										160			
				A3.4	E/213/003/4	525375	411350	29.9	0.50	7.6	1.40	N	293										110			
				A3.5	E/213/003/5	525780	411350	29.9	0.50	7.6	1.40	N	293										270			
				A3.6	E/213/003/6	525785	411350	29.9	0.50	7.6	1.40	N	293										160			
				A4.1	W/213/002/1			27.4	0.50	6.4	1.10	N	-													
				A4.2	W/213/002/2	525540	411340	27.4	0.50	6.4	1.10	N	293										190			
				A4.3	W/213/002/3	525565	411335	27.4	0.50	6.4	1.10	N	293										120			
				A4.4	W/213/002/4	525590	411330	27.4	0.50	6.4	1.10	N	293										150			
				A4.5	W/213/002/5	525535	411315	27.4	0.50	6.4	1.10	N	293										490			
				A4.6	W/213/002/6	525560	411310	27.4	0.50	6.4	1.10	N	293										100			
				A4.7	W/213/002/7	525585	411305	27.4	0.50	6.4	1.10	N	293										220			
				A4.8	W/213/002/8			27.4	0.50	6.4	1.10	N	-													
				A5.1	E/215/013/1	525748	411363	45.6	3.00	0.4	2.00	N	293													
				A5.2	E/215/013/2	525773	411363	45.6	3.00	0.4	2.00	N	293													
				A9.1	222/021/1	525675	411355	18.2	0.15	15.0	-	-	293											10		
				A9.2	222/021/2	525700	411355	18.2	0.15	15.0	-	-	293											10		
				A10.1	222/026/1	525688	411368	18.2	0.15	8.0	0.14	N	293											40		
				A31.1	E/266/009	525590	411230	107.7	3.51	7.1	55.00	N	943											20850		
				A41.1	E/269/007/1	525600	411170	18.3	0.25	6.2	0.30	N	293											30		
				A41.2	E/269/007/2	525625	411165	18.3	0.25	6.2	0.30	N	293											30		
				A41.3	E/269/007/3	525650	411160	18.3	0.25	6.2	0.30	N	293											30		
				A43.1	E1/284/001/2	525660	411210	22.5	0.76	12.1	3.80	N	333											1860		
				A43.2	E1/284/001/4	525605	411195	22.5	0.76	12.1	3.80	N	333											2100		
				A43.3	E1/284/004/1	525630	411190	22.5	0.76																	

Region	LA	Operator	Auth	Stack Parameters Stack ID	Description	OS Coordinates		Stack Height (m)	Stack Diameter (m)	Exit Vel. (m/s)	Vol. Flow. (m3/s)	N A S	Gas Temp. (°C)	NAQS Substances - Emissions From 1997 ORI (kg/annum)								
						x_coord	y_coord							Benzene	1,3 Butadiene	CO	NOx	SOx	Ozone	Particulates	PM10s	Lead
ANGLIAN REGION	MID BEDFORDSHIRE	MOUNTSTAR METAL CORPORATION LTD	AS5962	A1	Main Stack	519100	244200	21.6	0.92	-	4.99	N	283									97
				A2	Fume Extraction																	
ANGLIAN REGION	THURROCK	MOBIL OIL COMPANY LTD	AF8050	A(2nd Flue)	Catalyst Regeneration FCC	574350	182050	117	2.60	24.55	-	-	463				1407000	5276000		226000		
				B	Sulphur Recovery Unit Afterburner	574440	182040	91.5	1.22	18.85	-	-	811					8410000				
ANGLIAN REGION	NORTH BEDFORDSHIRE	HANSON BRICK LIMITED	AJ0012	A1	Kiln 5	502730	244980	53.0	2.30	-	27.20	S	383					Y - 1338644		Y - 34745		
				A2	Kiln 6	502840	245000	53.0	2.30	-	27.20	S	383					Y		Y		
ANGLIAN REGION	PETERBOROUGH	PETERBOROUGH POWER LTD	AF9708	A1	No 1 Bypass Chimney	521930	299100	45.0	6.10	<15	315.00	N	708	Y - 406793		Y - 1492568	Y - 29156					
				A2	No 1 main Chimney	521900	299100	80.0	4.82	<15	315.00	N	383	Y		Y	Y					
				A3	No 2 Bypass Chimney	521930	299175	45.0	6.10	<15	315.00	N	708	Y		Y	Y					
				A4	No 2 main Chimney	521900	299175	80.0	4.82	<15	315.00	N	383	Y		Y	Y					
				A5	1.6 MWh exch. boiler												Y		Y			
				A6	Emergency Generator																	
				A7	Fire water pumps																	
