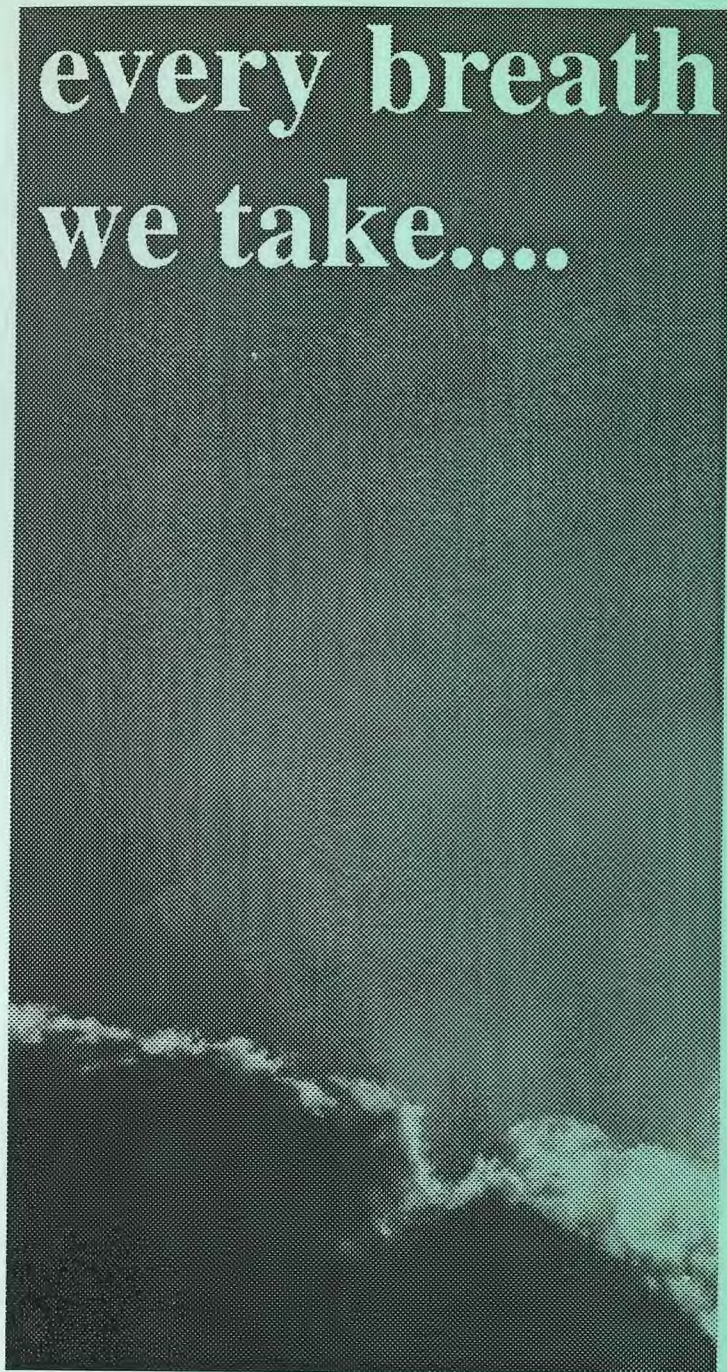


every breath
we take....



Air Pollution in Southwark 1950-1992

pollution trends



Southwark
Council



*environmental
protection
group*



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The nature of this report is such that it relies upon the work of many officers, past and present, in particular those responsible for the collection of data. Although the report has just one author, the content therefore represents the work of many and accordingly I freely acknowledge the contributions made by my colleagues.