				A8	HCl Storage scrubber																	
ANGLIAN REGION	KING'S LYNN AND WEST NORFOLK	PORVAIR INTERNATIONAL LTD	AP3169	A2	Paste Carter Midac	561050	321800															
				A6	Paste area Category 3 vents																	
				A7	No 2 Triple roll mill																	
				A25	Sanders category 3 vents																	
				A46	10.3 MW Boiler - HFO	561050	321800	29.3	0.79	10.0	-	-	472				Y - 143000	Y - 371000		Y - 73600		
				A47	No 1.6 MW Boiler - Coal	561100	321800	29.0	0.74	12.0	-	-	472				Y	Y		Y		
				A48	No 2.6 MW Boiler - Coal	561050	321850	29.0	0.74	12.0	-	-	472				Y	Y		Y		
				A49	3 x 4.2 MW Boilers - HFO	561100	321850	28.0	0.79	10.0	-	-	472				Y	Y		Y		
				A50	Beverley Boilers - HFO	561250	321850	23.2	0.37	11.0	-	-	613				Y	Y		Y		
ANGLIAN REGION	KING'S LYNN AND WEST NORFOLK	ANGLIAN POWER GENERATORS LTD	AM1481	A1	Gas Turbine Stack	560890	317100	80.0	6.10	<15	502.00	N	387			Y - 54112	Y - 681311	Y - 29103				
ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	ALLIED COLLOIDS LTD	AO5026	A1	No 1 main drier	524055	412070	35.0	1.99	15.0	38.63	N	338				7489	13425				
				A2	No 2 main drier	524030	412090	35.0	1.99	15.0	38.63	N	328				7489	13425				
				A3	Main scrubber			28.8	0.25	15.0	0.47	N	-									
				A4	No 1 coating drier	524000	412070	27.0	0.88	15.0	7.22	N	298				2018	3615				
				A5	No 2 coating drier	523975	412090	27.0	0.88	15.0	7.22	N	298				2018	3615				
				A6	Acid/acrylamide storage scrubber			10.5	0.10	15.0	0.01	N	-									
				A7	Solvent storage tank vent			Tank + 2m	0.15	-	0.01	N	-									
				A8	No 1 mixed monomer storage			Building + 3m	0.15	7.5	0.03	N	-									
				A9	No 2 mixed monomer storage			Building + 3m	0.15	7.5	0.03	N	-									
				A10	Lubrication make-up vent			10.8	0.10	7.5	0.01	N	-									
				A11	Additive make-up vent			8.0	0.30	7.5	0.01	N	-									
				A12	Initiator scrubber vent			Building + 3m	0.15	12.0	0.24	N	-									
ANGLIAN REGION	SOUTH CAMBRIDGESHIRE	RUGBY GROUP PLC	AH8735	A1	Kiln 4	539588	250238	82.0	2.67	10.0	-	-	455			587137	18335142	1110023		Y - 68472		
				A2	Cement Mill 1	539813	250800	20.0	1.25	1.6	2.00	N	380.5									
				A3	Coal Mill	539838	250488	20.0	0.58	12.0	-	-	340								Y	
ANGLIAN REGION	NORTH LINCOLNSHIRE	RUGBY GROUP PLC	AH8743	STACK	Vents 31, 32 & 91	497206	420883	91.4	2.70	-	107.00	N	366				3320968	2726387		37568		
				31 - VIA STACK	No 2 cement kiln																	
				91 - VIA STACK	No 3 cement kiln																	
				32 - VIA STACK	No 2 clinker cooler																	
				50	No 3 cement mill	497325	420988	20.0	1.50	18.0	-	-	338								17234	
				95	No 4 cement mill	497338	420888	21.0	1.70	19.0	-	-	333								5866	
				11	Works chalk crusher	497263	420863	11.00	0.9	-	6.40	N	283								2004	
				44	No 1 double rotator	497175	420919	30.00	1.5	-	24.00	N	363				26905				38711	
				82	No																	

[illegible]

Region	LA	Operator	Auth	Stack Parameter Stack ID	Description	OS Coordinates		Stack Height (m)	Stack Diameter (m)	Exit Vel. (m/s)	Vol. Flow (m3/s)	T A S	Gas Temp. (°C)	NAQS Substances - Emissions From 1997 CR1 (kg/annum)									
						x_coord	y_coord							Benzene	1,3 Butadiene	CO	NOx	SOx	Ozone	Particulates	PM10s	Lead	
ANGLIAN REGION	KING'S LYNN AND WEST NORFOLK	BRITISH SUGAR PLC	AA2259	A1	Gas Boiler Units Nos 1-3	586000	297700	55	2.4	7.2	33.33	-	427			27036	102715						
				A2	Gas Boiler Unit No 4	586175	297700	30.5	1.00	3.4	2.67	-	505			Y	Y						
				A3	Gas Boiler Unit No 5	588000	297800	32.0	0.78	7.0	3.17	-	505			Y	Y						
ANGLIAN REGION	SOUTH CAMBRIDGESHIRE	VETSPEED LTD	AM9217	A1	Chimney No 1	544550	244600	14	0.55	12.1	-	-	508				Y - 37761				1647		
				A2	Chimney No 2	544550	244450	14	0.60	15.9	2.40	S	508				Y				512		
				A3	Chimney No 3	544550	244450	14	0.60	17.0	2.10	S	621				Y				4283		
				A4	Chimney No 4	544700	244500	14	0.69	16.0	3.40	S	486				Y				1931		
				A5	No 1 incinerator de-ashing point	-	-	-	-	-	-	-	-										
				A6	No 2 incinerator de-ashing point	-	-	-	-	-	-	-	-										
				A7	No 3 incinerator de-ashing point	-	-	-	-	-	-	-	-										
				A8	No 4 incinerator de-ashing point	-	-	-	-	-	-	-	-										
				A9	Evans MK 2V Cremulator exhaust	-	-	-	-	-	-	-	-										
ANGLIAN REGION	NORTH BEDFORDSHIRE	NATIONAL POWER PLC	AJ2747	A1	No 1 gas turbine & steam generator	518600	257700	65	7.20	-	480.00	S	363			Y - 166791	Y - 1894104						
				A2	No 2 gas turbine & steam generator	518600	257800	65	7.20	-	480.00	S	363			Y	Y						
ANGLIAN REGION	NORTH LINCOLNSHIRE	NATIONAL POWER PLC	AF0920	A1	No 1 gas turbine stack	515350	419510	65	5.60	17.0	-	-	373				Y - 2283000						
				A2	No 2 gas turbine stack	515330	419500	65	5.60	17.0	-	-	373				Y						
				A3	No 3 gas turbine stack	515310	419490	65	5.60	17.0	-	-	373				Y						
				A4	No 1 gas turbine fuel gas vent pipe	-	-	-	-	-	-	-	-										
				A5	No 2 gas turbine fuel gas vent pipe	-	-	-	-	-	-	-	-										
				A6	No 3 gas turbine fuel gas vent pipe	-	-	-	-	-	-	-	-										
ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	HUMBER POWER LTD	AH1185	T1	No 1 gas turbine via No 1 main chimney	522900	413250	75	5.60	-	553.00	-	365				Y - 65874						
				T2	Nos 2&3 gas turbines via No 2 main chimney	522950	413200	75	7.00	-	1106.00	-	365				Y						
				T3	Nos 4&5 gas turbines via No 3 main chimney	522980	413100	75	7.00	-	1106.00	-	365				Y						
				AB1	Auxiliary boiler via No 4 aux chimney	-	-	30	1.25	-	18.00	-	-										
				NG1	No 1 gas turbine fuel gas vent pipe	-	-	30	-	-	-	-	-										
				NG2	No 2 gas turbine fuel gas vent pipe	-	-	30	-	-	-	-	-										
				NG3	No 3 gas turbine fuel gas vent pipe	-	-	30	-	-	-	-	-										
				NG4	No 4 gas turbine fuel gas vent pipe	-	-	30	-	-	-	-	-										
				NG5	No 5 gas turbine fuel gas vent pipe	-	-	30	-	-	-	-	-										
				C1	Generator 1	-	-	25	-	-	-	-	-										
				D1	Emergency Diesel generator	-	-	3.5	-	-	-	-	-										
				D2	Emergency Diesel generator	-	-	3.5	-	-	-	-	-										
				F1	Emergency fire pumps	-	-	-	-	-	-	-	-										
				F2	Emergency fire pumps	-	-	-	-	-	-	-	-										
ANGLIAN REGION	NORTH LINCOLNSHIRE	POWERGEN PLC	AB5473	A1	No 11 gas turbine main stack	515340	418950	78	6.80	20.0	-	-	380				Y - 1605000						
				A2	No 11 gas turbine bypass stack	515330	418970	33	6.80	40.0	-	-	823										
				A3	No 12 gas turbine main stack	515360	418980	78	6.80	20.0	-	-	380				Y						
				A4	No 12 gas turbine bypass stack	515350	418980	33	6.80	40.0	-	-	823										