Graham P. Love BSc MSc
Environmental Health Officer

| | | |
|-----------|----------------------------|-----|
| | figures & tables | iii |
| | foreword | iv |
| CHAPTER 1 | introduction | 1 |
| CHAPTER 2 | sulphur dioxide | 7 |
| CHAPTER 3 | nitrogen oxides | 19 |
| CHAPTER 4 | ozone | 33 |
| CHAPTER 5 | lead | 37 |
| CHAPTER 6 | carbon monoxide | 47 |
| CHAPTER 7 | radiation | 53 |
| CHAPTER 8 | particulates | 57 |
| CHAPTER 9 | conclusions | 71 |
| | glossary | 75 |
| | index | 76 |

contents



figures and tables



FIGURES

| | | |
|------|---|----|
| 1.1 | Housing before slum clearance | 5 |
| 1.2 | Flatted estates | 5 |
| 1.3 | Southwark's docks | 6 |
| 1.4 | Road usage | 6 |
| 2.1 | London smog of 1952 | 7 |
| 2.2 | Effects of sulphur attack on buildings | 8 |
| 2.3 | SO ₂ monitoring sites | 10 |
| 2.4 | Graph of SO ₂ levels - Spa Road Town Hall | 11 |
| 2.5 | Graph of SO ₂ levels - Spa Road Town Hall | 12 |
| 2.6 | Graph of SO ₂ levels - Peckham Town Hall | 13 |
| 2.7 | Graph of SO ₂ levels - Peckham Town Hall | 14 |
| 2.8 | Graph of SO ₂ levels - Lordship Lane | 15 |
| 2.9 | Graph of SO ₂ levels - Lordship Lane | 16 |
| 2.10 | Graph of SO ₂ levels - Peckham Town Hall | 17 |
| 2.11 | Graph of SO ₂ levels - Keyse Road | 18 |
| 3.1 | NO _x emissions from power stations | 19 |
| 3.2 | NO ₂ monitoring sites | 21 |
| 3.3 | Graph of NO ₂ levels - Evelina Road | 22 |
| 3.4 | Graph of NO ₂ levels - Old Kent Road | 23 |
| 3.5 | Graph of NO ₂ levels - Keyse Road | 24 |
| 3.6 | Graph of NO ₂ levels - Canada Wharf | 25 |
| 3.7 | Graph of NO ₂ levels - Dulwich Park | 26 |
| 3.8 | Graph of NO ₂ levels - Evelina Road | 27 |
| 3.9 | Graph of NO ₂ levels - Old Kent Road | 28 |
| 3.10 | Graph of NO ₂ levels - Keyse Road | 29 |
| 3.11 | Graph of NO ₂ levels - Canada Wharf | 30 |
| 3.12 | Graph of NO ₂ levels - Dulwich Park | 31 |
| 3.13 | Graph of NO ₂ levels - comparison of means | 32 |
| 4.1 | Sea air and ozone | 33 |
| 4.2 | Graph of ozone exceedences | 35 |
| 5.1 | Lead monitoring sites | 38 |
| 5.2 | Vehicles as the main source of lead | 38 |
| 5.3 | Graph of lead levels - Canada Wharf | 39 |
| 5.4 | Graph of lead levels - Dulwich Park | 40 |
| 5.5 | Graph of lead levels - Keyse Road | 41 |
| 5.6 | Graph of lead levels - Redriff Road | 42 |
| 5.7 | Graph of lead levels - Elephant & Castle | 43 |
| 5.8 | Graph of lead levels - Old Kent Road | 44 |
| 5.9 | Graph of lead levels - Evelina Road | 45 |
| 5.10 | Graph of lead levels - Union Street | 46 |
| 6.1 | Carbon monoxide from vehicles | 48 |
| 6.2 | CO monitoring sites | 48 |
| 6.3 | Graph of CO levels - Evelina Road | 49 |
| 6.4 | Graph of CO levels - Old Kent Road | 50 |
| 6.5 | Graph of CO levels - Union Street | 51 |