				A5	No 21 gas turbine main stack	515380	418970	78	6.80	20.0	-	-	380				Y						
				A6	No 21 gas turbine bypass stack	515370	418990	33	6.80	40.0	-	-	823										
				A7	No 22 gas turbine main stack	515400	418980	78	6.80	20.0	-	-	380				Y						
				A8	No 22 gas turbine bypass stack	515390	419000	33	6.80	40.0	-	-	823										
				A9	Auxiliary boiler	515400	419000	30	-	-	-	-	-										
				A10	Station fuel gas vent pipe	-	-	-	-	-	-	-	-										
ANGLIAN REGION	SOUTH NORTHAMPTONSHIRE	ELEMENTIS PIGMENTS	AU5327	A1	Big wet scrubber	476520	238750	22.5	1.00	12.2	-	-	318								850		
				A2	No 1 yellow drier	478410	239880	17.5	0.58	18.2	-	-	326				Y	1002			447		
				A3	No 2 yellow drier	478410	238720	15.2	1.38	4.9	-	-	318				Y	3823			1978		
				A4	New factory boilers 1-4	478330	239610	36.5	0.78	11.8	-	-	473				Y	4114					
				A5	New factory boiler 5	478330	239610	36.5	0.78	17.6	-	-	473										
				A6	Big wet boilers A & B	478520	238750	34	0.45	17.0	-	-	473										
ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	NOVARTIS (CIBA-GEIGY PLC)	AK8511	S801/B62/A3	Multipurpose scrubber	525000	411650	17	-	-	-	-	-										
				S802/B62/A3	Multipurpose scrubber	-	-	17	-	-	0.14	-	-										
				S803/B62/A3	Multipurpose scrubber	-	-	17	-	-	-	-	-										
				S804/B62/A3	Multipurpose scrubber	-	-	17	-	-	-	-	-										
				S804/B57/A4	Multipurpose scrubber	-	-	20	-	-	0.72	-	-										
				S805/B62/A3	Multipurpose scrubber	-	-	20	-	-	-	-	-										
				S943/B80/A2	Multipurpose scrubber	-	-	-	-	-	-	-	-										
				S807/B120/A6	General scrubber	-	-	30	-	-	-	-	-										
				S815/B120/A6	Dedicated scrubber	-	-	12	-	-	-	-	-										
				S820/B110/A5	Building scrubber	-	-	24	-	-	-	-	-										
				S821/B110/A5	Building scrubber	-	-	24	-	-	-	-	-										
				S821/B120/A6	Emergency relief scrubber	-	-	28	-	-	-	-	-										
				S822/B110/A5	Emergency relief scrubber	-	-	25	-	-	-	-	-										
				S952/B80/A2	Building scrubber	-	-	15	-	-	0.33	-	-										
				S953/B80/A2	Building scrubber	-	-	15	-	-	0.33	-	-										
				S954/B80/A2	Building scrubber	-	-	13	-	-	0.07	-	-										
				S962/B104/A2	Phosgene building scrubber	-	-	40	-	-	0.03	-	-										
				SUXGP/1	General purpose scrubber	-	-	20	-	-	-	-	-										
				S963/B87/A2	Dedicated scrubber	-	-	13	-	-	-	-	-										
				S964/B87/A2	Dedicated scrubber	-	-	13	-	-	-	-	-										
				S965/B80/A2	Dedicated scrubber	-	-	19	-	-	-	-	-										
S966/B80/A2	Emergency scrubber	-	-	15	-	-	0.56	-	-														
S967/B87/B88/A2	Emergency scrubber	-	-	12.5	-	-	-	-	-														
S968/B88/A2	Dedicated scrubber	-	-	13	-	-	-	-	-														
S969/B80/A2	Building scrubber	-	-	19	-	-	0.17																

Region	LA	Operator	Auth	Stack Parameters Stack ID	Description	OS Coordinates		Stack Height (m)	Stack Diameter (m)	Exit Vel. (m/s)	Vol. Flow (m3/s)	N A S	Gas Temp. (K)	NAQS Substances - Emissions From 1997 CRI (kg/annum)												
						x_coord	y_coord							Benzene	1,3 Butadiene	CO	NOx	SOx	Ozone	Particulates	PM10s	Lead				
ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	SYNTHOMER LTD	AK4117	A1	Acrylonitrile storage tank (27m3)	523080	413600	4	-	-	-	-	-	-	-	-	-	-	-	-	-					