| | | |
|------|---|----|
| 6.6 | Graph of CO levels - comparison of sites | 52 |
| 7.1 | Radiation monitoring site | 54 |
| 7.2 | Graph of radiation levels - Peckham Rye | 55 |
| 7.3 | Graph of London background radiation | 56 |
| 8.1 | Bankside power station | 58 |
| 8.2 | Particulate monitoring sites | 59 |
| 8.3 | Smoke Control Order | 60 |
| 8.4 | Graph of particulate levels - Acorn Walk | 61 |
| 8.5 | Graph of particulate levels - Acorn Walk | 62 |
| 8.6 | Graph of particulate levels - Aylwin School | 63 |
| 8.7 | Graph of particulate levels - Aylwin School | 64 |
| 8.8 | Graph of particulate levels - Bankside | 65 |
| 8.9 | Graph of particulate levels - Brunel Road | 66 |
| 8.10 | Graph of particulate levels - Peckham Town Hall | 67 |
| 8.11 | Graph of particulate levels - Canada Wharf | 68 |
| 8.12 | Graph of particulate levels - Dulwich Park | 69 |
| 8.13 | Graph of particulate levels - Dulwich Park | 70 |
| 9.1 | Pollution contribution from road traffic | 72 |

TABLES

| | | |
|-----|--|----|
| 1.1 | Pollution episodes mortality | 2 |
| 2.1 | Air Quality Standards for sulphur dioxide | 9 |
| 2.2 | DoE Air Quality categories for SO ₂ | 9 |
| 2.3 | WHO sulphur dioxide guidelines | 9 |
| 3.1 | Air Quality Standards for nitrogen dioxide | 20 |
| 3.2 | DoE Air Quality categories for NO ₂ | 20 |
| 3.3 | WHO nitrogen dioxide guidelines | 20 |
| 4.1 | Ozone thresholds | 34 |
| 4.2 | WHO ozone guidelines | 34 |
| 4.3 | DoE Air Quality categories for ozone | 34 |
| 4.4 | Ozone exceedences | 36 |
| 4.5 | Ozone exceedences | 36 |
| 5.1 | Air Quality Standards for lead | 37 |
| 5.2 | WHO lead guidelines | 37 |
| 6.1 | WHO carbon monoxide guidelines | 48 |
| 8.1 | Particulate size and respiratory deposition | 57 |
| 8.2 | Air Quality Standards for smoke | 59 |
| 8.3 | HD vehicle emission limits for particulates | 59 |
| 9.1 | Vehicle pollution control options | 74 |

PREFACE

I am pleased to introduce the first Pollution Trends Report for the London Borough of Southwark. This Council has a long standing priorities programme which includes specific actions and targets for improving our environment and making the Borough cleaner, greener and safer. These are aimed at making **Southwark a better place to live**. The improvement of our environment in general and the control of pollution in particular are central to a number of initiatives implemented to meet this aim.

In 1994, during National Environment Week, we launched our Environmental Information Pack which confirmed our commitment to the environment. Ahead we have the challenge of implementing Local Agenda 21, the result of the Rio summit of June 1992, to promote sustainable development and broader environmental concern.

We shall continue to promote public transport, energy conservation and recycling all of which will improve air quality in our Borough. To this end we are integrating action for the environment with other economic, educational, planning and leisure initiatives to regenerate the Borough. This will take time and requires collaboration and partnerships with the community.

Information about our environment is essential to this process. This report is therefore a key first step in the provision of information which will influence future action.

Councillor Jeremy Fraser
Leader of the Council

POLLUTION TRENDS

EXECUTIVE SUMMARY

Concern about air quality is not a recent phenomenon. Significant changes to the composition of the atmosphere are relatively recent although major pollution episodes were experienced, in particular in London, since before the Industrial Revolution. This concern about our air quality has increased throughout this century as the quantity of emissions and number of pollutants rose. "London Ivy", the euphemism for the smogs of the first half of the century, provided both the evidence of the direct health effects of urban pollution and the imperative to tackle the causes of such episodes by legislation.

At the time of the London smog, sulphur dioxide and smoke were regarded as the most important pollutants and legislation was introduced, by way of the Clean Air Acts, to improve air quality related to emissions of these two pollutants. The outcome of this action and its enforcement by local authorities is clearly indicated by the results included in this report.

During the 1970's and 1980's attention focused on increasing lead concentrations due to dramatic increases in the use of cars. Again a great deal of success can be seen in reducing this pollutant as highlighted in the body of the report.

An increasing volume of legislation, largely emanating from European Directives, has appeared during the last two decades reflecting both the increasing importance given to the environment and the changing nature of atmospheric pollution. Our work continues.

Fred Manson, Director
Regeneration and Environment Department

foreword



introduction



THE PURPOSE OF THIS REPORT

General concern about the environment is probably at its highest ever level. Awareness of pollution and its effects have been raised at both the global level through for example concerns about the greenhouse effect and depletion of the ozone layer to local issues such as vehicle pollution and air quality.

In part this has been the aim of Environmental Health practitioners throughout the world and in particular at the local level. To sustain this interest and further promote environmental awareness requires information to be readily available to enable everyone to understand the problems and influence the process of corrective measures.

This report attempts to provide information on air pollution in Southwark in a manner that enables long term changes to be considered. This differs from the annual pollution reports which have been produced in the past. This report therefore, in contrast, should be viewed as a *pollution trends report* and covers the period from 1950 to 1992.

The report should also be seen in light of the recently launched Southwark Health Charter, a joint commitment of Southwark Council and Lambeth Southwark and Lewisham Health Commission. Several pollutants are implicated in or impact upon a number of key health priorities identified within the Charter.

Lastly the report provides a vehicle for the promotion of the aims of the current EU funded LIFE project and Air Aware programme addressing the major pollutants and air quality concerns at the present time.

THE SCOPE OF THE REPORT

This report deals only with air pollution and illustrates the changes in pollution levels and the underlying reasons for such changes.

Specifically it deals with some of the most significant pollutants affecting Southwark residents, namely;

- sulphur dioxide
- particulates
- nitrogen dioxide
- ozone
- lead
- carbon monoxide
- radiation.

Each pollutant, its health effects, sources, standards and levels over the relevant monitoring periods is dealt with in a separate chapter. It is important to remember however the synergistic nature of many pollutants eg. sulphur dioxide and particulates. It is also worth noting that many aspects of pollution have global implications such as acid deposition, the greenhouse effect and ozone depletion.

Although many of these pollutants occur indoors this report is concerned only with ambient or outdoor pollution.

The report is not intended to be a technical manual and therefore excludes specific details of the monitoring techniques and equipment used, analytical methods and the collected raw data.

A limited glossary is included on page 75 for reference.

WHAT IS AIR POLLUTION?

All air contains natural contaminants such as pollen, fungi spores and smoke and dust particles. It also contains naturally occurring compounds such as carbon monoxide, hydrocarbons and methane.

Air pollution can be defined as the presence in the outdoor atmosphere of one or more air contaminants in sufficient quantities, of such characteristics, and of such duration as to be, or threaten to be, injurious to human, plant or animal life or to property, or which reasonably interferes with the comfortable enjoyment of life or property.

This definition encompasses the broadest possible definition of air pollution and has been embodied in various Acts of Parliament. It acknowledges that pollutants may be of natural origin as well as man made.

Air pollution has been noted throughout history as being of concern to man and early controls were driven largely by pollution episodes causing increased morbidity and mortality as highlighted in Table 1.1.

Table 1.1 Reported mortality occurring during air pollution episodes in London

| Year | Month | Excess deaths |
|------|-----------|---------------|
| 1948 | Nov - Dec | 700 - 800 |
| 1952 | Dec | 4000 |
| 1956 | Jan | 1000 |
| 1957 | Dec | 700 - 800 |
| 1959 | Jan | 200 - 250 |
| 1962 | Dec | 700 |
| 1963 | Jan | 700 |

GENERAL HEALTH EFFECTS

Air pollution can cause severe and immediate ill effects (acute) as well as long term (chronic) effects. Ambient air pollution does not however affect the health of exposed individuals with equal severity. It is widely accepted that particular groups of individuals are at a greater risk of suffering adverse effects when exposed to a given level of air pollution than the general population although all individuals may suffer ill health if exposed to very high levels of pollution.

People may be more susceptible due to their age, sex, medical condition, where they live and their job or other activities. Various groups of individuals have been identified as populations at risk including;

- pre-adolescent children
- individuals with asthma
- individuals with other respiratory diseases
- individuals with cardiovascular disease
- people over 65
- pregnant women and unborn children.