				A2	Acrylonitrile storage tank (31m3)	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
				A3	Methacrylic storage tank (23m3)	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
				A4	Acrylic acid storage tank (26m3)	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
				A5	Chain transfer agent storage tank (18m3)	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
				A6	Methacrylic storage tank (28m3)	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
				A7	Holding tank H21 vent	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
				A8	Holding tank H22 vent	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
				A9	Stripper vac. system S21	522925	413700	31	0.06	4	0.01	-	303	-	Y - 9967	-	-	-	-	-	-	-	-			
				A10	Stripper vac. systems S23, 25, 26 & 27	522922	413681	31	0.06	4	0.01	-	303	-	Y	-	-	-	-	-	-	-	-			
				A11	Stripper vac. system S24	522938	413658	31	0.06	4	0.01	-	303	-	Y	-	-	-	-	-	-	-	-			
				A12	Stripper vac. system S21 vent	522900	413669	31	0.06	4	0.01	-	303	-	Y	-	-	-	-	-	-	-	-			
				A16	No 1 waste heat boiler	522975	413783	39.7	1.0	-	3.35	-	373	-	-	-	-	Y - 36259	-	-	-	-	-			
				A17	No 2 waste heat boiler	522975	413763	39.7	1.0	-	3.35	-	373	-	-	-	-	Y	-	-	-	-	-			
				A18	No 3 waste heat boiler	522975	413763	39.7	1.0	-	3.35	-	373	-	-	-	-	Y	-	-	-	-	-			
				ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	BG COGEN LTD	AN7884	A1	No 1 gas turbine bypass stack	521775	414775	19.5	1.5	-	21.91	-	393	-	-	-	-	-	-	-	-	
								A2	No 1 heat recovery steam generator	521775	414775	35	1.5	-	22.29	-	393	-	-	-	-	Y - 267827	-	-	-	-
								A3	No 2 gas turbine bypass stack	-	-	19.5	1.5	-	21.91	-	393	-	-	-	-	-	-	-	-	-
A4	No 2 heat recovery steam generator	521825	414775					35	1.5	-	22.29	-	393	-	-	-	-	Y	-	-	-	-				
A5	No 3 gas turbine bypass stack	-	-					19.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
A6	No 3 heat recovery steam generator	-	-					35	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
A7	No 9 boiler	-	-					29	1.52	-	9.7	-	473	-	-	-	-	-	-	-	-	-				
A8	No 11 boiler	-	-					29.9	1.02	-	7.5	-	388	-	-	-	-	-	-	-	-	-				
ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	HYDRO AGRI (UK) LTD	AL9078	A1	Ammonia unloading scrubber vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
				A2	Ammonia refrigeration condenser vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A3	Nitric acid plant (NAP) stack	520310	415440	82	2	-	93.3	A	423	-	-	-	Y - 416287	-	-	-	-	-				
				A4	NAP ammonia stripper vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A5	NAP ammonia vaporiser vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A6	Boiler 1	520140	415420	39	1.22	-	14.2	A	518	-	-	-	-	Y	-	-	-	-				
				A7	Boiler 2	520140	415420	39	1.22	-	14.2	A	518	-	-	-	-	Y	-	-	-	-				
				A8	Boiler 3	520140	415420	39	1.22	-	14.2	A	518	-	-	-	-	Y	-	-	-	-				
				A9	Superheater	520130	415460	30	1.085	-	18.7	A	1132	-	-	-	-	Y	-	-	-	-				
				A10	LAN condenser (Cd-03) vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A11	78% AN solution evaporator vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A12	GAN scrubber stack	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A13	97% AN solution separator vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
ANGLIAN REGION	BASILDON	NEW HOLLAND FORD LTD	AQ4569	A1	Number 1 Boiler	570500	190000	33.5	1.37	4.55	4.112	N	445	-	-	10199	133873	242890	-	22299	-	-				
				A2	Number 2 Boiler	570450	190000	33.5	1.37	5.57	4.983	N	450	-	-	Y	Y	Y	-	Y	-	-				
				A3	Number 3 Boiler	570400	190000	33.5	1.35	7.75	6.55	N	463	-	-	Y	Y	Y	-	Y	-	-				
				A4	Number 4 Boiler	570350	190000	33.5	1.37	7.09	6.215	N	459	-	-	Y	Y	Y	-	Y	-	-				
ANGLIAN REGION	ST EDMUNDSBURY	INTERNATIONAL FLAVOURS AND FRAGRANCES (GB) LTD	AN7031	A1	Tubey Lincoln Boiler	566800	244700	37	0.8	-	7.5	N	573	-	-	-	Y - 11563	-	-	-	-					
ANGLIAN REGION	TENDRING	CARLESS REFINING & MARKETING LTD	AB2963	A1	No 1 UNIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
				A2	No 2 UNIT	-	-	-	-	778.0	172.00	-	-	-	-	-	-	-	-	-	-	-				
				A3	No 3 UNIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A4	No 4 UNIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A5	No 5 UNIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A6	No 6 UNIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A7	No 7 UNIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A8	Soda Lime Beds Condenser Vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A9	Perco Sweetening Beds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A10	Fugitive Losses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A11	No 1 Boiler	623898	232228	24.0	0.45	14.0	2.23	-	547	-	-	-	86000	93006	-	-	-	-				
				A12	No 2 Boiler	623901	232239	24.0	0.45	14.0	2.23	-	523	-	-	-	Y	Y	-	-	-	-				
				A13	No 3 Boiler	623884	232241	6.8	0.28	7.0	0.44	-	531	-	-	-	Y	Y	-	-	-	-				
				A14	Beverley A Heater	623890	232223	24.0	0.53	15.9	3.51	-	737	-	-	-	Y	Y	-	-	-	-				
				A15	Beverley B Heater	623890	232223	24.0	0.53	15.9	3.51	-	736	-	-	-	Y	Y	-	-	-	-				
				A16	Beverley C Heater	623871	232238	24.0	0.53	15.9	3.51	-	547	-	-	-	Y	Y	-	-	-	-				
ANGLIAN REGION	THURROCK	NATIONAL POWER PLC	AA3204	A1	Boiler 7/8	586050	175550	171	8.3	-	837	S	417	-	-	118500	9780000	25187000	-	183000	-	715				
				A2	Boiler 9/10	666050	175700	171	8.3	-	845	S	420	-	-	Y	Y	Y	-	Y	-	Y				
				T1	Gas Turbine Chimney - Emergency Use	-	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				T2	Gas Turbine Chimney - Emergency Use	-	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				T3	Gas Turbine Chimney - Emergency Use	-	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				T4	Gas Turbine Chimney - Emergency Use	-	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
				A1	FCC - Fluidised Catalytic Cracker	574327	182458	117	2.90	-	72.4	N	475	-	-	-	160430	39610	-	-	-	-	-			
				A3	CCR - Continuous Catalytic Regenerator	574599	182579	80.2	4.05	-	41.7	N	433	-	-	-	114060	11760	-	-	-	-	-			
ANGLIAN REGION	THURROCK	MOBIL OIL COMPANY LTD	AA3387	A4	Fuels	574630	182415	91.4	4.11	-	97.5	N	527	-	-	-	221380	214120	-	-	-	-				
				A5	CHD - Catalytic Hydro-desulphurisation	574510	182369	36.6	1.14	-	3.7	N	572	-	-	-	12490	12110	-	-	-	-	-			
				A6	2PTR - No 2 Pre-treater	574518	182512	23.2	0.91	-	1.2	N	593	-	-	-	5190	500	-	-	-	-	-			
				</																						