Determination of health risk is not static. As knowledge evolves and new information becomes available our understanding improves and new interpretations and evaluations of health risks are made. Similarly our concept of ill health is dependent on our perception of good health. Levels of pollution which may have been accepted in earlier times are not necessarily acceptable today.

It remains difficult however to assess the overall impact of air pollution on local people's health despite the known health effects of individual pollutants. Although conclusive evidence linking incidence of illness to pollution is lacking it is clear that a reduction in air pollution enhances the quality of life of our residents.

introduction



Introduction



MONITORING AIR POLLUTION

Air pollution has been monitored in what is now the London Borough of Southwark by a number of organisations since 1914. The main organisations include the London County Council (LCC), the Central Electricity Generating Board (CEGB), the Metropolitan Boroughs of Camberwell, Southwark and Bermondsey and, since 1965, the London Borough of Southwark.

Some monitoring, smoke and sulphur dioxide for example, has also been undertaken as part of wider monitoring programmes coordinated by government bodies such as the Warren Springs Laboratory or, more recently, as part of innovative programmes such as the London Air Quality Network co-ordinated by the South East Institute of Public Health (SEIPH).

The type of monitoring undertaken has largely been dependent on the availability of sampling and analytical techniques. For example at the turn of the century simple deposit gauges and smoke filters were first developed and used by the Meteorological Office. During the 1930's, 40's and 50's, when monitoring was primarily aimed at smoke and sulphur dioxide, smoke stain reflectometers and volumetric apparatus together with grit and dust deposit gauges were the norm.

As analytical technology developed, enabling measurement of the very low levels of pollutants in the ambient air, other pollutants became subject to continuous monitoring. During the 1970's for example, when success in the control of smoke and sulphur dioxide was notable and general public concern once again focused on environmental issues, other pollutants such as nitrogen oxides and carbon monoxide became subject to regular monitoring.

WHY MONITOR?

In the past monitoring was primarily undertaken to support research into the effects of air pollution or in response to specific pollution episodes.

As greater awareness and concern for our environment developed the rôle of air pollution monitoring expanded accordingly. Specific monitoring of ground level concentrations now encompasses much broader objectives including;

- confirmation of predicted patterns of dispersion of pollutants from specific sources
- identification of areas that are subject to the worst air pollution
- assessment of the need for emission controls and feedback on such controls
- monitoring minimum air quality standards
- evaluation of changes or trends and the collection of historical records
- confirmation of the effect of legislative controls
- improvement in the understanding of the way pollutants interact

STANDARDS

Ambient environmental standards for each pollutant are given in the relevant chapter. It should be noted that only those values deriving from European Union (EU) Directives are enforceable through UK specific legislation.

EU values are based on statistical analysis and therefore require evaluation over a period of time to determine compliance. WHO guideline values are more stringent and based on single pollution episodes ie. short term exposure to actual events. Department of the Environment air quality bands were devised to provide a qualitative assessment of air quality based on thresholds of perceived health consequences.

In all cases where standards are given in tables they are presented in the units determined by the relevant body. Where necessary and to make comparisons possible conversions have been made assuming an atmospheric pressure of 101kPa and a temperature of 20°C (ATP).

REGULATORY CONTROL

The control of pollution in the UK during the period covered by this report has been through legislation and regulations based on the "Best Practicable Means" principle established over 150 years ago. Although introduced primarily to control industrial emissions the principle has been extended to apply to 'lesser' polluters such as those covered by the statutory nuisance provisions.

Enforcement of air pollution legislation has traditionally been through a number of agencies such as the Alkali Inspectorate, HM Inspectorate of Pollution and the Health and Safety Executive.

However, the most significant agency in Southwark, especially in recent times, has been the Council exercising, through its Environmental Health Officers, control over industrial, commercial and domestic pollution.