Region	LA	Operator	Auth	Stack Parameters Stack ID	Description	OS Coordinates		Stack Height (m)	Stack Diameter (m)	Exit Vel. (m/s)	Vol. Flow (m3/s)	N A S	Gas Temp. (°C)	NAQS Substances - Emissions From 1997 CRI (kg/annum)								
						x_coord	y_coord							Benzene	1,3 Butadiene	CO	NOx	SOx	Ozone	Particulates	PM10s	Lead
ANGLIAN REGION	NORTH NORFOLK	AMOCO (UK) EXPLORATION CO	AF8220	A1	K-401	633000	334500	8.0	1.07	30.0	-	-	733	-	-	Y - 28126	Y - 93133	-	-	-	-	-
				A2	K-501	633000	334600	8.0	1.07	28.5	-	-	742	-	-	Y	Y	-	-	-	-	-
				A3	K-101	633000	334700	8.7	0.26	14.5	-	-	648	-	-	Y	Y	-	-	-	-	-
				A4	K-201	633000	334800	8.7	0.26	14.5	-	-	648	-	-	Y	Y	-	-	-	-	-
				A5	K-301	633000	334900	8.7	0.26	14.5	-	-	648	-	-	Y	Y	-	-	-	-	-
				A6	K801A	633000	335000	8.7	0.20	5.2	-	-	554	-	-	Y	Y	-	-	-	-	-
				A7	K801B	632900	334500	8.7	0.20	7.1	-	-	554	-	-	Y	Y	-	-	-	-	-
				A8	A-1001	632900	334600	10.1	0.85	5.8	-	-	573	-	-	Y	Y	-	-	-	-	-
				A9	A-1002	632900	334700	9.3	0.85	5.8	-	-	573	-	-	Y	Y	-	-	-	-	-
				A10	A-2201	633100	334700	11.5	0.61	4.8	-	-	598	-	-	Y	Y	-	-	-	-	-
				A11	A-2211	633100	334800	11.5	0.61	4.1	-	-	526	-	-	Y	Y	-	-	-	-	-
				A12	F-801	633100	334900	12.7	0.81	2.3	-	-	461	-	-	Y	Y	-	-	-	-	-
				A13	F-6001	633100	335000	17.0	0.49	15.0	-	-	593	-	-	Y	Y	-	-	-	-	-
ANGLIAN REGION	NORTH EAST LINCOLNSHIRE	CONOCO - HUMBER REFINERY	AF6173	A1	ST101	515950	416550	92.0	2.44	28.9	126	A	604	-	-	338116	239780	-	-	-	-	
				A2	ST201	516040	416600	92.0	4.23	2.0	28	A	520	-	-	28462	1868	-	-	-	-	
				A3	ST301	515980	416670	122.0	5.94	7.1	187	A	587	-	-	594571	32524	-	-	-	-	
				A4	SRU	515880	416750	107.0	1.14	14.8	15	A	700	-	-	8467	2026908	-	-	-	-	
				A5	H6301/2	515940	416890	64.0	1.83	11.8	30	A	475	-	-	90401	7508	-	-	-	-	
				A6	H6303/4/5	515940	416900	64.0	1.52	14.0	25	A	475	-	-	83846	6255	-	-	-	-	
				A7	ST3401	515710	416830	115.0	2.80	15.8	97	A	545	-	-	96410	1280107	-	-	-	-	
				A8	H4102	515880	416530	48.0	0.76	23.7	11	A	505	-	-	11198	2502	-	-	-	-	
				A9	ST501	516230	416860	61.0	3.70	18.1	173	A	500	-	-	973382	1858032	-	-	-	-	
				A10	ST5601	516330	416870	43.0	3.05	13.7	114	A	500	-	-	581840	1568236	-	-	-	-	
				A11	H5281	516080	416700	34.0	1.19	13.7	15	A	520	-	-	47795	3338	-	-	-	-	
				A12	CHP	515719	416717	50.0	3.40	15.1	88	A	428	-	-	147482	4170	-	-	-	-	
				A13	NO. 1 FLARE	516810	416820	91.0	-	-	-	-	1000	-	-	-	-	-	-	-	-	-
				A14	NO. 2 FLARE	516170	416810	137.0	-	-	-	-	1000	-	-	-	-	-	-	-	-	-
NORTH EAST	EAST RIDING OF YORKSHIRE	BP CHEMICALS LTD	AK4591	A3	HCR Stack / OF2 Stack / DF3 Stack	518470	427950	36	3.7	1.73	-	-	150	-	-	18237000	-	-	-	-	-	
				A9	SB2 Boilers 2,3	518520	427950	62.5	1.6	6	-	-	150	-	-	1025	2009350	21930	-	-	-	
				A10	SB2 Boiler 4	518570	427950	40	1.16	12.1	-	-	180	-	-	1025	Y	Y	-	-	-	
				A11	T1, T2 & SB5	518470	428050	40	3.5	12.76	-	-	150	-	-	-	Y	Y	-	-	-	
				A12	T3, T4 & SB6	518520	428050	40	3.5	12.76	-	-	150	-	-	-	Y	Y	-	-	-	
NORTH EAST	KINGSTON UPON HULL	HOLLIDAY PIGMENTS LTD	AL7731	A1	Kin Chimney	510010	430970	137.7	1.4	24	23.8	N	433	-	-	-	-	4506000	-	-	-	
NORTH EAST	KINGSTON UPON HULL	CRODA UNIVERSAL LTD	AK4257	A1	Solvent Extraction Vent	TA093	TA317	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
				A2	Ammonia Recovery Vent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NORTH EAST	EAST RIDING OF YORKSHIRE	MIRACLE GARDEN CARE	AL6816	A3	Boiler Plant Chimney	509450	431790	48.9	2.4	1.63	-	-	553	-	-	81883	-	-	-	-	-	
				AIR1	Granulation Plant Stack	475900	426800	48	1.83	10	25	-	303	-	-	-	-	-	19171	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	CRODA CHEMICALS LTD	AK9186	AIR2	American Air Filter Stack	475800	428800	10.5	0.86	4.3	2.5	-	293	-	-	-	-	-	1238	-	-	
				A24	Flue from VT80-01 Steam Boiler	470180	421350	27.5	0.84	-	4.65	-	363	-	-	15836	9734	-	12203	-	-	
				A25	Flue from VT80-02 Steam Boiler	470180	421450	27.5	0.84	-	4.65	-	363	-	-	1157	4175	-	2655	-	-	
				A26	Flue from VT702-20 Thermal Oil	470180	421550	13.7	0.36	-	0.45	-	573	-	-	475	-	-	-	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	BP PLC	AF7720	A1	Amethyst gas turbine compressor	539883	420000	15	2.8	18.7	-	-	611	-	-	41653	-	-	-	-	-	
				A2	RS 211 Turbine	540027	419993	17.75	3.48	15.51	-	-	705	-	-	88773	-	-	-	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	BP CHEMICALS (ADDITIVES) LTD	AN9956	A1	TGCU Stack	516570	428060	75.9	1.27	-	11	-	573	-	-	-	1724000	-	-	-	-	
				G1	Start up vent stack	516200	427800	60	0.76	38.2	17.2	-	283	-	-	7493.3	-	-	-	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	BP CHEMICALS LTD	AN9816	G2	Safety valve header	516250	427800	80	0.25	318.4	15.8	-	293	-	-	201418	-	-	-	-	-	
				G3	K4002 Superheater flue	516300	427800	31.5	0.84	4.5	1.42	-	573	-	-	111.3	-	-	-	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	BP CHEMICALS LTD	AK4567	G4	K4001 Start up header flue	516250	427900	21	1.42	1.28	20	-	283	-	-	389.7	-	-	-	-	-	
				G5	C4001A Seal Chambers Vent	516250	427900	18	0.025	16	0.008	-	293	-	-	389.7	-	-	-	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	BP CHEMICALS LTD	AK4567	G6	C4001B Seal Chambers Vent	516300	427900	18	0.025	16	0.008	-	293	-	-	389.7	-	-	-	-	-	
				G7	Storage Tank annulus purge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	BP CHEMICALS LTD	AK4567	A1	Thermal Oxidiser Stack C26	516720	428370	40	2.88	10.6	64.86	N	1053	-	-	65819	-	-	-	-	-	
				A2	Scrubber D32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
				A3	Distillation Oil Heater C81	516810	428410	36.8	0.9	4.4	2.78	N	573	-	-	100	13990	-	-	-	-	-
				A4	Residues Incinerator C57	516710	428370	36.8	0.84	4.3	2.39	N	-	-	-	-	-	-	-	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	BP CHEMICALS LTD	AK3709	AIR10	SB7 Boiler	518900	428500	30	3.05	7.22	-	A	473	-	-	-	31350	-	-	-	-	
				AIR11	A5 CO plant fired heater	516550	428750	41.5	1.67	-	6.0	-	423	-	-	Y - 318233	135619	-	-	-	-	
				AIR13	A4 CO plant reformer	516650	428750	28.2	1.85	-	42.9	-	423	-	-	Y	135619	-	-	-	-	
				AIR16	A4 CO plant compressor seals C.801	-	-	19.2	0.025	-	2.70E-03	-	-	-	-	-	-	-	-	-	-	
				AIR17	A4 CO plant compressor seals C.803LP	-	-	56	0.025	-	1.53E-02	-	-	-	-	-	-	-	-	-	-	
				AIR18	A4 CO plant compressor seals C.804	-	-	17	0.05	-	6.30E-05	-	-	-	-	-	-	-	-	-	-	
				AIR19	A4 CO plant compressor seals C.805	-	-	17	0.05	-	2.10E-03	-	-	-	-	-	-	-	-	-	-	
NORTH EAST	EAST RIDING OF YORKSHIRE	BP EXPLORATION OPERATING CO LTD	AF7711	AIR20	A4 CO plant cold box	-	-	33	0.08	-	1.00E-04	-	-	-	-	-	-	-	-	-	-	
				A1	H701 Furnace - Shutdown or Standby	-	-	10	2.99	8.5	-	-	td									