Current air pollution legislation is largely embodied within a single act, the Environmental Protection Act 1990, giving powers under Part I to deal with prescribed processes and, under Part III to deal with statutory nuisance. Within the last 50 years the local authority has enforced, and in some areas continues to apply, the provisions of other legislation having a profound effect on our environment. Principal amongst these have been;

- Public Health Act 1936
- Clean Air Act 1956
- Clean Air Act 1968
- Control of Pollution Act 1974
- Control of Smoke Pollution Act 1989

Significant by its omission in all of the above was any means by which a local authority could control emissions from vehicles. Although for example the Control of Pollution Act contained the provisions for regulating the content of motor fuel the regulations were not enforceable by local authorities. The only direct control of vehicle emissions has been under the Road Traffic Acts enforced by the police.

A further principle, deriving from the UN Conference on the Human Environment in 1972 and adopted by the European Community in the First Action Programme on the Environment (1973-1977), is that of the "Polluter Pays Principle". This is most notably exercised in the UK by the provisions of Part I of the Environmental Protection Act and was reiterated at the Rio summit in 1992 as the basis for further action.

introduction



introduction



SOURCES IN SOUTHWARK

In order to understand the trends in local pollution it is necessary to consider the social and economic changes that have taken place in Southwark over the last 40 years. The environmental evolution of the borough provides an insight into many of the observable changes that have occurred in pollution levels.

Prior to 1965 Southwark comprised three Metropolitan Boroughs each with their own particular problems, independent funding and differing priorities. For the majority of the period covered by this report there existed a London strategic authority, initially the London County Council (LCC) and latterly, until its abolition, the Greater London Council (GLC). Both played a significant rôle directly and indirectly in relation to pollution monitoring and control.

One of the most significant factors affecting pollution sources has been that of housing, an issue tackled by both the strategic authorities and the borough councils.



Figure 1.1 Typical Southwark housing before slum clearance showing tenement blocks with a proliferation of chimneys.

Massive slum clearance programmes led to the demolition of thousands of dwellings in tenement buildings and terraced houses to be replaced largely by flatted estates. This, coupled with the promotion of Garden Cities and New Towns, saw the population of Southwark slowly decline from its peak of over 300,000. The predominant form of heating in the Victorian slums was open fire coal burning. Central heating is a relatively recent introduction although district heating systems accompanied the construction of the large estates during the 1950's and 1960's using mainly gas or electric driven warm air systems.

The Clean Air Act of 1956 introduced Smoke Control Areas (Smokeless zones) enforced initially by the three Metropolitan authorities. By 1975 $\frac{2}{3}$ rds of the then London Borough of Southwark was controlled with completion in 1988. The application of this Act, and later the 1968 Act, together with the slum clearance programme led to significant changes in heating methods for residential accommodation. This transitional period also saw the introduction of smokeless fuels in the mid-60's.



Figure 1.2 Construction of large flatted estates and the declaration of smokeless zones changed the nature of local pollution.

Transport has also been the subject of significant changes in the borough with Southwark continuing to provide through routes to central London by rail and road.

Although passenger trains were the first to be electrified, goods continued to be moved by steam trains and subsequently diesel until the early 1960's. Direct use of fossil fuels was the norm up to this time. The Bricklayers Arms depot, in full use at the time of the beginning of this report and the source of much local pollution has now been redeveloped primarily for residential use.

The river Thames provided a commercial artery with coal fired steam boats transporting goods to the dock areas with their steam cranes and derricks until their demise in the early 60's.



Figure 1.3 Part of Southwark Docks with Enthovens lead works on the river front - the site of a major pollution episode in 1972.

Public road transport in the 40's and early 50's was by trams and petrol driven buses to be replaced by the now exclusively diesel driven fleet.

Until relatively recent times there were few privately owned cars belonging to Southwark residents but our roads provided major commuter routes to central London. Although car ownership in Southwark rose dramatically in line with national trends in the late 60's and continues at the present time the level of ownership is typical for an inner city area. Commuter and through goods traffic remains a significant proportion of vehicles on our roads.



Figure 1.4 Road usage in Southwark has continued to rise due to its strategic location in London.

The main industries in Southwark were inherently polluting and particularly odorous and included tanneries, soap manufacturing, wood trading, lead and aluminium smelting and oil refining. Most have now disappeared with the redevelopment of the Surrey Docks.

